Multifaceted, Collaborative Access to Cultural Heritage

Project IST-034984

D4.1 Virtual Expedition Methodology

Deliverable

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Executive Summary

Document Objective

Detailed exposition of the novel methodology and the corresponding design paradigm for the presentation of cultural heritage named *Virtual Expedition*.

Targeted Audience

MOSAICA Consortium

Prerequisite

None

Summary

Virtual Expedition is a novel concept introduced in MOSAICA and designed specifically to enable presentation of the cultural heritage oriented content in a way suitable to the digital character of the content, as well as to the growing audience accustomed to the modern day media. Virtual Expedition is viewed as a concept, design paradigm and technology.

As concept, Virtual Expedition is viewed as the modern day, digital equivalent of the traditional storytelling. Although rooted deeply in the traditions of the storytelling used to pass cultural heritage down the generations, Virtual Expedition draws heavily from the computer gaming, cinematography and graphic novels. Virtual Expedition, consequently, aims to provide a novel conceptual framework for the transfer of cultural heritage.

As design paradigm, Virtual Expedition sets the design principles for the presentation of the digital cultural heritage oriented content. Virtual Expedition provides framework for the presentation of cultural heritage 1) through digital media in general, and over the Internet in particular (hence the term "Virtual" in its name), and 2) by creating user experience based on exploration and discovery (hence the term "Expedition" in its name).

As technology, Virtual Expedition is envisioned as one of the emerging technologies within the Web 2.0 paradigm of the Internet use. Virtual Expedition is envisioned as a medium for introducing the collective intelligence into the domain of cultural heritage.

MOSAICA not only allows communities of users to collaboratively collect, annotate and organize the content of interest, but moreover, with Virtual Expeditions MOSAICA enables communities to use this knowledge, apply their creativity for the benefit of all, create their own narrative, their own stories, and thus empowers communities to continue the cultural heritage into the digital age.

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1. INTRODUCTION

The following document is the second version of the original deliverable. Although no specific updates of this deliverable were originally planned, towards the second year of the project a commonly shared feeling emerged in the consortium that a thorough revision of the vision of the Virtual Expeditions, and consequently of this deliverable is necessary. This feeling was further strengthened by the reviewers' comments issued during the project's first annual review.

There were several reasons for the dissatisfaction with the first, draft vision of the Virtual Expeditions.

1. The initial vision of the Virtual Expedition was blurred and vague. The consortium felt that additional thinking effort is required, in order to crystallize the initial amorphous ideas into a sharp, clear vision.
2. The initial conceptualization of the Virtual Expedition seemed to be overly dependent on the underlying technology. The consortium felt that a broader, technology-independent approach is required.
3. The desired effect of the Virtual Expedition on the promotion of cultural tolerance and multiculturalism was insufficiently outlined. The consortium felt that an elaboration of how we plan to accomplish this effect is required.
4. The innovation introduced in MOSAICA did not seem to be presented in a convincing way, and that important aspects of that innovation were left out. The consortium felt that it is necessary to sharpen and clarify the introduced innovation.
5. The initial vision did not provide any account of its relation to the Web 2.0 paradigm of use of the online resources. The consortium felt that the impact of the Web 2.0 on the future use of the digital resources is essential for the understanding of the introduced innovations.

Accordingly, after an intensive period of discussion that involved all consortium partners, the following document is issued collaboratively, as a replacement for the previous version of the same deliverable.

2. STORYTELLING

2.1. Storytelling for Promoting Cultural Heritage

Storytelling and cultural heritage are interwoven to the point that often they cannot be distinguished: over the centuries the culture was preserved and passed down to the next generation by oral tradition, stories, legends, myths… It is therefore not surprising that Virtual Expedition adopted the storytelling approach for the presentation of the cultural heritage content. Actually, **Virtual Expedition could be best understood as the modern-day, digital equivalent of the traditional storytelling**.

The selection of the storytelling as the leading approach to presentation of the cultural heritage content blurs the distinction between the story **about** the cultural heritage, and the story **as** the cultural heritage. By conveying cultural heritage in narratives, the original and authentic way of oral tradition is brought back to life – but now, facilitating modern, technologically updated means of expression. Speaking about cultural heritage – as the existing mainstream approach to the presentation and teaching of the cultural heritage – is thus replaced in Virtual Expeditions by letting the cultural heritage speak.

The storytelling approach is in particular rooted in the Jewish cultural heritage tradition through the institution of Meggid. Meggid is a storyteller that provides explanation of difficult theological, moral and philosophical notions through short tales, fables, allegories, parables, similes and metaphors. In contrast to the official Darshan (preacher) who comments the Biblical text providing rational, philosophical argumentation about it, Meggid talks to the heart, tells a story, brings the problem and the solution closer to his contemporary audience, makes it understandable to everybody. While a Darshan turns to a small audience of selected scholars capable of handling the "Pilpul" (literary "spiciness" – alluding to the convoluted and often contradictory theological arguments) of philosophical discourse, Meggid turns to just everybody, wide opening the gates to the garden of knowledge to his listeners.

The institution of Meggid flourished in particular in the Hassidism. In contrast to the previously predominant Kabala, which favored complex and highly abstract philosophical arguments, Hassidism was primarily a social movement, talking to the heart of every individual, and trying to bring "Frommigkeit" – simple, religious devotion – to everybody. Accordingly, the theoretical arguments were replaced by similes and metaphors, and the founder of the Hassidism, Baal Shem Tov, never wrote any theological tractate, but rather formulated his teaching in parables and allegories, orally told to his students and followers.

Virtual Expeditions are certainly different from the Hassidic parables and allegories. – They do not have a specific program and teaching to convey and popularize. Although inspired by the tradition of Meggid s, and by their enormous popularity over the centuries, Virtual Expeditions are carefully designed to be suitable to just any possible cultural heritage tradition. Indeed, similar institutions to that of Meggid can be found in many other oral traditions as bards and sages. What is common to all of them is the storytelling as the most natural medium to pass the tradition to the next generation. – And this is the starting point for the Virtual Expeditions.

2.2. Storytelling and Racial, Religious and Cultural Tolerance

MOSAICA is primarily a technological project with clearly defined scientific and technological objectives and success indicators. Nevertheless, by the virtue of the sensitivity of the content that MOSAICA set to handle, the project declared additional, non-technological objective as the true purpose of the technological research and development: **to promote the use of diversified cultural heritage in the education for cultural pluralism and racial, religious and cultural tolerance**.

The selection of the storytelling as the conceptual blueprint for the Virtual Expeditions was significantly influenced by the need to accomplish the above objective. In contrast to the sociobiologists who view xenophobia as the result of "an innate, evolution-produced tendenc y to seek proximity to familiar faces" ([Waller 2002]), we adopt the position that xenophobia, racism and religious and cultural intolerance are "unreasonable attitude that is unusually resistant to rational influence" ([Rosnow 1972]), and that consequently, these attitudes can be modified through education ([Ambrosewicz-Jacobs and Hondo 2004]).

Breckler and Wiggins define attitudes as "mental and neural representations, organized through experience, exerting a directive or dynamic influence on behavior" ([Breckler and Wiggins 1992]). Attitude is a hypothetical construct that cannot be directly observed, but is rather inferred from what people say and do. Accordingly, behavior is dependent upon attitude, and in order to modify behavior, attitudes should be altered. According to both Heider's balance theory ([Heider 1946], [Heider 1958]) and Festinger's theory of cognitive dissonance ([Festinger 1957]), humans are motivated to maintain consistency between beliefs, attitudes and behaviors. Accordingly, if a new cognition or affect is introduced so that it contradicts the existing attitude, people are motivated to reestablish balance of attitudes, or to reinstate consonance of attitudes by changing the existing beliefs or behavior about the attitude object. This is the basic mechanism for attitude change, and the major argument for the use of education for combating prejudice.

Storytelling is hereby highly effective in introducing both cognitions and affects that contradict the existing attitudes, and that could thus lead to the attitude imbalance or dissonance, and trigger the attitude change. The power of storytelling lies in persuasion: as a means of entertainment, education, preservation of culture and in order to instill moral values, storytelling can affect listener both emotionally and intellectually at the same time. Instead of merely conveying a message, storytelling can draw a listener into the world of a story, introducing novel and unexpected situations, facts and events. This novelty and the encounter with the unexpected is what triggers cognitions and affections that cause attitude imbalance and dissonance.

History museum expert Barbara Franco excellently summarized this power of good storytelling techniques in the context of museum exhibit: "good labels raise questions and get people thinking" ([Begiebing et al. 2004]). The voice telling the story makes a great difference. First-person encourages the reader, audience, or visitor to the museum to listen and relate to a person, the speaker, not just to the recitation of facts. "Addressing the unfamiliar is one way to foster critical engagement," says Joshua Brown, filmmaker and historian ([Begiebing et al. 2004]). A good storyteller gives the listener or reader a sense of making order out of chaos. So the good storyteller must give the reader a good dose of feeling the chaos, and there has to follow enough order made out of the chaos to give the reader the satisfaction of a good story.

The celebrated work on persuasion of Carl Hovland, at Yale University in the 1950s and 1960s, argues that we should understand attitude change as a response to communication ([Hovland et al. 1953]). The so-called Yale Attitude Change Approach suggests several factors that influence the attitude change, and that could be effectively used in storytelling[1]:

- Who (**source**):
  - The speaker should be credible and attractive to the audience.
- Says what (**message**)
  - Messages should not appear to be designed to persuade.
  - Present two-sided arguments (refuting the 'wrong' argument, of course).
- To whom (**audience**)
  - Distract them during the persuasion.

Storytelling is indeed an excellent medium for conveying messages that do not appear to be designed to persuade, but rather provide entertainment and satisfy curiosity. Storytelling is also a good medium to present multiple sides of an argument. Mixes of viewpoints and voices assist in telling extremely complex stories. Franco says it this way: "Audience research has shown that visitors are more willing to deal with difficult topics in exhibitions if they are given multiple viewpoints and are able to hear different sides" ([Begiebing et al. 2004]). This is also what Brown suggests as creating a chaos in which the listener can make order: by presenting different, conflicting views the listener

[1] Summarized at http://changingminds.org/explanations/theories/yale_attitude_change.htm

is invited and motivated to evaluate them, to counterpose and counterbalance them, to resolve the dissonance introduced through them.

Hovland also discusses cognitive routes by which persuasion acts. A message can appeal to an individual's cognitive evaluation to help change an attitude. In the **central route** to persuasion the individual is presented with the data, and motivated to evaluate the data and arrive at an attitude changing conclusion. In the **peripheral route** to attitude change, the individual is encouraged to not look at the content, but at the source. This is commonly seen in modern advertisements that feature celebrities. In some cases, physician, doctors or experts are used. In other cases film stars are used for their attractiveness.

Storytelling has the capacity to act on both routes simultaneously: on the central route, storytelling can provide information and stimulate its evaluation or reevaluation, while at the same time providing an attractive (and authoritative) source of information, on the peripheral route. This is why the attractiveness of the Virtual Expedition as a new presentation paradigm is of critical importance, and why its appeal to the targeted audience must be set as the highest design requirement.

In the Elaboration Likelihood Model (ELM) cognitive processing is the central route and affective/emotion processing is often associated with the peripheral route. The central route pertains to an elaborate cognitive processing of information, while the peripheral route relies on cues or feelings. The ELM suggests that true attitude change only happens through the central processing route that incorporates both cognitive and affective components, as opposed to the more heuristics-based peripheral route ([Petty and Cacioppo 1986]). This suggests that motivation through emotion alone will not result in an attitude change.

In the Heuristic-Systematic Model (HSM) information is either processed in a high-involvement and high-effort systematic way, or information is processed through shortcuts known as *heuristics* ([Chaiken et al. 1989]). Emotions, feelings and gut-feeling reactions are often used as shortcuts.

Both models point out the importance of combining the cognitive with emotional aspects in persuasion. Storytelling is hereby a convenient medium to accomplish this. In addition to a logically well-founded argument, storytelling must, and can provide also the heuristic aspects of persuasion. Virtual Expeditions must employ storytelling to intrigue users, to create in users the motivation to listen to the rational argument, evaluate it, and create a stand, to draw users into a new setting where new facts and situations are encountered, contradicting the existing beliefs and attitudes. In order to create the cognitive dissonance, Virtual Expeditions must first and foremost **motivate a user to consume them**.

