The Education of Information and Knowledge Management of Cultural Heritage

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Abstract

The information and knowledge management (IKM) of the cultural heritage is one of the permanent issues for the professionals working on the preservation, management, demonstration and education fields. By time it has to be reviewed regularly, how the information and knowledge needs of the cultural heritage stakeholders – authorities, site managers, researchers, museologists, teachers, trainers, tourism experts, etc. – change, as well as when and how to deliver them. According to the strong influence of the new information and communication technologies, such as mobile, cloud, 3D scanning and printing, virtual reality, semantic language technology, etc., we have to rethink the methods and content of the education programmes. This paper suggests some education developments based on the practical definitions of IKM.

Keywords: *cultural heritage, information, information management, knowledge management, education strategy, education program*

1 Introduction

The information and knowledge management (IKM) of the cultural heritage is one of the permanent issues for the professionals working on the preservation, management, presentation and education fields. By the time passing, it has to be reviewed regularly, whether the education programs or the education strategy behind them are still valid or should be updated. Especially, because of the dynamics of the social and economic environment nowadays, it is inevitably a must to revise, how the information and knowledge needs of the cultural heritage stakeholders – authorities, site managers, researchers, museologists, teachers, trainers, tourism experts, etc. – change, as well as when and how to deliver them. According to the strong influence of the new information and communication technologies, such as mobile, cloud, 3D scanning and printing, virtual

reality, semantic language technology, etc., we have to rethink the methods and content of the education programmes.

The following chapter briefly summarizes a general evaluation method to check the need for the revision of the education strategy. Later sections will focus on the selected area: the contemporary definitions of IKM and their impacts on cultural heritage education as the consequences of the changes in our socio-technical environment.

2 Questions for the education strategy

Generally, strategic plans can be understood and implemented from long term perspectives of the organization. The mission statement of the organization, the national goals announced in the constitutions or in long term national political programmes, the political level goals originated by governments or institutional owners and the organizational politics, the vision and the values declared by them, as well, provide them with a foundation and frame for that purpose. All of these can be summarized in the following framework. (Figure 1)

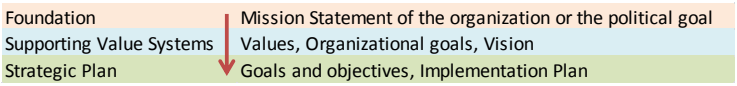

Figure 1: Organizational strategy framework

Derived strategies, like the education strategy have to be stemmed from the general strategy of the organization or the state including the educational goals, objectives and the implementation plan. As it can be supposed that all the institutions have one, the question is which indicators can show time to revise the education strategy, if the strategy framework (see Figure 1) did not change. Six dimensions or points of views represented by 6 questions are suggested for this analysis.

a) Whom? – Audience How is the audience and are there any changes in their demographic, behavioural, social, cultural and economic attributes, since the strategy plan has been elaborated? Strategy planning and project planning are using stakeholder analysis, a fundamental method for identifying and understanding the members of the structure in the affected social environment. For the cultural heritage education, the organizational stakeholders are the state, the authorities, municipalities, affected non-profit and occasionally religious organizations, the sites and institutions. They are represented by people, so if we wanted to teach the organizations, we have to teach their staff. Thus, authority decision makers, mayors, officers, clerks and administrators, site managers, researchers, museologists, teachers, trainers, tourism experts, as well as visitors and the local citizens are affected. The cultural diversity, e.g. the new generations have more skills

for using new technologies, the old school decision makers have aged decision making reflexes, the citizens and the village people have different mind-sets regarding local values, the multicultural background of the visitors, etc. are just single attributes which changes can trigger the education strategy and plan revision processes.

b) Why? – Reason The reasons to educate are to satisfy the interests of the stakeholders:

- decrease the uncertainty, particularly among the decision makers
- a decision situation needs various points of view of deeper understanding
- answer to the stakeholders' needs, even if it is information, knowledge or solution for a problem; or, at last but not least,
- satisfy their interests and curiosity.

