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Personal Meaning Mapping in Context of Digital Humanities Pedagogics

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Abstract — The study aimed at assessing visitors' learning and perception using the Personal Meaning Maps methodology. The study was conducted within the course "Museum Information Systems", implemented under the Program "Applied Informatics in Arts and Humanities..." of Saint Petersburg State University according to the University requirements. Thirty-five third-year bachelors (19–22 years-old) took part in the experiment.

Quantitative and qualitative analysis of the collected data showed interesting results. Indeed, we can state that PMMs allow studying new knowledge of specialists in the field of Digital Humanities. Also, we observed that PMMs, used as a pedagogical and research tool, activates both common theoretical knowledge of learners and the students' personal experience, allowing them to gain a more complete picture of the scientific phenomenon as well as of a historical fact.

Keywords: Personal Meaning Maps, Digital Humanities, Blended Learning

1. INTRODUCTION

In this paper, we aimed at assessing visitors' learning and perception about a topic or a masterpiece when visiting a museum. With this aim, we used the Personal Meaning Maps methodology, commonly used for museum experiences and thoughts. The study presented here started by a previous study [19] on a scientific museum adapting and extending the methods implemented to fit the requirements of a cultural museum.

This approach consists of a qualitative investigation that takes into consideration the background of a visitor before the visit and the gained knowledge and changes after the visit itself.

It is also used not only to assess knowledge, but also as an expression of personal perception about the topic or tour. The results, thus, may be interpreted through a quantitative analysis.

Also, other works [2] have been presented on this topic, particularly taking into consideration the priming approach and the application of EEG-based Brain Computer Interface [7, 10] to collect EEG-data from visitors and quantitative methods to analyze changes in focusing and memory ability. Brain-Computer Interface devices, which are a simplification of medical EEG, allow collecting brain signals related to users' response to specific stimuli in real-time, through dry or wet sensors positioned on individuals' scalp. The devices are connected to a computer via Bluetooth enabling real-time data collection and analysis, this latter performed by Artificial Intelligence (Machine Learning) algorithms.

The Personal Meaning Maps methodology is particularly useful because it encompasses a more situated and contextualized vision, which takes into account also perception, emotions, cognitive biases, social interactions, and motivations, as equally important in the learning process [3]. Traditional approaches, that do not take situational aspects into consideration, come, for examples, from cognitive psychologists [8] who see the learning approach as a top-down teaching where learning would be simply mean storing an abstract code in the mind.

Instead, a more complex vision deems learning as a process of negotiation between the participant and the environment [6].

For instance, considering scientific concepts, learners develop flexible and coherent representations [4, 15,17] that allow connections among different conceptual and experiential domains. In this way, a concept is not only the result of deductive and inductive processes, but they also include contextual characteristics and personal experience as well, which help to build a rich representation of the phenomenon.

For this reason, a change in the teaching methods is needed, to a more situated, active and engaging approach, which would promote the learner's own sense-making and learning [18].

A natural context in which this can be more likely achieved is the museum, which is an informal context that may push for «free-choice learning» [9].

Moreover, museums are social context with a strong role in lifelong learning, and such learning is multi-faceted, rich and complex, thanks to the multiple stimuli and factors at play. However, the impact of the museum experience of learning is not easily measurable, also because each individual plays an active role in shaping his or her own learning path.

Further complexity comes from the need to implement distance or blended learning settings. In fact, the recent Covid-19 pandemic has forced many educational agencies to adopt methods that, if not entirely new from a technological and applicative point of view, are certainly innovative with respect to the methodologies adopted by traditional university courses as well as museums. This has forced practitioners to move onto new horizons, with the need to adapt their methodologies to the emerging context. Similarly, students as well as museum visitors have had to adapt themselves to the new situation without a real support about how actually to adjust to the new situation. It is well known that distance learning, in all its different forms, can heavily affect cognitive processes, especially memory and attention. However, at least from our point of view, it is the interactive dynamic between teachers and learners and between peers that were mostly affected by the new education setting with a great impact on the pedagogical process [11] In this sense, the use of methodologies such as those used in this study can be particularly effective in stimulating meta-cognitive processes underlying a work that involves reflection, divergent thinking and convergent thinking, thus placing itself at a level somewhere between a creative work in the strict sense and a didactical one. This kind of cognitive work is precisely what is often missing in at-distance education. Moreover, such methodologies can be used as an effective tool to stimulate teacher-learner and peer interaction [16] becoming an important compendium to at-distance or blended learning.

For all these reasons, the visitor's learning in such a context must be evaluated with a methodology capable to grasp the qualitative and multi-faceted nature of knowledge development, that is, must be able to capture the individual perspective of each visitor.

2. PMM APPLICATION TO BLENDED LEARNING AT UNIVERSITY

The study was conducted within the course «Museum Information Systems», implemented under the Program «Applied Informatics in Arts and Humanities» of Saint Petersburg State University according to the University requirements. The Course objectives are the development of students' competencies aimed at designing, presenting, evaluating various digital humanities resources. Peculiarities of pedagogical approaches allow promoting

knowledge and skills that reflect equally humanitarian and technological components of cultural objects. This is one of the current issues of contemporary digital humanities pedagogy.

Training sessions include thirty-two hours of face to face classroom work and thirty-two hours of self-study. The independent student activity is carried out in the virtual section of the course, which is published on the Saint Petersburg State University e-learning platform (LMS BlackBoard). The face to face part of the course is held as lectures, seminars, discussions whose topics include the following units: Introduction to Museum Studies, Main directions of Information Technologies Application in a modern museum, Digital Cultural Heritage. A special place is given to the specifics of information technology deployed for exhibiting of museum objects in the museum space and the Internet. In this regard, the "virtual museum" is one of the significant terms of the course.