3. VIRTUAL EXPEDITION

3.1. What is Virtual Expedition?

Virtual Expedition is a novel concept introduced in MOSAICA in order to promote exposure of cultural heritage: 1) through digital media in general, and over the Internet in particular (hence the term "Virtual" in its name), and 2) by creating user experience based on exploration and discovery (hence the term "Expedition" in its name). **Virtual Expedition is thus a paradigm setting the design principles for the presentation of the digital cultural heritage oriented content.**

Virtual Expedition is first and foremost a story – but in contrast to stories written in books (including the so-called "eBooks"), Virtual Expedition is a story told utilizing technological means and approaches borrowed from gaming, graphic novels and cinematography. In Virtual Expeditions narrative is not simply presented. – In Virtual Expeditions user is challenged to discover and unveil the narrative, re-create it and co-create it with the storyteller, and thus become an active part of the storytelling. Accordingly, Virtual Expedition is an extension of the storytelling approach into the realm of interactivity and multimedia.

In technical terms, Virtual Expedition is a multimedia presentation of some specific, thematically uniform, cultural heritage oriented content – but, this presentation features:

1. **Scenario** – similar to the motion features, Virtual Expedition is based on an underlying, dynamically enveloping plot, although in contrast to the motion features, and just like the computer games, its scenario provides alternative continuations, and potentially supports the non-linearity and the non-sequentiality of the narrative.
2. **Exploration** – similar to computer games, narrative is in Virtual Expedition discovered through user's actions and her interaction with the virtual environment, virtual objects, and virtual characters, and the underlying plot is not simply deployed as in presentations, but rather recreated by gradually revealing its structure and organization.
3. **Internal and external content** – in Virtual Expedition external content consisting of digitized cultural heritage objects (as multimedia files) is bound together by internal content, such as dialogs, instructions, puzzles and questions, etc. into an integrated and coherent narrative.
4. **Conceptual design** – borrowing again from the cinematography and gaming, and strongly inspired by graphic novels, Virtual Expedition provides a conceptually

uniform and graphically unique interface design, reflecting the underlying topic, attitude of the storyteller, intended message, etc.

The concept of Virtual Expedition does not refer hereby to the technology in which Virtual Expedition can be implemented – ranging indeed from MS PowerPoint and HTML to 3D gaming platforms, to virtual reality. – **The concept of Virtual Expedition refers solely to the conceptual framework and the methodology for the organization, structuring and design of the content presentation into a coherent storytelling narrative.**

Virtual Expeditions must be clearly distinguished from the so-called "virtual tours" – today a popular WWW epithet for websites visually presenting a particular physical location, ranging from the NASA Visitors Center, to real estate properties, to human ear. The term 'Virtual Tour' was first introduced in [Main et al. 1994] featuring a computer system providing walk-through of a 3D reconstruction of Dudley Castle in England as it was in the year 1550. Despite the similarity in names, there is almost nothing in common to these two concepts. In contrast to the virtual tours, which are virtual mockups of the real, physical locations, Virtual Expeditions are stories with plot, characters, events and situations…Even when a Virtual Expedition presents a specific physical location (see below), it does not do that as a virtual tour: i.e. by merely enabling navigation through the virtual mockup of the location. – Virtual Expedition of a physical location is a story about that place, story that is discovered by exploring it.

3.2. Innovation Introduced by Virtual Expedition

During the past decade great efforts were invested into digitalization of the cultural heritage, as well as into making this digital content available online over the Internet. Indeed, extensive quantities of digital cultural heritage content became available either on the WWW or in numerous digital libraries and repositories accessible over the Internet. But, MOSAICA decided to walk the next step, and set forth the vision of bringing this digital content closer to the Internet users, and in particular to the generations already brought up on the cyber-culture and the modern means of communication. This vision could be realized only by making the presentation of the cultural heritage content more attractive, more appealing to the Internet users accustomed to the technological innovations introduced and driven by computer gaming and film industry.

Nevertheless, the intention is hereby not to introduce yet another innovative technology and propose a new technological platform. – Driven by the huge demand and tough competition, gaming industry and computer animation constantly innovate the underlying technologies, relentlessly placing more and more power into the hands of the developers, and allowing them to provide a more and more thrilling user experience. Instead of a technological innovation, the intentions of MOSAICA are rather to provide

a coherent, theoretically well-grounded and novel conceptual framework for developing such thrilling user experience in the domain of cultural heritage. The implementation technologies are hereby irrelevant: there are already mature implementation platforms available, and more will always become available in the future. What matters, are the conceptual framework and the methodology – the novel paradigm for development of exciting and stimulating user experience in the consumption of the digitized cultural heritage content.

This situation could be compared to the emergence of the paradigm of the Web page on the WWW. The initial implementation technology for Web pages was HTML, but since they first emerged in the early 1990s a series of technological innovations were steadily introduced: XML, DHTML, Java script, ActiveX, Java applets, Macromedia Flash, etc. Nevertheless, the basic conceptual framework for the design of a Web page remained the same: composite document format combining resources in separate, distributed files, non-sequential interactive access to the content, hyper-linking to additional content… The technological innovations only enabled the basic paradigm to be implemented in a more and more attractive manner.

Similar to the Web pages, Virtual Expedition is also a technologically independent paradigm setting design principles for presentation of digital content. However, in contrast to the Web pages, Virtual Expedition introduces the storytelling approach into the WWW-based content presentation, and features the paradigm of narrative. In this sense, Virtual expedition is an extension of the Web pages and the basic WWW content presentation paradigms.

On the other hand, Virtual Expedition shares this paradigm of narrative with some types of games (primarily with the Role-Playing Games[2]). An additional similarity with these games is the use of interactivity for inquiry and discovery of the content. However, unlike these games, Virtual Expedition is not designed to provide primarily entertainment, but rather utilizes entertainment to present a particular digital content, and to convey an educational message. This educational objective Virtual Expedition shares with the so-called "educational games" or "games for learning" that also combine entertainment with learning. However, unlike educational games, Virtual Expedition is not a game, but rather content presentation adopting only some aspects of computer gaming.

Accordingly, the innovation introduced with the Virtual Expedition could be summarized in the following three points:

[2] Role-Playing Games (RPG) are typically associated with computer gaming, although many RPGs, most notably Dragons and Dungeons (D&D) preceded the computer technology, and are thriving as printed card games until today.

1. Introduction of the storytelling approach into the digital content presentation (extension of the WWW paradigms),
2. Use of computer-based interactivity for inquiry and discovery of the digital content (adoption of gaming approach), and
3. Exploitation of entertainment for content presentation and education (adoption of educational games strategy).

Although none of these features is an innovation per se, and each could be found in various previous paradigms, their combination into a coherent conceptual framework and application in the domain of the cultural heritage is the innovation introduced in MOSAICA.

However, the major innovation introduced in MOSAICA is the incorporation of the Web 2.0 principles and paradigm into the digital content presentation, as it will be explained in a separate chapter below.

3.3. Virtual Expedition and Web 2.0 Paradigm

The concept of Web 2.0 was launched in a popular techno blog by Tim O'Reilly in 2005 ([O'Reilly 2005]). It became rapidly popular, despite the fact that soon it found itself under scrutiny and criticism of the most prominent WWW technologists, including the father of the WWW, Sir Timothy Berners-Lee ([Berners-Lee 2006]).

Web 2.0 was coined to signify the shift in the use paradigm of the WWW that occurred with the emergence of the websites such as Google, Flickr, MySpace, YouTube, and recently deli.cio.us and FaceBook. The major characteristics of this paradigm shift are quoted as:

1. **The network effect** (social networking) – the network of machines was transformed into a network of people. Instead of searching for information, the use of the WWW turned into the search for people and social interaction. Major Web applications with exploding popularity are all social network oriented utilities: from online games counting their communities in millions, to file sharing applications to casual online communities such as SecondLife.
2. **Architecture of participation** – the content of the WWW is created, contributed and organized by the consumers themselves. The distinction between content provider and content consumer is blurred beyond recognition. Personal websites were replaced by blogs, and prominent bloggers turned into trendsetters drawing hundreds of thousands, even millions of readers! Encyclopedia Britannica was replaced by the Wikipedia. The concepts such as 'publishing' and 'press releases' lost their meaning, and are replaced by 'participation' and 'corporate blog'.
3. **Harnessing the collective intelligence** – not only the content is being provided by the consumers themselves. – The knowledge is provided by the users. What started as technical support forums rapidly has spread to every aspect of life. The

bookmark sharing website deli.cio.us is only one example of social tagging of the WWW content. Yahoo!Answers enables users to post just about any question: from dating problems to vacation recommendations and kitchen tips and tricks, and YouTube features video instructions from just about any domain of modern life.

Both proponents of the Web 2.0 and its critics certainly agree about one: Web 2.0 is merely a shift in the use paradigm, and there is no novel technology facilitating it. But, evidently, the WWW is used today in a significant different way than only few years ago.

MOSAICA was certainly inspired by the Web 2.0, and adopted many of its premises – most notably content creation by sharing and collective intelligence through semantic annotation[3]. The novel concept of Virtual Expedition is in particular rooted in the current use paradigm shift. **Virtual Expedition is envisioned as a medium for introducing the collective intelligence into the domain of cultural heritage**.

Collective intelligence is based on the contribution of knowledge by all participants involved in a virtual community. It goes beyond the content collection and contribution, and introduces collaboration in content organization, interpretation and utilization. A typical example of such collaboration is social tagging of websites, and sharing of the tags within a virtual community. Even when the so-called 'folksonomies' are replaced with formally defined ontologies, allowing application of formal reasoning and logical inference, as well as construction of very large knowledgebases, this collaborative effort is insufficient in the domain of the cultural heritage. When compared to the content of popular blogs, social networks and areas in which social tagging became popular, the domain of cultural heritage features evidently differing content: cultural heritage content is not directly derived from the day-to-day life, and it invokes a qualitatively different curiosity than lives of celebrities, political developments, or sport events. Cultural heritage content needs to be carefully organized, interpreted and presented, in order to draw the attention, to become the topic of the day.

Nevertheless, the working assumption is hereby that the ones who know the best how to make sense out of the cultural heritage content, and how to organize, interpret and present it – are the users themselves! – What is missing is the paradigm, conceptual framework that will set standards for that. And this is what the concept of Virtual Expedition sets out to accomplish.

MOSAICA is envisioned as a technological platform that in the spirit of the Web 2.0 allows communities of users to collaboratively collect, annotate and organize the content

[3] Nevertheless, MOSAICA did not adopt the so-called 'folksonomies' that are merely keyword collections lacking any formal semantics.

of interest. MOSAICA provides to such communities the infrastructure to develop their knowledgebase and their collective intelligence. But moreover, with Virtual Expeditions MOSAICA enables communities to use this knowledge, to apply their creativity for the benefit of all, to create their own narrative, their own stories. Virtual Expeditions empower communities to continue the cultural heritage into the digital age.

4. MOSAICA CONCEPTUAL FRAMEWORK

4.1. MOSAICA Ontology

MOSAICA Ontology is a high-level ontology of the cultural heritage domain in general. Accordingly, it provides the basic concepts, relations and properties used to describe and specify cultural heritage content. These high-level concepts, relations and properties are then partially contextualized specifically to the Jewish cultural heritage (for example, Jewish religious professions, such as Rabbi, Cantor, etc. were included as subclasses of the generic class 'Clergyman'). This core ontology provides the semantics and the conceptual framework for development of large cultural heritage knowledgebases.

However, in addition to providing the infrastructure for a knowledgebase, MOSAICA Ontology must also provide the interface for navigation and browsing, and is thus designed to serve also as a directory for cataloguing cultural heritage content. MOSAICA Ontology is exposed to the user through the Semantic Browsing user interface as an alternative to searching by querying. Accordingly, it is expected to provide a simple and easily conceivable structure.

MOSAICA Ontology thus exposes 7 general top-level topics:

- People
- Things
- Places
- Events
- Periods
- Notions
- Resources

Each of these topics evidently requires a significantly different narrative, and indeed, differing genres and literal forms were developed in literature over the time (and adopted in cinematography and computer gaming) – such as biographies, historical fiction, diaries, essays, etc. – in order to handle these differing topics. Consequently, prior to systematically exposing the methodology of the Virtual Expedition, it is necessary to first analyze and discuss the typology of the narratives required to support the domain of cultural heritage, and hence thoroughly understand the full extent of complexity required from the Virtual Expeditions.