In many cases, someone wants to change the ways of thinking or the followed cultural values of his or her partners, audience or community, even if it is originated from a mission or a business goal. This is a reciprocal situation: the communication wants to raise interest in opening the minds for the education content. If there is no inspiration or motivation to learn, the education process will have low efficiency or will fail. (Ormrod, 2008)

c) When? – Time In the last decades the foundations of the classic Prussian education methods have been undermined. Partly, because of the time pressure: the labour market needs practice oriented, experienced and skilled workers as early as possible – the importance of the strong theoretical background became secondary. Thus, the majority of the big auditorium lectures is replaced by seminars, practices, labs, team works and projects. On the other hand, the quick development of science, the technological environment and the fast change of business hypes and trends, the lifelong learning have become a fundamental component of the everyday life. This requires the most effective use of business – and more and more the private – time, while the communication and media noise mentioned above compete for all the available time fragments and attention. Moreover, based on the statistics of the usage of online services, it is evident that the length of the sessions is decreasing, users focus less and less time to one topic or activity. (Statista 2016)

These conclude in the following situation: education should leave the ordinary schedules of the schools and other classic learning services. Anytime, when their attention can be grabbed, the audience should tried to be taught, to be delivered information and knowledge. Anytime – 7/24/365 – the education should be accessible and available.

d) Where? – Venue Hand in hand with the disappearance of the dedicated learning time frames, the importance of the location for education processes have weakened, too. While some special infrastructure or environmental needs keep the labs and education centres alive, simulations, virtual environments, 3D modelling, elearning etc. help to become the

location independent in the education processes. Nowadays education is leaving the walls of the schools and other classic learning venues and situations. In most cases, anywhere in the physical and digital space around the Globe, the service should be available, where the content and the learners can meet, as well as teachers, trainers, consultants can be involved into this process in the same way. The challenge is to achieve the mindfulness, the attentive presence of the audience even in a virtual space.

e) What? – Content The reasons, questions and interests are vividly changing but the nature of them is not: information and knowledge is needed – the things which are really useful in the given situation.

However, this is just one of the weakest points in the everyday education and communication practice. Millions of pages of documents, terabytes of data, thousands of posts, videos, pictures, etc. are flooding from every corner of the world, hardening the effective working or learning processes. For the visitors, as well as for the professionals, this seems to be a very strong audio-visual noise. If someone would like to reach his or her target audience with a message, it usually ends in a lauder and forced communication. The consequence is a more and more intensified, noisy communication pressure, besides the huge flow of documents and messages turning it into a "mission impossible". Consequently, this is not the right way. That is why the next chapter details the nature of the information, knowledge and some aspects of their management.

f) How? – Methodology Raising inspiration, giving motivation, showing up credibility, giving feedback during the entire learning cycle and awarding the results are fundamental in the education process. Less formal presentations, less theories and dry texts but more involvement, experience provision and challenges, games and role plays are required to grab and keep the attention of the audience in the strong media noise. Establishing a container as a trap or contextual shell can ensure the conscious presence of the visitors. This is the way how contents and the delivery channels have to be tailored to the attributes of the audience.

3 The nature of data, information and knowledge from the visitors' perspectives

In order to understand information and knowledge, we have to go back to the meaning of the following terms: sign or signal and data. In the literature a broad scale of definitions can be found, as well as a series of hierarchic and multidimensional models have been built and then extensively debated regarding the relation of these five terms: sign, data, information, knowledge and wisdom to each other and to such ones, like skill, proficiency, competence, experience, expert, master, system, organization, technology etc. (Kiss, 1998) (Wiig, 1993) (Z. Karvalics, 2015) Nevertheless, according to the latest results, most of these models have

been misleading, because of the lack of solid foundations: the clear definitions of the five core terms. (Frické, 2007) (Rowley, 2007) (Z. Karvalics, 2015) Thus, leaving the models out, the nature of the five fundamental terms has to be reconsidered at least form the practical perspective. There are some simple definitions which express the usability values of them for everyday people.

3.1 Sign

Signs (and signals) are representations of facts; they even are results of personal or community actions, technical events or natural phenomena. (Kiss, 1998) In the science of signs, semiotics, the sign is defined as something which has a meaning, or as something which is more than itself. They are exact, but in many cases, we cannot understand their meaning without the proper context or reference. E.g. the sign on Figure 2 could mean a Greek letter: pi; the character #5143 in the Unicode UTF-16 code table; the irrational value 3.1415926535… in mathematics; symbol of the yuan, the Chinese money; origin or the beginning in Japanese; unbroken, integrant, entire in Vietnamese; could mark the meaning of a variable noted with pi; could symbolize the ratio between the perimeter and the diameter of a disk; a small chair, a gate, etc.