Fifteen years cooperation between the State Russian Museum and Saint Petersburg State University in the framework of the international project «Russian Museum: Virtual Branch» opens up broad opportunities for understanding the theoretical aspects of the phenomenon and their practical implementation at the modern museum.

The students are provided with media library materials, which include almost 3000 electronic and print publications. Also, students can attend the virtual lecture hall of the Multimedia Center of the Russian State Museum. At the same time, face to face meetings with the museum's specialists at the University or the Museum are of particular importance. This common work served as the basis for the implementation of an experiment to explore the prospects of PMMs application to the educational process.

A guided tour around the thematic multimedia exhibit «Our Romantic Emperor», dedicated to the era of Paul I, was held at the Multimedia Center of the Russian Museum. Students have presented in detail the works of painting, drawing, applied art, filmed in the highest quality, the bachelors' learned about the types and genres of fine art, artists and styles, as well as the process of restoration, attribution of paintings. During the visit of the exhibition, there was an expert who accompanied and introduced the visitors to the life of Emperor Paul I, members of his family and courtiers on the basis of historical facts recorded in works of art and museum objects. The guide's story was completed by an individual study of the exhibits, based on interaction with them.

Thirty-five third-year bachelors (19-22 years-old) took part in the experiment.

They were asked to complete two types of PMM: one dynamic and one static. In this case, a dynamic PMM refers to a map that is filled during the semester, and a static PMM is a map that is designed within 2-3 hours before and after the tour. A set of control materials was then created based on a static PMM, and a set of experimental materials was formed starting a dynamic PMM.

3. DISCUSSION and CONCLUSION

As a result of the experiment, it was revealed that PMMs allow studying new knowledge of specialists in the field of Digital Humanities. At the same time, it is necessary to take into account that the filling out of PMM is intended to have the museum visitors reflect and think about information and about the transformation of their knowledge. In a university context learning situation, the use of PMMs is a valuable method to obtain significant and rich feedback. This last phase of the learning process represents a fundamental component of the pedagogical process, alongside with the participation in lectures and seminars, and independent work in an electronic environment.

Therefore, in order to achieve success as university education goals, an adaptation of the PMM method was carried out. Two groups of PMM were defined, namely, dynamic and static. Dynamic PMMs (dPMMs) are used to reflect the student learning outcomes in the learning process which includes museum guided tours. Static PMMs (sPMM) are applied to

record the results of only the museum guided tour. In this experiment, sPMM (static maps) performed the function of control materials, allowing to evaluate the experiment results.

Firstly, based on the fact that students present scientific concepts as flexible and consistent statements [4,15,17] , which allow establishing connections between various theoretical and experimental areas, PMMs allow to follow the process of gradual development of four knowledge levels of the students: from repetition and conceptualization at stages 1 and 2 to demonstrate the capabilities of strategic and advanced thinking at stages 3-4. It is significant, that this pedagogical tool activates not only common theoretical knowledge of learners but also the student's personal experience, which altogether allows them to gain a more complete picture of the scientific phenomenon as well as of a historical fact.

Secondly, PMMs allow each student to create a "baseline" as the starting step for a discussion, thus allowing the development of knowledge by a peer-to-peer interaction as well as other significant interactions. This is coherent with the idea that knowledge follows from a negotiation between an individual and the environment [16].

Finally, museums are natural environments, which allow acquiring knowledge in an informal context of learning and realize «learning by choice» [9]. PMMs assist students to enhance interaction's competencies in a cognitive environment, the museum's collections in this case. Museums can play an important role in lifelong learning. Here lies the third advantage of PMM implementation/application to university education.

One of the most significant trends in the information society education is the possibilities of each person to play an active role in designing a life long learning trajectory, determining its content, duration, location and so on. In this situation, traditional approach to learning as "top-down" process of creating repositories of abstract and common to all codes in students' brains is adjustable by on-demand educational paths.

This new is based on concepts aimed to train professionals in the use of methods, which allow the creation and monitoring of their own path throughout their lives. In this regard, the view of a pedagogical system as a whole, with a particular focus on the feedback system, is rapidly changing.

In this context, the research of experts' groups with pedagogical skills, considered in this paper as a community of novice professionals, becomes relevant. Every beginner scholar has individual characteristics, perceptions, emotions, social interactions and motivations that affect the learning process and generate cognitive distortions. Identification of the characteristics of each student (future scholar) allows them to take into consideration all these features when organizing feedback based on peer-to-peer assignments, discussions of educational topics, etc., which leads to the student's knowledge development. Such an approach, in turn, allows developing innovative methods aimed at the growth of the students' competencies, that are demanded in the modern academic community. One of such techniques is the Personal Meaning Maps, which may be used at different levels with different goals. In particular, as shown in this study, PMMs may be used to assess the personal experience, the enrichment of specific knowledge as well as emotion and other social aspects. Furthermore, PMMs may be used to measure changes in knowledge organization and consolidation at short, medium or even long run. Finally, PMMs can be considered a valid and easy-to-use method to be applied to a variety of contexts. In this view, PMMs are also educational tools that the students will be able to use in their future professional life.

Further development will consist in performing a quantitative analysis of the collected data and in designing and developing a tool allowing to fill a digital version of PMMs. This way it will be possible to test the hypothesis that PMMs may be used in at-distance setting both to stimulate cognitive and interactive processes. We believe that digital PMMs might be useful both for higher education and museum didactic pathways. Also, we intend to continue the study by including in the research the collection of EEG data from visitors. This further step could be done using dry sensors EEG-based BCIs which appear to be the best choice in our case. Indeed, thanks to their low cost and especially to their communication protocol, users would be free to move without feeling stressed or limited. The collected signals wouldn't, so,

be influenced by noise due to factors different from the response to the stimuli we are interested in.

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