4.2. Typology of Virtual Expeditions

Based on the coverage of the MOSAICA conceptual model, the following typology of Virtual expeditions could be distinguished:

4.2.1. Virtual Expeditions about People

4.2.1.1. Biography

Biography is an account of the life of an individual. It focuses on the events from one's life, presents his or her achievements, analyzes his or her personal experience, provides personal details, and may even include analysis of his or her personality. An example of biography would be Virtual Expedition about the founder of the Hassidism, Israel Ben Eliezer (Baal Shem Tov).

4.2.1.2. Family Saga

Family saga is a chronicle of several prominent generations in a particular family. In contrast to a biography, it does not focus on a single person, but rather presents a group of people bound by the family relationship. In addition to the family relationships, family members may share more common traits (for example, Virtual Expedition about the Ashlag family would feature two generations of prominent rabbis in the dynasty of Belz), or not (Virtual Expedition about the Mendelssohn family, on the other hand, would present three generations featuring a famous philosopher, a successful banker, a well-known composer, and a pianist).

4.2.1.3. History of a Community

History of a community provides an account of a group of people sharing particular environment, believes and interests. In contrast to the family saga, it covers a larger group of people, consisting of multiple families, and is typically an account of a more extensive period of time. An example of the history of a community would be a Virtual Expedition about the Hassidic community of Belz (spanning from the early 19th Century Ukraine to the modern-day Israel, and encompassing prominent rabbis from three families).

4.2.1.4. History of an Organization

History of an organization is account of a group of people organized in a purposeful structure within a social context. An example of the history of an organization would be the Virtual expedition about the Chabad (Lubavitch) Hassidic organization with worldwide presence of emissaries with the stated mission of educating non-observant Jews about Orthodox Jewish practice. In contrast to previous types of Virtual Expeditions, history of an organization does not focus on particular persons, family or community members, but rather on the common mission, activities and objectives.

Chabad can be presented also as a community spanning from the 18th Century Bielarus to the Crown Heights in modern Brooklyn. Nevertheless, the focus and the emphasis would in that case be on the community life and history, rather than on the "shlichus" (mission or serving as emissary).

4.2.1.5. History of an Institution

History of an institution is similar to the history of an organization, except that it focuses on the institutional aspects of an organization, rather than on the social and historical aspects. An example of the history of an institution would be a Virtual Expedition about the Chabad House, which is an institution established and managed by the Chabad organization.

4.2.1.6. History of a Movement

History of a movement is an extension of the history of a community in the sense that it encompasses a larger group of people, typically including many communities affected by a movement, and spans over a longer period of time. An example of the history of a movement would be a Virtual Expedition about the Hassidism. The focus in the history of a movement is on the elucidation of the common traits that bound different individuals and groups into a more or less coherent movement, as well as on the diversity and differences encountered within such movement.

4.2.2. Virtual Expeditions about Things

4.2.2.1. Description of an Artifact

Description of an artifact is an explanation of what a specific cultural heritage artifact is. An example of it would be a Virtual Expedition about Menorah (candelabrum with seven branches). Although it is primarily a description of an object, it can also include the account of its history, etymology of the name, famous examples, demonstration of its use, etc.

4.2.2.2. Description of a Relic

Description of a relic is a variant of the description of an artifact that focuses on a specific, singular artifact. An example of it would be a Virtual Expedition about the Menorah from the Second Temple. While the description of the Menorah as an artifact would provide a generic explanation about the seven branched candelabrum in Judaism, the description of the Menorah from the Second Temple as a relic would focus on that specific artifact, its particular history, use, appearance, etc. Accordingly, the description of a relic may often include its reconstruction, since a relic (such as the Menorah from the Second Temple) may not be in existence any longer, and only its descriptions and presentations in historical sources may be available.

4.2.2.3. Explanation of an Object of Significance

Description of an object of significance provides an account of any object, including natural objects, such as fruit and grain (for example, a Virtual expedition about Shiva't HaMinim – seven kinds of natural products typical for the land of Israel), given that they bear a specific cultural significance. Such objects typically do not require an explanation, since they are ubiquitous and well known, but rather their cultural significance stipulates an explanation. An example of it would be a Virtual Expedition about the use of Etrog in the Succoth prayers.

4.2.3. Virtual Expeditions about Places

4.2.3.1. Account of a Historical Site

Account of a historical site is a presentation of a specific cultural heritage artifact (in the broadest sense as a human-made object) or set of artifacts, such as walls, buildings, bridges that cannot be transported, and are therefore bound to a particular location. An example of it would a Virtual Expedition about the Synagogue in Budapest. This type of the Virtual Expedition may feature a virtual reconstruction, in case that the historical site did not survive until this day (for example, The Second Temple). In contrast to the virtual tours (see above), which were originally designed to present virtual reconstructions of the cultural heritage sites, Virtual Expeditions about historical sites utilize the storytelling, rather than touring in order to present a place. Actually, the accuracy of the virtual reconstruction of the site is not relevant at all, as long as it provides the background for the story told about the place.

4.2.3.2. Account of a Geographical Location

Account of a geographical location is an extension of the account of a historical site, applied when the historical artifacts that constitute the site cannot be or do not need to be specified. An example of it would be a Virtual Expedition about the Ghetto in Warsaw. Such Ghetto comprises buildings that are not architectonically different from the reminder of the city, and cannot be presented as a recognizable site. In such case the accuracy of the reconstruction of the site is even less important.

4.2.4. Virtual Expeditions about Events

Virtual Expeditions about historical events are accounts of happenings at a given place and time, such as battles, disasters, weddings, coronations, etc. An example of it would be a Virtual Expedition about the distraction of The Second Temple by the Romans in the year 70 AD. The event is not necessarily restricted to a single geographical location. For example, the Crystal Night (die Kristallnacht) took place in every German town with significant Jewish population. Nevertheless, events are restricted to a specific point in time, and if they involve multiple locations, then their simultaneous occurrences are implied.

4.2.5. Virtual Expeditions about Periods

Virtual Expeditions about periods are an extension of the Virtual Expeditions about events. This type of Virtual Expedition can present a historic period whose definition is agreed among scholars (for example, a Virtual Expedition about the Second Temple Period), or merely a continuous event without well defined time frame (for example, the Black Death, which occurred at several points in time during the 14th Century).

4.2.6. Virtual Expeditions about Notions

The topic 'Notion' covers a broad range of cultural heritage related concepts in the MOSAICA Ontology. This coverage ranges from calendar to musical genre, from holidays to theological concepts, from political ideas to names, etc. Therefore, there is also a great variety in the types of the Virtual Expeditions used to present this top-level topic.

4.2.6.1. Explanation of a Holiday

Explanation of a holiday is an account of festivities providing their historical background, cultural significance, description of customs and rites, account of resources and artifacts used for it, explanation of the name, symbols and notions, etc. An example of the explanation of a holiday would be a Virtual expedition about Pessach (Passover).

4.2.6.2. Description of a Custom

Description of a custom is an account of the tradition in the broadest sense, ranging from ceremonies (for example, a Virtual Expedition about Bar Mitzvah), to rituals (for example, a Virtual expedition about Birur Hametz – the ritual house cleaning performed before Pessach aiming at removing all traces of yeast from the house), to prayers (for example, a Virtual expedition about Shmona Asar – the basic 18 daily prayers), blessings (for example, a Virtual expedition about wine blessing), even proverbs ((for example, a Virtual expedition about "Nichnas Yain, Yatz'a Sod" – the Hebrew equivalent of the Latin "in vino veritas"), sayings (for example, a Virtual expedition about "Gesher Tzar Me'od" – encouraging message attributed to Baal Shem Tov, the father of the Hassidism) , customary expressions (for example, a Virtual expedition about "Ad Me'a VeEsrim" – traditional birthday blessing), etc.

4.2.6.3. Explanation of Belief

Explanation of a belief is an account of religious or spiritual belief or a system of beliefs developed over generations as an aspect of cultural heritage. Virtual Expedition presents what that belief is, its history, prominent proponents, its manifestations and consequences, etc. A typical example of such explanation would be a Virtual Expedition

about the Kabala, as a system of beliefs. Hassidism could also be presented as an explanation of belief, which in contrast to its presentation as a history of a movement (see above), would emphasize its theological and philosophical dimensions, rather than its social and communal aspects.

4.2.6.4. Overview of a Religion

Overview of a religion is an extension of the explanation of belief that provides a brief introduction into a complex and extensive system of beliefs. A typical example of it would be a Virtual Expedition called "Judaism for Dummies"[4]. This type of Virtual Expedition is expected to provide the first and brief insight into a religion, rather than a systematic account of it.

4.2.6.5. Explanation of an Ideology

Explanation of an ideology is another extension of the explanation of belief, only into the secular direction. An example of it would be a Virtual Expedition about Zionism as a political ideology based on the belief that the Jewish nation has the right to establish sovereignty in the historical homeland. Although Zionism is not a complex and extensive system of beliefs (in contrast to religion), the extension is required in order to cover its political complexity (including its history, controversies, prominent personalities, etc,).

4.2.6.6. Explanation of a Symbol

Explanation of a symbol is an account of the conventional understanding of signs representing cultural notions or otherwise bearing cultural significance. Hereby the terms 'sign' and 'symbol' must be understood in the broadest possible sense, including graphic patterns (for example, a Virtual Expedition about Magen David – the Star of David), sounds (for example, a Virtual Expedition about the sound of Shofar – ritual horn), gestures (for example, a Virtual Expedition about the Cohen's Blessing – a hand gesture used by the priests for blessing), or even abstract notions (for example, a Virtual Expedition about the notion of 'Bride' used in the Kabala to symbolize Shabbat – the seventh day of creation and the seventh day in a week), etc.

4.2.6.7. Description of a Genre

Description of a genre is an account of a literary, music or artistic genre associated with a specific cultural heritage. An example of it would be a Virtual Expedition about Kleizmer – musical genre developed by the Jews in Eastern Europe (apparently initially in Romania), typically associated with the Hassidism, and recognized by its distinguished combined use of clarinet and violin.

[4] The idea of such Virtual Expedition was factually raised in MOSAICA during the visit to the Museum of Jewish Cultural Heritage in Porto by the non-Jewish colleagues in the consortium.

4.2.6.8. Explanation of a Concept

Explanation of a concept provides account of abstract notions of primarily philosophical or theological character that are not used in a symbolic manner. The distinction between concepts and symbols is often blurred in the domain of cultural heritage, and it boils down only to emphasizing different aspects of the same notion. An example of the explanation of a concept would be a Virtual Expedition about Adam Kadmon – the primordial man of cosmic proportions though which – according to the Kabala – the creation took place. The predominantly symbolic character of the Kabalistic expression allows interpretation of this notion as both a symbol, and a theological concept.

4.2.6.9. Explanation of a Name

Explanation of a name is an account of the meaning of a naming notion, covering its etymology and etiology, and ranging from personal names (for example, a Virtual Expedition about the name Emmanuel), to names of the places (for example, a Virtual Expedition about the name Be'er Sheva), to names of a nation (for example, a Virtual Expedition about the name Israel), etc.

4.2.7. Virtual Expeditions about Resources

4.2.7.1. Presentation of an Archeological Source

Presentation of an archeological source is an account of archeological findings that serve as a source of information about a cultural heritage. An example of it would be a Virtual Expedition about the Sennacherib's Prism – an Assyrian inscription discovered in the ruins of Nineveh in 1830 (today stored at the Oriental Institute in Chicago), detailing the events of Sennacherib's campaign against Judah in the 7th Century BC.

4.2.7.2. Exposition of a Literal Source

Exposition of a literal source is an account of a written resource with significance to a cultural heritage. An example of it would be a Virtual Expedition about just any book of the Hebrew Bible (see below).

4.2.7.3. Presentation of an Oral Tradition

Presentation of an oral tradition is an account of the non-written resources passed down the generations as storytelling, and can include myths, legends, fables, allegories, parables, tales, etc. An example of it would be a Virtual Expedition about the Hassidic tale of the Golem – a man-made creature brought to life by inscribing tetragrammaton on its forehead, and then turning violently against its creator.

4.2.7.4. Presentation of a Music Source

Presentation of a music source is an account of musical tradition passed down the generations as tunes, scales, rhythms, songs, dances, etc. An example of it would be a Virtual Expedition about Hassidic mystical dance.