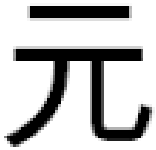

Figure 2. A simple sign

The missing cultural background or knowledge or misleading memories of the observers or visitors can be a barrier for proper understanding. For decoding the meaning of the relevant knowledge of the relevant code is necessary, like the Rosetti Stone for understanding the hieroglyphs.

3.2 Data

Data is a descriptive attribute of a fact. It can describe the origin of the sign, what happened, when, where, etc. (Kiss, 1998) If we find for example a simple sign written on a wall like in Figure 1, according to this definition, we can generate a big set of data about it. Location data could be e.g. geographic positioning system (GPS) coordinates, map references or access route descriptions. A sketch, a scaled drawing, a painting or a photo could be the visual description of the sign, dimensions in millimetres, colours, drawing/painting technique, geographical directions on the wall surface, etc. can refer to the appearance, as well. Furthermore, the description of the meaning can be naturally added. Evidently, this could also be subjective: which context we should use to understand the meaning of the sign. The context can be a reference to an alphabet or to a code table, a reference can pointing that it is a symbol or a local or an international sign standard, etc. At

the same time, it is a data quality issue whether we use the proper context or not, whether we explain the meaning of the sign correctly.

The descriptive data about data are called meta data. It could be e.g. the time stamp of the photo about the sign, the name of the person who found it, the geographic position from which the photo was shot, etc. Data and meta data can be information, as well, and are subject of data quality measures, too.

3.3 Information

Information is a data, which is relevant to the subject of the communication, is needed or interesting for the receiver party and it changes the actual level of knowledge as well as has a credibility measure. (Kiss, 1998) The relevance and the need for a given piece of information or the interest to know it, are fundamental requirements. If the content of a news, message, explanation, teaching, report, guidance or introduction does not interest the audience (the receiver, the visitor or colleague), the message will not initialise any influence, impact, it will just remain data. The need or the interest can be originated from personal and community deficiency or uncertainty. The relevance can be defined, as the data behind the information fitting into the context and the explanation of the fact or sign is coming from the relevant point of view of the subject.

The term “changes the actual level of knowledge” means that the information can be confirmative or contradictory: weakens our knowledge about the given subject or underlines and strengthens it. This is the attribute of information which is commonly simplified to “information is something new”. Consequently, if someone presents data instead of information, he or she is wasting the time and resources of the receivers, the audience and gets them bored or upset. Whereas the above definition of information recalls the context relevance issue of the data, as a part of credibility, as well, using a trust focused point of view.

3.4 Credibility of the information

The level of trust in the source of information is a fundamental factor in the final impact presenting which information can achieve change of the actual level of knowledge. The low level of trust, which is equal to the low level of credibility, can eliminate the influence of information about a surprising event. Thus, for the quality information delivery, it is necessary to make a distinction among facts, misleading or wrong data, rumours and gossips. Traditionally, the respect of the elders, teachers and higher officials has granted credibility for their statements and communication but unfortunately, the situation has been dramatically changed. The publications and the opinion of the relatives, friends, friends of

friends and general public have a dynamically increasing impact on information, on travel plans, as compared to the official materials like travel guides and official homepages of heritage sites or the information provided by tour operators, TV, radio and newspapers.

The trust depends on the communication channels. The opinions of visitors, event participants, everyday people are credited much higher than the experts' or professionals' in the Facebook or other social media posts. (Zhang et al. 2010) In 2015, 83% of the people trusted in recommendations from people they know (78%-88% spread in regions), while consumer opinions posted online and the editorial content, such as newspaper articles gained 66% trust, both. It is interesting, that while 26% is the trust in the advertisements on mobile devices and on online banners in Europe, this ratio is around 50% in the rest of the world. In the same time, the branded websites are the second-most-trusted advertising formats, behind recommendations from friends and family, which means that brands could keep their significant influencing power. (Nielsen 2015)

These results show that private comments, posts, opinions, the word of mouth are the most influencing components in personal information collection and decision making. Regarding cultural heritage, it means that these communication channels should be targeted to grab the attention of the potential visitors and raise their interest.

3.5 Knowledge

There have been a lot of definitions known from the last 2500 years from Confucius to Polanyi, Takeuchi, Nonaka, etc. (Hunt, 2003) (Polanyi, 1966) Nevertheless, the most usable one for nowadays was given by Sveiby: Knowledge is the capability to act – solve a problem, intervene into a process or create something new. (Kiss, 1998) (Sveiby, 1997) Polanyi identified two types or classes of knowledge: explicit and tacit knowledge. (Polanyi, 1966) The main difference between them is how we can express and transfer them. The explicit, or in other name codified or formal knowledge is what we can describe, express and transfer using language, words, symbols, flowcharts, equations, models, maps, drawings, pictures, music, gestures, dance, etc. These are the subjects of formal learning processes and in most of the cases, knowledge transfer works without the presence of a teacher or trainer i.e. one can study alone. This means we can transfer knowledge, if the learner knows the necessary elements of the social and technical context: the alphabet and grammar, the meanings of the symbols and markers, the reference points and measurement units, the story or the event logs behind, geographic directions and references, etc. – which can be called as "Rosetti stones of knowledge transfer". Consequently, if someone described knowledge and the context decades or centuries ago, we can learn the kind of knowledge even today which has not been learned and used since then.

There is a very different situation with the tacit knowledge. It cannot be expressed with the tools of language, movements or arts – it is intangible. It can be transferred only during a learning-by-doing process, where the master and the 'padawan' work together for a longer time realizing mostly a non-formal or an informal education process. Thus, we can store the tacit knowledge only in human minds, so the preservation and the transfer of it require a direct and continuous lineage of transmission. (Kiss, 1998)

3.6 Wisdom

The wisdom is the capability to foresee. (Kiss, 1998) To foresee the most probable outcome of a process, the best solution among the possible ones, the capability to choose the perfect tool for solving a problem. Unfortunately, only a little part of the wisdom can be formalized into rules, algorithms, models, network of relations. Most of them are very complex, or, just on the contrary, so simplified that a deep knowledge is needed for its understanding. That is why sharing wisdom with others requires prepared (trained, experienced) audience, attention and time for understanding.

4 Data, information and knowledge management activities

All of these three terms are broadly used but it is worth to compare what kinds of activities are covered by them. (Table 1) These are the fields to teach regarding cultural heritage.

Table 1. Activities of Data, Information and Knowledge Management (Kiss, 1998)

Data Management	Information Management	Knowledge Management
collect	collect, filter/select data	learn (study, experience)
store	(not possible)	formalize, memorize
modify	use a new information	modify
update	use a new information	update
delete	negate, deny	age, forget, disintegrate, destroy the knowledge storage
copy	(not possible)	copy
multiplicate	generate	observe, research, conclude, teach (share)
index, map	index, map	index, map
search	search	search
share	share	share (teach), formalize, express

It should be underlined, every user and visitor wants to get information and use knowledge. This requires more and more complex IKM processes to find and deliver the customized contents in heritage presentation as well as in its maintenance and decision support. New mobile and smart devices, language technologies, like machine interpreters, artificial intelligence, big data, cloud services, virtual reality, 3D scanning, printing and multimedia, simulation, gamification and new fields of knowledge management, such as association management provide more effective tools for that, while the citizens of the developing

regions have to learn the using culture of them. (Kiss, 2013) (Kiss – Török, 2015) (Kiss et al. 2015) (Török – Kósa, 2014) It seems fundamental to teach the integrated point of view of data with consequent use of geocoding, time stamping and meta data. (Kiss – Jelen, 2001) These and the standardized use of terms can give a backbone for linking, searching and analysis of the huge databases and multimedia contents.

Summary

The overweighted role of social media in the evaluation of things and trust in credible information sources, give higher importance to the skilled use of social media than the deep knowledge of historical facts, arts and heritage values. The audience is trying to remain on the surface and it demands heavy efforts to attract them. If they are physical or virtual visitors, they want to get joyful experiences, not dry data. If they are decision makers, bureaucrats, they want to do their job in the shortest time and by the least effort, so they want to know only the facts they did not know before.

According to the nature of information and knowledge, it is a fact that only information and knowledge should be delivered for the professionals and the visitors. Information is a fugitive state of a data which can influence the level of knowledge of a person who is interested in it and knows the context. Thus, the education of IKM of cultural heritage has to focus on 1) understanding the nature of data, information and knowledge, 2) awareness raising and keeping the mindful presence with a cosy, involving container, 3) methods to identify the interest fields and understand the cultural background, misbeliefs and pre-assumptions of the visitors, 4) effective generation and selection of information and knowledge elements to be taught for a given visitor, learner of the profession during the personalization, 5) the design of the proper learning and communication channels, as well as 6) the selection of the appropriate information technologies for IKM of the management and the presentation processes. These issues require the revision of not only the education programs but of the entire education strategies.

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