4.2.7.5. Exposition of a Tangible Source

Exposition of a tangible source is an extension of the exposition of archeological sources to all tangible, non-archeological findings. An example of it would be a Virtual Expedition about a collection of Menorahs from the Ghetto in Venice (assuming that such hopefully exists somewhere).

4.2.7.6. Presentation of Art as a Cultural Heritage Resource

Presentation of art is an exposition of artistic artifacts as a source of information about a cultural heritage. The art hereby could be either plastic arts (for example, a Virtual Expedition about Chagall's paintings that contain many elements of the East European Jewish oral tradition), or literature (for example, opus of Isaac Bashevis Singer providing authentic insight into the life of Polish Ghettos before the Second World War), or music.

4.3. Requirements for Virtual Expeditions

The above overview of the typology of Virtual Expeditions provides an insight into the complexity of the methodology required for Virtual Expeditions. Evidently, a large variety of significantly differing topics needs to be expressed using the Virtual Expedition methodology. Some of these topics are very visual (Virtual expeditions about artifacts, places, visual resources), and the means of virtual reality would be probably best suitable to them. Some are plot-based (Virtual Expeditions based on the historical material), and the means of cinematography would be the most suitable. Some of them are very abstract and intangible (Virtual Expeditions about concepts and abstract notions), and textual exposition is probably the most suitable media. Some of them require extensive sound coverage (Virtual Expeditions about musical tradition and musical genres). Etc.

To make it even more complex, the presented variety is expected to have also a very heterogeneous audience. The primary users are young generations – from young adolescents to young adults. The differences in style, complexity and depth of the content are significant even within this age group. Nevertheless, parents and even grandparents may also get involved in both creation and consumption of the Virtual Expeditions. Also, potential users may already have background in the given cultural heritage at differing level, but some users may be completely ignorant about it, and require the most basic explanations.

The differences in the targeted audience stipulate also different objectives. In MOSAICA, Jewish audience is approached driven by the need to provide knowledge about Judaism, primarily to the audience in Diaspora, and enable them to educate new generations in the effort to preserve their cultural identity. Other audience is addressed with a message of cultural tolerance and multiculturalism, wishing to provide an insight into the Jewish tradition, history and culture. Sometimes, the most effective message is simply to tell the truth about misperceptions and misinformation (for example, a Virtual Expedition about Pessach discussing, among other issues, the notorious Blood Libels). Sometimes, controversies and disputes need to be presented, in order to present the complete picture of the state of affairs (for example, controversies surrounding Zionism and the modern State of Israel). – Virtual Expeditions must be designed that way that they provide the medium for all that variety of messages and objectives.

Finally, Virtual Expeditions must have the right appeal. The chief objective of the MOSAICA Project is to offer a novel attractive way for consumption and use of the cultural heritage digital content. Virtual Expeditions are one, and maybe the most central effort in achieving this project objective. It is therefore of critical importance to design the methodology of Virtual Expeditions in such way that the use of suitable technology can provide a high appeal to a broad range of audience, and especially to the generations brought up on and accustomed to extensive use of gaming technology, computer graphics and visual effects.

Accordingly, the basic requirements for Virtual expeditions could be summarized as follows:

4.3.1.1. Flexibility

Virtual Expedition must support a very broad range of potential topics. Virtual Expeditions must be capable of presenting just about anything that is related to the cultural heritage – no matter how complex, abstract or extensive it may be.

4.3.1.2. Adaptability

Virtual Expedition must support a variety of plots and narratives. Virtual Expedition is primarily a story, but a story could be told in different ways: as a joke, as an anecdote, as epics, as drama… – Virtual Expedition must be capable of supporting all these various plots and styles, and more.

4.3.1.3. Support of Creativity

Virtual Expedition must be capable of supporting different genres and approaches. Authors will raise various ideas how to tell a story, and may use various genres to do that. The story of a holiday, for example, can be told as a documentary, an action feature,

religious tractate or family story… – Virtual Expeditions must support all such different ideas, and allow authors' creativity to be driven to its maximum.

4.3.1.4. Appeal

Virtual Expedition must allow authors to develop a high appeal by providing unique, distinguished overall conceptual design. Like in cinematography, computer games and graphic novels, the overall conceptual design combining visual, audio and textual elements provides the unique and easily recognizable look-and-feel that users seek. Virtual Expedition must support authoring of such conceptual design in all its dimensions.

4.3.1.5. Presentational Variety

Virtual Expedition must support a variety of presentation and narrative techniques, ranging from dialog to quest to exploration… This variety should be dynamic in the sense that multiple techniques could be combined in a single Virtual Expedition.

4.3.1.6. Novel User Experience

Virtual Expedition must provide a novel user experience, different from the current WWW standards, and based on the:

- **Curiosity** – users should be drawn into a Virtual Expedition by having their curiosity and inquisitiveness stimulated,
- **Challenge** – users should be challenged to explore, discover and learn,
- **Feedback** – users should be provided by an interactive feedback regarding success in mastering the challenges presented in a Virtual Expedition.

4.3.1.7. Collaboration and Knowledge Sharing

It has been well established that knowledge is constructed through social interaction with peers ([Bruner 1993], [Vygotsky 1978]). Collaborative online communities working together towards a common goal is an example of a dominant mode for working and learning ([Barak and Rafaeli 2004], [Dori and Herscovitz 1999], [Eylon 2000]). The Virtual Expeditions must offer two ways for sharing knowledge and generating collaborative learning:

1. Users must be allowed to contribute privately owned content, such as documents, photos, music files, video files, etc., which otherwise would not be publicly exposed.
2. Virtual Expeditions must offer means for informal discourse among users that can be used as a communication tool for peer-assessment, as well as for posing questions and answers.

5. METHODOLOGY

5.1. Design Principles

Virtual Expedition is based on the following design principles:

5.1.1. Dialog

The story is not told as a monolog, but it rather evolves through a dialog with one or more persons. In the computer games (in particular in Role-Playing Games) the background information is typically provided by interviewing virtual characters. Such interview requires development of particular communication skills, since useless answers will be obtained if questions are not chosen well (see Figure 1).

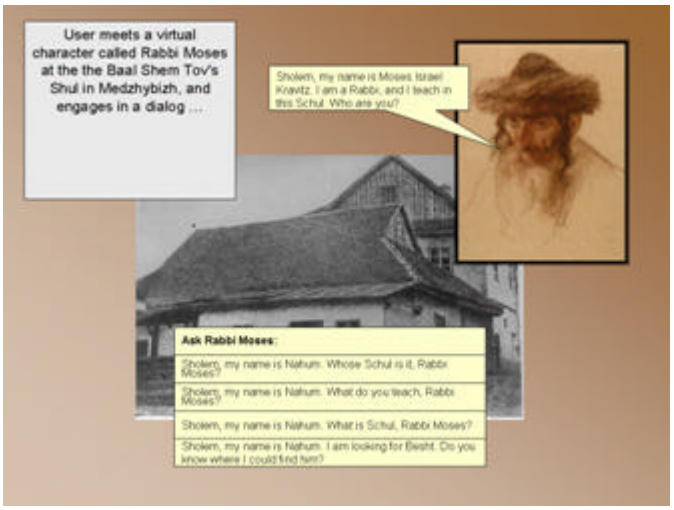


Figure 1 Example of a dialog with virtual character

5.1.2. Detection

The information does not need to be displayed in evidence; information can be concealed or merged into the environment, requiring mental effort to disclose it, or to realize its true meaning. Quest games were initially built without a declared purpose or game objective: player discovered what the purpose of the game is by exploring the landscape and characters encountered in it. Everything relevant was hidden somewhere – the player had to somehow find it.

5.1.3. Use

Rather than displaying objects, user can learn about them by using them (or by virtually replicating the use of objects). For example, rather than displaying the Seder Pesach table, user may be instructed to set it herself/himself.

5.1.4. Problem Solving

User can be challenged to obtain information only in result to a successfully performed task, which can include question answering, tests (checking if the previous information was correctly internalized), finding certain place with additional information (in detection scenarios), collecting information step by step (in detection scenarios, but also when interviewing virtual characters in a correct order), and then using it to answer questions, relocation of objects, using objects in the correct manner, etc. (see Figure 2).

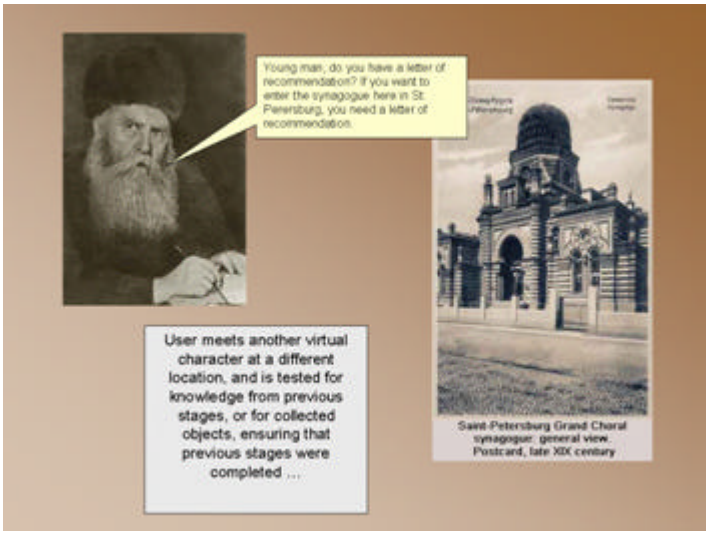


Figure 2 Example of a problem solving

5.1.5. Decision Making

A particular problem solving challenge for the user can be making decisions regarding continuation of the scenario. Incorrect decision making can be pointed out, and accompanied by additional instructions (or a request to repeat certain elements of the previous actions). This principle can be in particular effective in the reconstruction of the historical events, when the user may be cha llenged to reconstruct the decision making of the real historical personalities.

5.1.6. Exposure to Peers

Users should be allowed to publically comment and grade the compliance of a Virtual Expedition with the ethical values and objectives, such as promoting cultural tolerance, multiculturalism, etc. These grades and comments should be made visible when searching for a Virtual Expedition (i.e. utilized for the ranking of Virtual Expeditions in search results). Furthermore, dialogs and problem solving should also support contributions from users: users may suggest their own versions of dialogs in already existing Virtual Expeditions, or suggest a method for problem solving. These contributions could then also be graded by users.

5.2. Virtual Expedition Framework

Following the design principles detailed above, the notion of Virtual Expedition can be presented as a framework, consisting of the framework semantics and a toolbox of basic controls from which a Virtual Expedition can be created.

5.2.1. Semantics

Semantics provides the conceptual model and the basic vocabulary for the framework.

1. **Environment** – the entirety of display. It consists of objects and backgrounds.
2. **Background** – the aspect of the environment that is not distinguished as a separate object (i.e. user cannot interact with it). Background could be viewed as a film "set" in which the actions take place, and include graphics and sound, potentially even animated of cinematographic graphics (see Figure 3).
3. **Object** – any distinguishable (moving or static) element of the environment. In contrast to the background, objects interact with the user, i.e. support actions (see Figure 3).
4. **Virtual character** – an object featuring appearance of a human or a personification (for example, human-like animal), and supporting actions that resemble human behavior, such as dialog (see Figure 3).

Figure 3 Example of a Virtual Character (curator), Background (museum) and Objects (candelabra)

5. **Object area** – an arbitrary part of an object.
6. **Action** – a system operation initiated by the user, such as invocation if an application, execution of a script or task, etc.
7. **Chronological action execution** – a consecutive execution of a series of actions. Allows multiple actions to be chained (i.e. implementing the Boolean gate operator 'AND').
8. **Simultaneous action-prompt** – a menu prompting for selection of one of multiple potential actions (i.e. implementing the Boolean gate operator 'OR'). Such menu is the decision making point involving interaction with the user (see Figure 4).

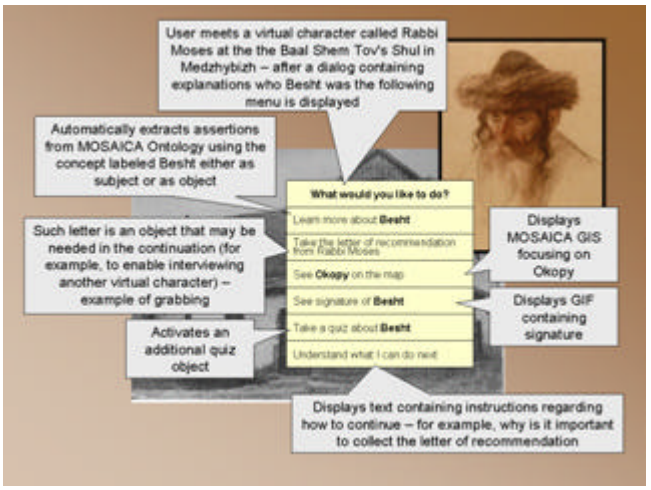


Figure 4 Example of simultaneous action prompt

9. **Mosaic action prompt** – a display of menus associated with specific object areas, rather than with the entire object (see Figure 5).

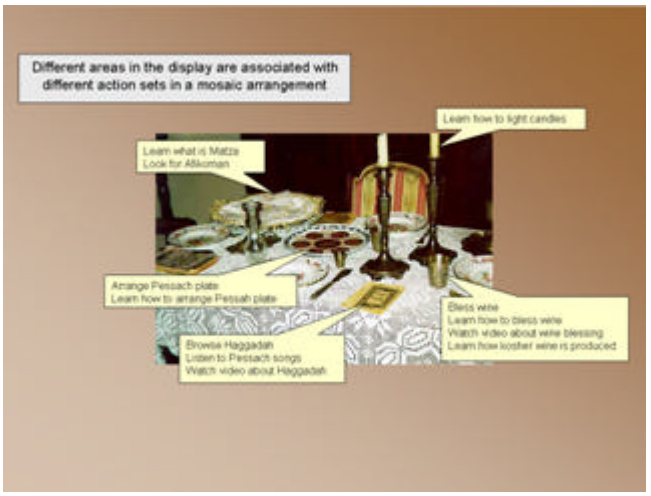


Figure 5 Example of a mosaic action prompt

10. **Combined action execution** – a combination of chronological action execution and simultaneous action prompts. Multiple actions can be combined into complex workflows supporting Boolean gate operators: conjunction (chronological action execution) and disjunction (simultaneous action prompts).
11. **Storyboard** – a narrative underlying a Virtual Expedition specified as a workflow consisting of actions. With each action the associated object supporting this action is specified.

5.2.2. Toolbox

Toolbox contains a set of controls, each designed to execute an action. Controls can be associated with an object, or a specific object area. Each control provides an interface in the form of a property dialog box used for the configuration of the action settings.

5.2.2.1. Resource Control

Resource is the control used to display either text, or an external multimedia file, or assertions from an ontology, or combination of these – in an **integrated** display window (see Figure 6). Properties should hold the text, URI to the multimedia file, and/or method to retrieve the desired set of assertions from ontology. In addition, properties should hold specification how to combine multiple display elements (for example, their spatial organization for display).

Figure 6 Example of the Resource Control (used to display a candelabrum)

5.2.2.2. Mosaic Control

This control is an extension of the Resource Control, providing implementation of the mosaic action prompt: marking of specific object areas on the displayed resources, and attaching separate menus to these object areas.

5.2.2.3. External Resource Control

External resource is the control used to invoke an external resource in a **separate** display window. Control properties should hold specifications of the invocation method, as well as all data required for invocation.

5.2.2.4. Grab-and-drop Control

This control is used to collect and relocate objects within the environment. Control properties should include potential valid destinations for the drop of the object.

5.2.2.5. Trigger Control

Trigger is the control used to activate another object in the environment. Control properties should include identity of the targeted object, identity of the specific action that targeted object supports, as well as the method of activation required for that action (and potentially also data required for the activation).

5.2.2.6. Dialog Control

Dialog is the control used to execute a gradual exposition of the information in a form of a dialog with a virtual character. Entire dialog is predefined as a workflow consisting of questions and answers. At every step during such dialog, user is prompted to select from a set of predefined questions that can be submitted to the virtual character at that step. Each snippet of information is then exposed as the reply in response to the particular

question selected by the user. Control properties should include the directed graph holding the predefined workflow.

5.2.2.7. Real Dialog Control

This control is used to exchange information with other users in real-time while executing a Virtual Expedition (it is an instant messaging control).

5.2.2.8. Quiz Control

This control is used to prompt user with a task, question or problem (see Figure 7). Control properties should include the following for each prompt:

- Question displayed in prompt
- Set of potential answers for selection, or
- Instruction for free text prompt
- Expected answer – either as an option in the displayed selection, or as expected free-text input in reply to the prompt
- Action to be executed if the answer is correct
- Action to be executed if the answer is incorrect
- Quiz should also keep track of scores, or record the provided answers in a separate file.

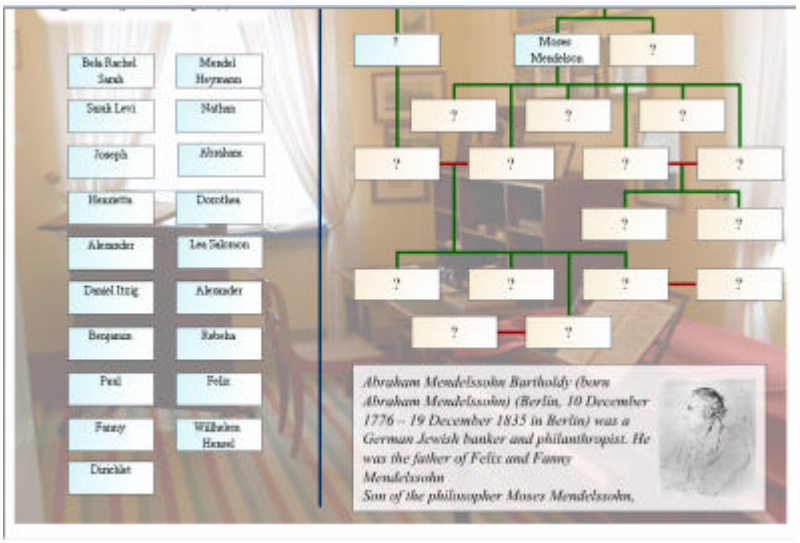


Figure 7 Example of the Quiz Control (drag-and-drop family tree puzzle)

5.3. Guidelines for Implementation

The implementation of the Virtual Expedition Framework is envisioned as two complementary utility applications: Virtual Expedition Editor and Virtual Expedition

Player. The Editor facilitates the authoring of Virtual Expeditions, and produces either XML-formatted output, or binary output, or combination of both. This output is than invoked by the Player, and executed.

In addition to the framework, it is recommended to develop and integrate into the Virtual Expedition Editor a set of Virtual Expedition templates, as well as a set of preset Virtual Expedition environments, and a set of the corresponding preset characters. Templates, preset environments and preset characters are proposed here as accessories for faster development of Virtual Expeditions, in particular required to assist beginners in their first attempts to create Virtual Expeditio ns.

The following is a short overview of the suggested templates, environments and characters.

5.3.1. Virtual Expedition Templates

5.3.1.1. Interview

Virtual Expedition is organized as a series of interviews with virtual characters. The order of interviewing these characters may be preset and stipulated, or completely random. Interview may include collection of objects (recommendation letters, keys to other rooms, etc.) required to continue interviewing other virtual characters. Interviews may include quizzes, and stipulate correct answers as the condition for continuation. Interviews may include display of external resources, or redirections to the MOSAICA navigational interfaces.

5.3.1.2. Guided Tour

Virtual Expedition is run and its execution is completely controlled by a virtual character or multiple virtual characters, presenting the content in a strictly predefined order, and providing the required explanations at every step. The Virtual Expedition is designed as a tutorial. It may include exploration tasks, quizzes and quests, but they are provided at certain points only, and as soon as they are successfully completed, the control over the Virtual Expedition goes back to the virtual character.

5.3.1.3. Quest

User is required to resolve a puzzle, solve a problem, or fulfill a task. At every step user is challenged by a quiz. – Successful answers provide access to the next step, or information required to succeed in future quizzes. The performance may be limited in time. The results may be scored.

One of the subtypes of Quest is **Treasure Hunt**. Resources and accompanying information is hidden at various locations in the environment. At each location,

instructions were given how to proceed to the next location. Instructions may contain tasks, puzzles, quizzes, etc. Virtual characters may be involved providing instructions, or disclosing the resources at the specific location. Items may be collected during the hunt, in order to combine them into the final picture at the end of the hunt.

Another subtype of the Quest is **Investigation**. Investigation is an extension of the Treasure Hunt. Rather than providing instructions regarding how to continue, it challenges the user to discover that by investigating the environment. Contradictory clues may be provided to make it more challenging. "Good" and "bad" virtual characters could be introduced providing helpful or confusing clues.

5.3.1.4. Demonstration

Use of an object (hanukkiah, yad, tzalachat Pessah, etc.), site (graveyard, synagogue, Mikweh, etc.) or even notion (e.g., blessing of wine, wedding ceremony, Succoth prayer, etc.) is demonstrated, rather than explained. Demonstration can be animation within the Virtual Expedition environment (by virtual characters), or an external video played at a certain point in the Virtual Expedition. Demonstration can be followed by the request to challenge the user to repeat the demonstrated activity herself/himself.

5.3.1.5. Reconstruction

An event or series of factual historical events is reconstructed as stations in a Virtual Expedition. Virtual characters are people involved in the events, providing information. Resources displayed are related to the events and locations.

At each step user may be requested to make a decision similar to those made by actual historical characters involved in the events. User's replies are compared to the factual decisions, and conclusions are drawn.

5.3.2. Preset Virtual Expedition Environments

5.3.2.1. Museum (indoors)

Resources are displayed as exhibits in a virtual museum. Museum consists of multiple exhibition spaces (rooms). If the environment supports stages, exhibition spaces can be organized into multiple floors (possibly requesting completion of a task or of previous floor to transit to the next floor). Virtual characters can be introduced as custodians and visitors in the museum rooms. Exhibits can combine resource and accompanying text. Rooms can be organized as a timeline (for example in a straight corridor), a gallery (random access to rooms), thematically, etc.

5.3.2.2. Home (indoors)

Resources are displayed as objects dispersed around a virtual home – as furniture, placed on top of furniture, in draws and on shelves… Considering the graphic design, several prototypical homes are required:

- Ancient Middle Eastern inside a tent,
- Ancient Middle Eastern inside a house,
- Oriental or North African,
- European from a shtetl,
- Modern.

5.3.2.3. Place of Worship (indoors)

Resources are displayed as objects dispersed around a virtual place of worship: synagogue, tabernacle, the First and the Second Temple … Considering the graphic design, several prototypical places of worship are required:

- Tabernacle,
- The First Temple,
- The Second Temple,
- Ancient synagogue,
- Sephardic synagogue,
- Ashkenazy synagogue.

Maybe some specific synagogues could be reconstructed, for example, the Great Synagogue in Amsterdam (Sephardic), and the Great Synagogue in Budapest (Ashkenazy).

5.3.2.4. Landscape (outdoors)

Resources are incorporated into the landscape – either lying around, or hidden within objects to be found in the landscape. Considering the graphic design, several landscapes are required:

- Desert,
- Archeological excavation site in a desert,
- Hill,
- Coast,
- Riverbank,
- Forest,
- Road.

5.3.2.5. Settlement (outdoors)

Resources are incorporated into the environment. Buildings in the environment can be entered and further explored (leading to the indoors environments). Considering the graphic design, several settlements are required:

- Ancient tent camp,
- Jerusalem,
- Egyptian city,
- Babylonian city,
- Ancient Middle Eastern village,
- Ghetto,
- Oriental village,
- Shtetl.

5.3.3. Preset Virtual Expedition Characters

5.3.3.1. Prototypical

Prototypical characters are anonymous characters featuring clothing typical of a certain period, or of a certain social group. Prototypical characters should include:

- Ancient men, women and children,
- Assyrian/Babylonian/Persian warriors,
- Egyptian warriors,
- Greek warriors,
- Roman legionnaires,
- Israeli and Philistine warriors,
- Hassidic men, women and children,
- Oriental men, women and children,
- Ghetto inhabitants.

5.3.3.2. Historical

In contrast to the prototypical characters, historical characters feature clearly distinguishable appearance, such as details of garment, decorations, etc. Present characters should include:

- Priests (Cohens),
- High Priest,
- King of Israel/Judah,
- Prophet,
- Pharaoh.

5.3.3.3. Generic

Generic characters are modern-day men, women and children in a variety of clothing.

5.4. New User Experience

In this chapter we shall demonstrate how we use the Virtual expedition Framework, in order to create novel user experience. To that purpose, we are presenting here the complete storyboard of a mockup Virtual Expedition, followed by the analysis of its objectives, and the implemented solutions aimed at achieving a different user experience.

5.4.1. Storyboard

Authoring of a Virtual Expedition implies primarily development of a storyboard, which includes specification of:

1. Environment (setting of the actions),
2. Objects of significance for the narrative (that are located in the environment),
3. Background for the story (in which the objects of significance are placed),
4. Characters participating in the Virtual Expedition, and
5. Plot (the narrative designed as a set of differing user's actions).

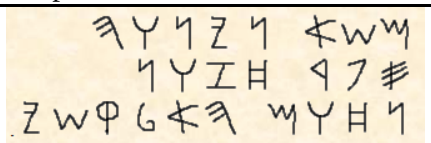
Storyboard is actually the scenario of the Virtual Expedition specified in technical terms, so that it can be executed by a suitable application.

The following is a mockup example of a storyboard featuring a Virtual Expedition about the Biblical Book of Nahum.

Environment: archeological excavation site in an imaginary desert.
Objects: somewhere on the site there is the site management desk – covered in documents, plans and maps, and sheltered by a shed made of palm-tree leaves; pits, piles of earth, and partially excavated remains of walls hide various pottery and rotten wooden cases that can contain and conceal various objects, such as papyrus scrolls, tablets, etc. Not all these containers enclose objects. There may be visual clues as to whether a container encloses an object of interest, or not.
Characters: Virtual characters resembling excavation workers are dispersed throughout the environment providing such clues through the dialog with them. Some characters may be "good", and provide true clues, but some may be "evil", and provide false and confusing clues.
Plot: Virtual Expedition is organized in stations. A station is an object concealed in a container somewhere in the environment, or exposed as the part of the environment (a fresco or a relief on one of the walls). If the object of interest is concealed in a container, the user must open the container, in order to find the object. The entire exploration is limited in time, and score is kept.
All stations except the first are inactive as long as the first station is not discovered, thus ensuring that the first station containing the instructions will be encountered first. The last station is inactive as long as all other stations are not discovered and explored. The last station is the conclusion of the Virtual Expedition, and must be encountered only when the information from all other stations is collected. The last station is designed to host a potential discussion summarizing the Virtual Expedition. This discussion can be

held online (if the Virtual Expedition is viewed simultaneously by a class, or by several users on different geographical locations), or the users can leave their contributions to the discussion for future viewers. In the latter case, the access to the discussion is enabled from the MOSAICA navigational interfaces, and not only from within the Virtual Expedition.

Each station features a piece of information presented as a graphic file, the accompanying text, and a menu. The presented text always starts with a quote from the Book of Nahum – first the Hebrew original, and then the English translation. The graphic file is the discovered object – a papyrus scroll, ancient map, pottery tablet, etc.

Station 1	**Book of Nahum**	
Description	Graphic resource	Caption
Hidden object is a papyrus scroll.		"This is the first verse of the Book of Nahum in the Paleo-Hebrew (used before 585 BC)."
Quote:	"1:1 The burden of Nineveh. The book of the vision of Nahum the Elkoshite."	
Text:	The book of Nahum is a book in the Tanakh. Tanakh consists of the Torah, the Nevi'im (Prophets) and the Ketuvim (Scripts). Book of Nahum is contained in the Nevi'im. Nevi'im consists of the Nevi'im Rishonim (First Prophets) and Nevi'im Aharonim (Later Prophets). There are 12 Later Prophets, which are therefore called Trei-Asar, meaning "twelve" in Aramaic. Nahum is one of the Trei Asar. His book comes in the chronological order between Micah and Habakkuk. While Nevi'im Rishonim feature narrative form, and are very extensive, Nevi'im Aharonim are much shorter, and written in a poetical form. Book of Nahum is the shortest of all Trei Asar, and has only three chapters. Look around the excavation site for hidden artifacts and scripts, and find out what did Nahum prophesize, and whether his prophecies did fulfill.	
Menu:	• Learn more about Tanakh[5] • Learn more about Nevi'im • Learn more about Nevi'v Rishonim • Learn more about Trei Asar • Learn more about Micah • Learn more about Habakkuk	

[5] All menu items formulated as "Learn more about …" trigger the MOSAICA semantic information retrieval interface displaying assertions from the ontology, as well as the associated annotated resources related to the concept specified in the menu item.

Station 2	**Assyrian Empire**	
Description	Graphic resource	Caption
The hidden object is a fresco on a wall.		"From 'Monuments of Nineveh' by Austen Henry Layard"
Quote:	"2:8 But Nineveh is of old like a pool of water: yet they shall flee away. Stand, stand, shall they cry; but none shall look back."	
Text:	Nineveh was an important city in ancient Assyria. This "exceeding great city", as it is called in the Tanakh (Jonah 3:3ff; 4:11), lay on the eastern bank of the Tigris in modern-day Mosul, Iraq. The Assyrian kings controlled a large kingdom at three different times in history. These are called the Old (20th to 15th c. BC), Middle (15th to 10th c. BC), and Neo-Assyrian (911–612 BC) kingdoms, or periods, of which the last is the most well known and best documented. Some scholars regard the Neo-Assyrian Empire to be the first real empire in human history. The Neo-Assyrian Empire is usually considered to have begun with the accession of Adad-nirari II, in 911 BC. Beginning with the campaigns of Adad-nirari II, Assyria became a great regional power, growing to be a serious threat to 25th dynasty Egypt. It began reaching the peak of its power with the reforms of Tiglath-Pileser III (ruled 745–727 BC). This period, which included the Sargonic dynasty, is well-referenced in several sources, including the Assyro-Babylonian Chronicles and the Tanakh.	
Menu:	• See Nineveh on a map [6] • Learn more about Assyrian Empire • Learn more about Jonah	

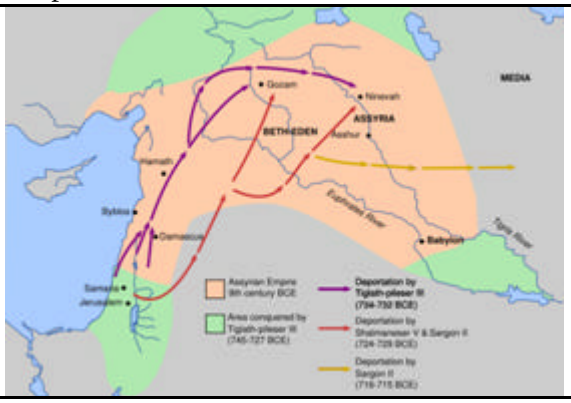
[6] All menu items formulated as "See … on a map" trigger the MOSAICA GIS/TIS interface displaying a suitable map focused on the place specified in the menu item.

Station 3	**Nineveh**	
Description	Graphic resource	Caption
The hidden object is a modern map left behind somewhere on the excavation site.		"Map of the archeological excavations at Nineveh showing the city walls and the gates"
Quote:	"3:1 Woe to the bloody city! It is all full of lies and robbery; the prey departeth not."	
Text:	In the Bible, Nineveh is first mentioned in Genesis 10:11: "Ashur left that land, and built Nineveh." Though the Books of Kings and Books of Chronicles talk a great deal about the Assyrian empire, Nineveh itself is not again noticed till the days of Jonah, when it is described (Jonah 3:3ff; 4:11) as an "exceeding great city of three days' journey", i.e., probably in circuit. This would give a circumference of about 100 km (60 miles). At the four corners of an irregular quadrangle are the ruins of Kouyunjik, Nimrud, Karamles and Khorsabad. These four great masses of ruins, with the whole area included within the parallelogram they form by lines drawn from the one to the other, are generally regarded as composing the whole ruins of Nineveh. It was strongly fortified on every side, bidding defiance to every enemy. Nineveh was the flourishing capital of the Assyrian empire (Second Book of Kings 19:36; Isaiah 37:37). Nineveh was then the center of the civilization and commerce of the world. It was also mentioned in Jonah that Ninevah was an evil city that needed to be condemned. To fix this problem, God sent the prophet Jonah (in Arabic: Nebi Yunus) to preach to Ninevah, and they repented. Nineveh was a "bloody city all full of lies and robbery" (Nahum 3:1), for it had robbed and plundered all the neighboring nations. "Because of the multitude of the whoredoms of the wellfavoured harlot, the mistress of witchcrafts, that selleth nations through her whoredoms, and families through her witchcrafts. Behold, I am against thee, saith Lord of hosts, and I will uncover thy skirts upon thy face; and I will show the	

	nations thy nakedness, and the kingdoms thy shame" (Nahum 3:4-5). This is very symbolic showing that Nineveh was known for being a city full of prostitutes.
Menu:	• See Nineveh on a map • Learn more about Jonah • Learn more about Genesis • Learn more about Books of Kings • Learn more about Books of Chronicles

Station4	**Kingdom of Israel**	
Description	Graphic resource	Caption
The hidden object is a modern map left somewhere on the site.		"Satellite map of the areas controlled by the divided kingdoms after Solomon's death"
Quote:	"2:2 For the Lord hath turned away the excellence of Jacob, as the excellence of Israel: for the emptiers have emptied them out, and marred their vine branches."	
Text:	The Kingdom of Israel is one of the successor states to the older United Monarchy (also often called the "Kingdom of Israel"). By Historians, ancient Israel is often referred to as the Northern Kingdom to differentiate it from the Southern Kingdom of Judah. The Hebrew Scriptures sometimes referred to the separate kingdom idiomatically as the "House of Joseph" in order to distinguish it principally from the "House of Judah". Soon after the death of King Solomon, Rehoboam, the son and successor of Solomon, was scarcely seated on his throne when the old jealousies between Judah and the other tribes broke out anew. Rehoboam insolently refused to lighten the burdensome taxation and services that his father had imposed on his subjects and the rebellion became complete. The Tribe of Ephraim and all Israel raised the old cry, "Every man to his tents, O Israel" (2 Samuel 20:1). Rehoboam fled to Jerusalem (1 Kings 12:1-18; 2 Chronicles 10), and in 930 BCE-920 BCE, Jeroboam was proclaimed king over all Israel at Shechem, with the Tribe of Judah and the Tribe of Benjamin remaining faithful to Rehoboam. This is why Kingdom of Israel	

	is also called the kingdom of Ten Tribes.
Menu:	• See Kingdom of Israel on a map • See Kingdom of Judah on a map • Learn more about Salomon • Learn more about Rehoboam • Learn more about Jeroboam

Station 5	**Bitter Destiny of Israel**	
Description	Graphic resource	Caption
The hidden object is an ancient map on papyrus.		"Map showing routes of Assyrian deportations from the Kingdom of Israel"
Quote: Text:	"2:10 Everything has been taken from her, all is gone, she has nothing more: the heart is turned to water, the knees are shaking, all are twisted in pain, and color has gone from all faces." It is not known if the Assyrians were the first to deport people, but it is likely that they were the first to practice it on a large scale. The Assyrians began to utilize mass-deportation as a punishment for rebellions since the 13th century BC. By the 9th century BC the Assyrians made it a habit of regularly deporting thousands of restless subjects to other lands. Assyrian deportations involved removing one enemy population and settling them into another. The decline of the Kingdom of Israel began in approximately 740 BC, when the tribes of Reuben, Gad, and eastern half-tribe of Manasseh were carried away by one of the first successful Assyrian invasions (I Chronicles 5:26; II Kings 15:29). In 721 BC, the Assyrian army captured the Israelite capital at Samaria and carried away the citizens of the northern kingdom into captivity. Sargon records his first campaign on the walls of the royal palace at Dur-Sarraku (Khorsabad). Assyrian cuneiform mention 27,290 captives were taken from Samaria, the capital of the Northern Kingdom of Israel, by the hand of Sargon II. Conservative estimates easily assume a captivity numbering in the hundreds of thousands. Some historians attribute the ease of Israel's defeat to the previous two	

	decades of invasions, defeats, and deportations. The inhabitants of the Kingdom of Israel were scattered throughout the East, and are popularly known as the Lost Ten Tribes of Israel. Unlike the Kingdom of Judah, which was able to return from its Babylonian Captivity, the ten tribes of the Northern Kingdom never had a foreign edict granting permission to return and rebuild their homeland. After the deportation of the ten tribes, the vacated land was colonized by various eastern tribes, especially Syrians, whom the king of Assyria sent there (Ezra 4:2, 10; 2 Kings 17:24-29).
Menu:	• See Kingdom of Israel on a map • Learn more about Assyrian Empire • Learn more about the Lost Ten Tribes

Station 6	**Campaign against Judah**	
Description	Graphic resource	Caption
The hidden object is a relief on a wall.		"Assyrian cavalry archer"
Quote:	"1:15 Behold upon the mountains the feet of him that bringeth good tidings, that publisheth peace! O Judah, keep thy solemn feasts, perform thy vows: for the wicked shall no more pass through thee; he is utterly cut off."	
Text:	The virtual destruction of Israel left the southern kingdom, Judah, to defend itself in the whirlwind of warring Near Eastern kingdoms. At the time of Samaria's fall, there existed two kings in Judah — Ahaz and his son Hezekiah — who ruled as co-regents. Judah existed as a vassal to Assyria during this time and was forced to pay an annual tribute to the powerful empire. In 715 BCE, following the death of Ahaz, Hezekiah became the sole regent of Judah and initiated widespread religious reforms — smashing the idols the people had worshiped during the reign of his father and leading the Jews toward a renewed relationship with God. He re-captured Philistine-occupied lands in the Negev desert, formed alliances with Ashkelon and Egypt, and made a stand against Assyria by refusing to pay tribute. In response, Sennacherib, king of Assyria, attacked the fortified cities of	

	Judah. While Sennacherib was besieging Lachish, he received a message from Hezekiah offering to pay tribute in exchange for Assyrian withdrawal. According to the Old Testament, Hezekiah paid three hundred talents of silver and thirty talents of gold to Assyria — a price so heavy that he was forced to empty the temple and royal treasury of silver and strip the gold from the doorposts of Solomon's temple.
Menu:	• See Kingdom of Judah on a map • See Lachish on a map • Learn more about Assyrian Empire • Learn more about Ahaz • Learn more about Hezekiah

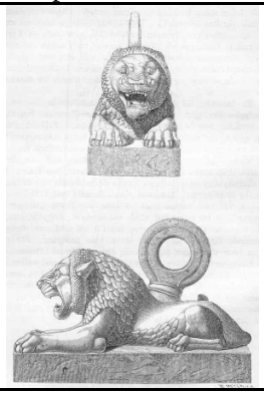
Station 7	**Siege of Jerusalem**	
Description	Graphic resource	Caption
The hidden object is Sennacherib's Prism.		"Sennacherib's Prism discovered in the ruins of Nineveh in 1830 (stored at the Oriental Institute in Chicago, Illinois)"
Quote:	"2:1 He that dasheth in pieces is come up before thy face: keep the munition, watch the way, make thy loins strong, fortify thy power mightily."	
Text:	Sennacherib's Prism details the events of Sennacherib's campaign against Judah. The account dates from about 690 BC. The text of the prism boasts how Sennacherib destroyed forty-six of Judah's cities, trapped Hezekiah in Jerusalem "like a caged bird". The text goes on to describe how the "terrifying splendor" of the Assyrian army caused the Arabs and mercenaries reinforcing the city to desert. The prism goes on to state that Jerusalem surrendered and Hezekiah gave the Assyrian king large quantities of money as tribute, resulting in the Assyrians victoriously returning home. This explanation contradicts that in the Tanakh. According to Tanakh Hezekiah gathered the citizens in the square and encouraged them by reminding them that the Assyrians possessed only "an arm of flesh", but the Jews had the protection of God. When the Assyrian force arrived, its field commander brought a message from Sennacherib himself. In an attempt to demoralize the Jews, the field commander announced to the	

	people on the city walls that Hezekiah was deceiving them, and God could not deliver Jerusalem from the king of Assyria. He listed the gods of the people thus far swept away by Sennacherib then asked, "Who of all the gods of these countries has been able to save his land from me?" However, the prophet Isaiah assured Hezekiah that the city would be delivered and Sennacherib would be cut down with the sword. The Tanakh states that during the night, an angel of God brought death to 185,000 Assyrians troops. When Sennacherib saw the destruction wreaked on his army, he withdrew to Nineveh. Jerusalem was spared destruction. The mass death mentioned in the Tanakh has never been substantiated by any archaeological find. Some historians speculate that the accounts of mass death among the Assyrian army in the Tanakh might be explained by an outbreak of cholera (or other water-borne diseases) due to the springs beyond the city walls having been blocked, thus depriving the besieging force of a safe water supply. The prophecy of Isaiah did not come to pass immediately, but did eventually intersect with Sennacherib. In 681 BC, while worshiping in the temple of Nisroch, the king of Assyria was killed by his own son. He had ruled Assyria for twenty-four years.
Menu:	• See Jerusalem on a map • See Nineveh on a map • Learn more about the Assyrian Empire • Learn more about Sennacherib • Learn more about Isaiah

Station 8	**Destruction of Nineveh**	
Description	Graphic resource	Caption
The hidden object is remains of a bow and arrows.		"Siege of Nineveh"
Quote:	"3:7 And it will come about that all who see you will go in flight from you and say, Nineveh is made waste: who will be weeping for her? Where am I to get comforters for her?"	

Text:	It was Sennacherib who made Nineveh a truly magnificent city. He built the famous “palace without a rival”, the plan of which has been mostly recovered, and has overall dimensions of about 210 by 200 m. At this time the total area of Nineveh comprised about 1,800 acres (7 km²), and 15 great gates penetrated its walls. An elaborate system of 18 canals brought water from the hills to Nineveh, and several sections of a magnificently constructed aqueduct erected by the same monarch were discovered at Jerwan, about 40 km (25 miles) distant. The enclosed area had more than 100,000 inhabitants (maybe closer to 150,000), about twice as many as Babylon at the time, placing it among the largest settlements worldwide. Nevertheless, Nineveh's greatness was short-lived. About 633 BC the Assyrian empire began to show signs of weakness, and Nineveh was attacked by the Medes, who about 625 BC, joined by the Babylonians and Susianians, again attacked it. “The chariots rage in the streets. They rush back and forth in the broad ways. Their appearance is like torches. They run like the lightning” (Nahum 2:4). Nineveh fell in 612 BC, and was razed to the ground. The people in the city who could not escape to the last Assyrian strongholds in the west, were either massacred or deported. Many unburied skeletons were found by the archaeologists at the site. “The horseman lifteth up both the bright sword and the glittering spear: and there is a multitude of slain, and a great number of carcasses; and there is none end of their corpses; they stumble upon their corpses” (Nahum 3:3). The Assyrian empire then came to an end, the Medes and Babylonians dividing its provinces between them. Following the defeat in 612 BC, Nineveh faded in importance. The site remained unoccupied for centuries until the Sassanian period. From the Arab conquest 637 AD until modern time the city of Mosul on the opposite bank of the river Tigris became the successor of ancient Nineveh. The book of the prophet Nahum is almost exclusively taken up with prophetic denunciations against this city. “The Lord has given an order about you, that no more of your name are to be planted: from the house of your gods I will have the pictured and metal images cut off; I will make your last resting-place a place of shame; for you are completely evil” (Nahum 1:14). Its ruin and utter desolation are foretold. “There is no healing of thy bruise; thy wound is grievous: all that hear the bruit of thee shall clap the hands over thee: for upon whom hath not thy wickedness passed continually?” (Nahum 3:19). Its end was strange, sudden, and tragic. “The gates of the rivers are opened, and the palace is dissolved. And the queen is uncovered, she is taken away and her servant-girls are weeping like the sound of doves, hammering on their breasts. But Nineveh has been from of old like a pool of water, yet they flee away. ‘Stop! Stop!’ they cry, but no one looks back. Take silver, take gold; for there is no end to the store; take for yourselves a weight of things to be

	desired. Everything has been taken from her, all is gone, she has nothing more: the heart is turned to water, the knees are shaking, all are twisted in pain, and color has gone from all faces" (Nahum 2:6-11) According to the Bible, it was God's doing, his judgment on Assyria's pride. "But with an overrunning flood he will make an utter end of the place thereof, and darkness shall pursue his enemies" (Nahum 1:8). Zephaniah also (2:13–15) predicts its destruction along with the fall of the Assyrian Empire of which it was the capital.
Menu:	• See Nineveh on a map • See map of the Assyrian Empire • Learn more about Assyrian Empire • Learn more about Jonah • Learn more about Zephaniah

Station 9	**Who was Nahum?**	
Description	Graphic resource	Caption
The hidden object is a small sculpture.		"Bronze lion from Nineveh"
Quote:	"1:1 The burden of Nineveh. The book of the vision of Nahum the Elkoshite."	
Text:	Little is known about Nahum's personal history. His name means "comforted," and he was from the town of Alqosh, (Nah 1:1) which scholars have attempted to identify with several cities, including the modern Alqush of Assyria and Capharnaum of northern Galilee. His writings could be taken as prophecy or as history. Nahum prophesied, according to some, in the beginning of the reign of Ahaz (740s BC). Others, however, think that his prophecies are to be referred to the latter half of the reign of Hezekiah (700s BC). Possibly the book was written in Jerusalem, where Nahum witnessed the invasion of Sennacherib (2 Kings 19:35). One account suggests that his writings are much later, and that his prophecies were written about 615 BC, just before the downfall of Assyria, while another account suggests that he wrote this passage as liturgy just after its downfall in 612 BC.	

	Nahum was from the Northern kingdom and he and his family must have suffered the wrath of Assyrian conquer and their enormous cruelty. How ferocious and brutal was the Assyrian rule can be understood from Isaiah: the Assyrians had been used as God's "rod of [...] anger, and the staff in their hand [as] indignation" (Isaiah 10:5). Nahum was a very nationalistic Hebrew however. He dreams of a mighty Israelite army that will conquer Nineveh and free Israel and other conquered nations from Assyrian oppression. "For Lord restores the excellence of Jacob, as the excellence of Israel; for the destroyers have destroyed them, and ruined their vine branches. The shield of his mighty men is made red, the valiant men are in scarlet: the chariots shall be with flaming torches in the day of his preparation, and the fir trees shall be terribly shaken" (Nahum 2:2-3). The tomb of Nahum is supposedly inside the synagogue at Alquosh, although there are other places outside Iraq that lay claim also to being the original 'Elkosh' from which Nahum hailed. Alquosh was abandoned by its Jewish population in 1948, and the synagogue that purportedly houses the tomb in a poor structural state, to the extent that the tomb itself is in danger of destruction. The tomb underwent basic repairs in 1796. A team of US/UK construction engineers is currently planning ways to save the building and the tomb.
Menu:	• See Alqush on a map • See Capharnaum on a map • Learn more about Isaiah

Station 10	**Structure of the Book of Nahum**	
Description	Graphic resource	Caption
The hidden object is a relief on a wall.		"Lion hunt found in the North Palace in Nineveh"
Quote:	"1:5 The mountains quake at him, and the hills melt, and the earth is burned at his presence, yea, the world, and all that dwell therein."	
Text:	From it's opening, Nahum shows God to be slow to anger but also one who will be no means clear the guilty but will bring his vengeance and wrath to pass. "God is jealous, and the Lord revengeth; the Lord revengeth, and is furious; the Lord will take vengeance on his adversaries, and he reserveth wrath for his enemies. The Lord is slow to anger, and	

	great in power, and will not at all acquit the wicked" (Nahum 1:2-3). God is strong and will use means, but a mighty God doesn't need anyone else to carry out vengeance and wrath for him. The first chapter concludes with the warning to the Ninevites of coming events, although Nahum is partly in favor of the destruction. The prophet Jonah shows us where God shows concern for the people of Nineveh, since the Assyrians had been used as an instrument of God's anger "and the staff in their hand [as] indignation" (Isaiah 10:5). In contrast, Nahum's writing testifies to his belief in the righteousness of God and the decision to destroy Nineveh. The second chapter describes the sack of Nineveh. Nahum uses numerous similes and metaphors. The lion, the symbol of Assyrian power is made reference to: Nineveh is compared to a lion's den where the lioness and young await the return of the lion with his kill. "Where is the dwelling of the lions, and the feeding place of the young lions, where the lion, even the old lion, walked, and the lion's whelp, and none made them afraid? The lion did tear in pieces enough for his whelps, and strangled for his lionesses, and filled his holes with prey, and his dens with ravine. Behold, I am against thee, saith the Lord of hosts, and I will burn her chariots in the smoke, and the sword shall devour thy young lions: and I will cut off thy prey from the earth, and the voice of thy messengers shall no more be heard." (Nahum 2:11-13). In the third chapter Nineveh is compared to Thebes, the Egyptian city that Assyria itself had destroyed. "Art thou better than populous No-amon [Thebes], that was situate among the rivers, that had the waters round about it, whose rampart was the sea, and her wall was from the sea? Ethiopia and Egypt were her strength, and it was infinite; Put and Lubim were her helpers. Yet was she carried away, she went into captivity: her young children also were dashed in pieces at the top of all the streets: and they cast lots for her honorable men, and all her great men were bound in chains" (Nahum 3:8-10). Nahum describes the siege and frenzied activity of Nineveh's troops as they try in vain to halt the invaders. "Draw thee waters for the siege, fortify thy strong holds: go into clay, and tread the morter, make strong the brickkiln. There shall the fire devour thee; the sword shall cut thee off; it shall devour thee like the canker-worm: make thyself many as the canker-worm; make thyself many as the locust. Thou hast multiplied thy merchants above the stars of heaven: the cankerworm spoileth, and flieth away. Thy princes are as the locusts, and thy marshals as the swarms of grasshoppers, which encamp in the hedges in the cold day, but when the sun ariseth they flee away, and their place is not known where they are" (Nahum 3:14-17). Poetically, he becomes a participant in the battle, and with subtle irony, barks battle commands to the defenders.

	It comes to conclusion with a satirical warning to Assyria's rulers: "Thy shepherds slumber, O king of Assyria: thy nobles shall dwell in the dust: thy people is scattered upon the mountains, and no man gathereth them. There is no healing of thy bruise; thy wound is grievous: all that hear the bruit of thee shall clap the hands over thee: for upon whom hath not thy wickedness passed continually?" (Nahum 3:18-19).
Menu:	• See Nineveh on a map • See Thebes on a map • See map of Egypt • Learn more about the Assyrian Empire • Learn more about Isaiah

Station 11	**Style of the Book of Nahum**	
Description	Graphic resource	Caption
The hidden object is a relief on a wall.		"The Assyrian army sacking a city and carrying away the loot"
Quote:	"1:11 There is one come out of thee, that imagineth evil against the Lord, a wicked counselor."	
Text:	The book of Nahum is often neglected because it is obscure and short. At the first glance it may feel as a rather dry account of ancient history. However, this prophecy is intended to reveal something about God's character. – It is the job of a prophet to reveal to us the character of God. Indeed, the aspect of God which the prophet Nahum was given to reveal is God's anger. In his prophecy God flashes forth in awful fury – God before whom men must stand silent and trembling. This prophecy is directed against the city of Nineveh to whom God sent first the prophet Jonah. When Jonah preached in Nineveh, the city repented and God's anger was withheld from the city. The book of Nahum comes some one hundred years after the prophecy of Jonah. During this time, Nineveh had begun to do the same things again that called forth the threat of judgment through the prophet Jonah. King Sennacherib who came from the capital city of Syria, Nineveh, invaded Israel at the time of the prophet Isaiah, and it was from this great	

	city in the north that the armies of the Syrians frequently came against the land of Judah and of Israel. Nahum means "consoled," or "comforted", and as the Assyrian army was spread out around the city of Jerusalem, the prophet was given a message of consolation. You can imagine how consoling it was when the armies were right there with their terrible reputation as ruthless warriors, burning and destroying, raping and pillaging, killing the children and sparing no one, to have this prophet stand up in Jerusalem and declare to them that God would destroy Nineveh, the capital city of their enemies.
Menu:	• See Jerusalem on a map • See Nineveh on a map • Learn more about Jerusalem • Learn more about the Assyrian Empire

Station 12	**Significance of the Book of Nahum**	
Description	Graphic resource	Caption
The hidden object is a snapshot left somewhere on the site.		"Nineveh today: Eastern wall and Shamash gate"
Quote:	"2:9 Take ye the spoil of silver, take the spoil of gold: for there is none end of the store and glory out of all the pleasant furniture."	
Text:	Once a glorious city and one of the most important places in the whole world, Nineveh is today ruins covered by dirt and scattered across the Iraqi desert. The invincible armies that once ruled the world disappeared. Great Kings who never showed mercy to enemies are no more. Is this the destiny of every human might? Why was Nineveh punished? Did the Assyrians draw God's wrath because they attacked Israel and later Judah? – But they are also an instrument of God – God's rod used to punish other nations for sins. Did the Assyrians truly deserve their destiny? The Assyrians conquered and tyrannized many nations. Besides the Ten Tribes and later Judah, other nations were conquered too: Aramaeans, Phoenicians, Medes, Hittites, Philistines, Cimmerians, Egyptians … The tragedy was not specifically Jewish, but rather universal human tragedy of the loss of freedom and the brutality of occupation.	

Menu:	• Join the discussion online[7] • Read messages left by other viewers[8] • Leave a message for future visitors[9]

5.4.2. Motivation and Objectives

Virtual Expedition about the Biblical Book of Nahum is primarily motivated by the importance of the source: Book of Nahum is one of the books of prophecy in the Hebrew Bible. As such, its importance is emphasized by multiple factors:

1. It is an outstanding example of the so-called "Biblical poetry", which is a unique literal genre.
2. It is one of the important historical sources for the period of two Kingdoms.
3. Composed to bring comfort and message of hope in the moment of agony and catastrophe, it has a special national value, and significance for self-determination.
4. It raises important ethical, political and theological questions, such as temporality of human power, horrors of occupation and human tragedy, human actions as an instrument of God's will…

Accordingly, the following objectives can be formulated for the Virtual Expedition about the Book of Nahum:

1. Introduce the modern-day readers to the Biblical poetry, and expose them to as much as possible of the original text.
2. Teach a lesson in an important period of the Jewish history.
3. Convey a universal human message.
4. Present a Biblical source in an exciting and intriguing manner.

5.4.3. Challenges

There are numerous challenges in presenting the Book of Nahum:

1. It is Biblical poetry, and not a narrative. – The problem is: how to transform poetry into Virtual Expedition?
2. It is focused on a single subject (i.e. destruction of Nineveh). – How much can be told about that? How long can user's attention stay focused on that?
3. It maintains monotone exposition: no plot, no development in the story, no characters – nothing really to start with when developing a storyboard.

[7] This menu item triggers IM facility embedded in the MOSAICA application, in order to use it for online discussion.
[8] This menu item triggers a forum facility embedded in the MOSAICA application.
[9] This menu item triggers a forum facility embedded in the MOSAICA application.

4. It presents dull and uninteresting content: fall of an ancient city almost three thousand year ago. – How many people are expected to find interest in it, and how is it related to the Jewish cultural heritage?
5. There is no actual story to tell.

This situation is actually not untypical for resources with either poetical or highly abstract content. The Book of Nahum was selected for the demonstration of the methodology for creating a novel user experience in the cultural heritage because it is a very difficult source presenting a challenge. This is neither the most important book of the Bible, nor the most important of the prophecies. But, it is the shortest book of the Bible with the least content, as well as one of the most obscure parts of the Bible, employing an extremely difficult literary expression. The major challenge is therefore to present such resources in an exciting way that would draw the attention of the modern-day users, and keep their attention throughout the entire Virtual Expedition.

Moreover, the Book of Nahum is also an educational challenge:

1. The text of the book is extremely difficult for reading (and translation).
2. The text uses complex and elevated language.
3. The text is abundant with similes and metaphors.
4. The text draws heavily on the rich background of associations familiar only to the versed Tanakh readers.
5. The text is considered by the Biblical researchers to be obscure and esoteric, and is typically avoided as a school reading.

The challenge is hereby to expose the user to as much as possible of the original text, providing the explanations, and guiding the reader through the difficult language and exposition.

Yet an additional challenge related to the Book of Nahum is concerning the message of tolerance and multiculturalism. The Book of Nahum is strictly a Jewish resource (from the Tanakh), underlined by the fact that the Prophet Nahum was an outspoken Hebrew nationalist. The challenge is how to utilize such strictly national oriented resource, in order to convey a universal human message.

5.4.4. Solutions

To meet this challenge, the following tactics were employed:

1. Use of the Investigation template. – Investigation is an extension of the Treasure Hunt template that challenges the user to discover how to proceed through the Virtual Expedition by investigating the environment in it, and the information hidden in it. The advantage of investigation is that it requires a high level of involvement on behalf of the user. Even if the plot of the story is “thin”, the curiosity and demand for constant interaction with the Virtual Expedition will keep the user fascinated throughout the Virtual Expedition.

2. Introduction of the historical background. – Although the historical backdrop for the Book of Nahum is handled in other books in the Bible, it is utilized here, in order to introduce a story with a plot and development. Also the archeological evidence is combined with the Biblical plot, in order to create tension and variety.

Combining both tactics enables introduction of the environment such as archeological excavation site as the backdrop for the Virtual Expedition.

5.4.5. Effects

The storytelling was introduced by presenting the historical background. The scenario gradually explained why a Hebrew prophet is concerned about the Assyrian capitol. The raise and fall of the Neo-Assyrian Empire, the atrocities of the ancient world, and the heroic struggle for independence provided the plot, the characters, and the dynamics of a narrative. Eventually, the prophet himself was turned into a hero of the narrative, and introduced not only as the author, but as an active character in the plot, bringing consolation and hope to the troubled people of ravished Judah and besieged Jerusalem.

The esoteric text was introduced in portions, interwoven with the historical facts and commentaries explaining it. An overview of the structure of the resource was also provided. An introduction into the style and the metaphoric world of the prophecy was provided. The final result is that more than 60% of the original text is actually provided in the Virtual Expedition.

Finally, the universal human message was emphasized through the topics for discussion. The nationalistic character if the Book of Nahum was neither concealed, nor minimized. However, the summarizing discussion elevated its national character into universal human sphere: the temporary character of human might, divine will, and human suffering under occupation were proposed as the topics for discussion.

The Investigation template proved useful for transforming highly abstract content into a narrative. This template seems useful for the situations where the narrative must be told in text (historical facts, poetic text, abstract concepts encountered in theology and philosophy, etc.), and is difficult for its transformation into a dialog. The high level of involvement required on behalf of the user in searching and discovering the information brings the required dynamics into the textual narrative.

A great deal of effort in the scenario was invested into interactivity with the external sources (option menus). The reason is to bring into it additional dynamics by allowing and encouraging the user to supplement the information with additional resources.

Further dynamics could be effectively introduced by combining Investigation with Dialog. – Some information could be conveyed in dialogs with virtual characters – randomly encountered during the investigation. For example, the Prophet Nahum could be one of such virtual characters.

6. CONCLUSIONS

Virtual Expedition is a novel concept introduced in MOSAICA and designed specifically to enable presentation of the cultural heritage oriented content in a way suitable to the digital character of the content, as well as to the growing audience accustomed to the modern-day media. Virtual Expedition is viewed as a concept, design paradigm and technology.

As **concept**, Virtual Expedition is viewed as the modern-day, digital equivalent of the traditional storytelling. Although rooted deeply in the traditions of the storytelling used to pass cultural heritage down the generations, Virtual Expedition draws heavily from the computer gaming, cinematography and graphic novels. Virtual Expedition, consequently, aims to provide a novel conceptual framework for the transfer of cultural heritage.

As **design paradigm**, Virtual Expedition sets the design principles for the presentation of the digital cultural heritage oriented content. Virtual Expedition provides framework for the presentation of cultural heritage 1) through digital media in general, and over the Internet in particular (hence the term "Virtual" in its name), and 2) by creating user experience based on exploration and discovery (hence the term "Expedition" in its name).

As **technology**, Virtual Expedition is envisioned as one of the emerging technologies within the Web 2.0 paradigm of the Internet use. Virtual Expedition is envisioned as a medium for introducing the collective intelligence into the domain of cultural heritage. MOSAICA not only allows communities of users to collaboratively collect, annotate and organize the content of interest, but moreover, with Virtual Expeditions MOSAICA enables communities to use this knowledge, apply their creativity for the benefit of all, create their own narrative, their own stories, and thus empowers communities to continue the cultural heritage into the digital age.

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