MOSAICA

Semantically Enhanced, Multfaceted, Collaborative Access to Cultural Heritage

Project IST-034984

D6.3 MOSAICA Evaluation Report

Deliverable

Editors: TECH
Contributors: TECH, ORT, COI,
Dissemination Level: **Public**
Date: 11-Dec-2008

Executive Summary

Following the evaluation plan developed in the previous task, D6.1, in this task we report the results of the data collected using three evaluation tools: Online pre- post- questionnaires, Semi-structured interviews and Log analysis. The fourth tool: expedition diary was designed as an open online forum enabling the Virtual Expedition creator to provide commentary and other users to communicate with her/him. The expedition diary and its merits as both a communication and evaluation tool are discussed in this report. However, its data was not analyzed since in order to provide a deep and thorough assessment of the system a longer usage duration is required.

This report includes six main sections divided into 11 chapters. In the first part we discuss societal impact evaluation and its characteristics. In the second part we detail the societal evaluation goals, research questions and methodology. We then present the quantitative and qualitative evaluation and tools. The third part includes the evaluation research plan, dividing the study into three stages: pre-pilot, pilot and main study. The forth part describes the results of each of the studies, by research tools. The fifth part includes the summary and conclusions. The final part, the appendix, includes the research tools used in the evaluation.

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1. INTRODUCTION

Evaluation of advanced technologies pertains primarily to attributing a measure of the quality of user's satisfactory, and level of the projects' success. Evaluation can be distinguished between traditional, quantitative assessment on one side of the spectrum, and authentic assessment, which involves a variety of qualitative approaches on the other side [1, 2, 3, 4].

The use of a collection of evaluation tools (online questionnaires, semi-structured interviews and access logs' analysis) is suitable to allow both generalized and specific evaluation of the system in terms of user feedback on the applicability of the system, assessing fulfilment of deliverables from the user perspective, suggestions for future systems development and user's disposition towards open-mindedness.

Data analysis was carried out based on quantitative and qualitative analysis. The analysis focused on users' attitudes, views, and behaviour, considering all the users suggestions and comments. It is important to stress that the technological effectiveness can be considered a preparatory stage for a wider "trial" process starting after project final delivery and is essential for a system to become marketable and, above all, part of routine social practice. The wider "trial" phase will not be part of MOSAICA project time frame. This is due to the fact that neither time nor resources within the MOSAICA project are sufficient for such a wider evaluation and of the different components of MOSAICA.

2. SOCIETAL IMPACT EVALUATION

Societal impact evaluation focuses on the connection of an individual to a certain society and its members. A society is defined as a grouping of individuals which is characterized by common interests and may have distinctive culture and institutions [5]. Members of a society may be from different ethnic groups pertaining to society or social groups, or to their activities, customs, etc. While aiming at social impact evaluation of a project, Van Der Meulen and Rip [6] identified four dimensions: its impact on users' societal beliefs; its relevance; communication between users; and enhancing the projects' usage. Accordingly, in the evaluation of MOSAICA system, four aspects were assessed: a) MOSAICA impact on users' dispositions toward open-mindedness, b) MOSAICA relevance to the preservation of Jewish culture heritage, c) MOSAICA ease of use: uploading resources and sharing them with others, and d) MOSAICA effect on users motivation and enjoyment.

As the world progresses, more and more people are required to make rational decisions based-on evaluative/critical thinking rather than to accept authority [7]. It is well established that exploring and learning about the culture and traditions of other people has a potential to foster ones own pluralistic views and open-mindedness [7, 8]. Therefore, our evaluation study focuses on the impact of the MOSAICA system applications and tools in terms of usability and disposition towards open-mindedness

[9, 10, 11].

In order to understand the principles of the evaluation in the context of this research, we describe the general theoretical contributions in the field of evaluation of digital technologies. During the creation of digital technology environments, it is important to accommodate users with prior experience, direction and advice [12]. It is also important that the technological environment be functional and easy to use [13]. The success of the technological usability and infrastructure has implications on the success of learning and societal impact. Malfunctioning hardware, bad software configuration, slow or down servers, busy signals and lack of access are all barriers which can cause frustration for users and ultimately affect the learning process and impact. This issue is difficult to overcome as problems with technology can arise at any time [11, 12, 13].

2.1 Evaluation Goals

MOSAICA's objective is to develop a toolbox of generic technologies for intelligent presentation, knowledge-based discovery, and interactive and creative educational experience catering for a broad variety of diversified cultural heritages. The question of how to present cultural heritage resources in a way that attracts the potential users is becoming ever more important. An effective way to use modern technologies for this purpose is a viable option. In line with this train of thought, the evaluation of a new technology-savvy system – MOSAICA and its societal impact were the foci of this study.

The objective of this study is twofold: a) to evaluate MOSAICA's potential impact on users' disposition towards open-mindedness, b) to evaluate MOSAICA's usability and its' potential to promote better understanding of the Jewish cultural heritage.

2.2. Evaluation Research Questions

The application of Semantic Web based technologies aiming at the preservation of cultural heritage, gave rise to the following research questions:

1. Whether and to what extent can the usage of MOSAICA system enhance users' disposition towards open-mindedness?

2. What are the users' opinions about the usability of MOSAICA system and its potential to promote better understanding of the Jewish cultural heritage?

3. EVALUATION METHODOLOGY

Evaluation is defined as the systematic acquisition and assessment of information to provide useful feedback about some object [14]. Evaluation utilizes many of the same methodologies used in traditional research methods, but because evaluation takes place within a socio-political and organizational context, it requires group skills, management ability, and sensitivity to multiple stakeholders.

The generic goal of most evaluations is to provide "useful feedback" to a variety of audiences including sponsors, donors, client-groups, administrators, staff, and other relevant constituencies. Most often, feedback is perceived as "useful" if it aids in decision-making and future improvements.

Evaluation strategy means broad, overarching perspectives on evaluation. They encompass the most general groups or "camps" of evaluators; although, at its best, evaluation work borrows eclectically from the perspectives of all these camps [14]. There are multiple groups of evaluation strategies - ***qualitative/anthropological models*** that emphasize the importance of observation, the need to retain the phenomenological quality of the evaluation context, and the value of subjective human interpretation in the evaluation process. Included in this category are the approaches known in evaluation as naturalistic; the various qualitative schools; critical theory and art criticism approaches; and, the 'grounded theory' approach of Glaser and Strauss [15] among others. Another is ***participant-oriented models***. As the term suggests, they emphasize the central importance of the evaluation participants, especially clients and users of the program or technology. Client-centered and stakeholder approaches are examples of participant-oriented models, as are consumer-oriented evaluation systems.

There are many different *types of evaluations* depending on the object being evaluated and the purpose of the evaluation. Perhaps the most important basic distinction in evaluation types is that between ***formative*** and ***summative*** evaluation. Formative evaluations strengthen or improve the object being evaluated -- they help form it by examining the delivery of the program or technology, the quality of its implementation, and the assessment of the organizational context, personnel, procedures, inputs, and so on. Summative evaluations, in contrast, examine the effects or outcomes of some object -- they summarize it by describing what happens subsequent to delivery of the program or technology; assessing whether the object can be said to have caused the outcome; determining the overall impact of the causal factor beyond only the immediate target outcomes; and, estimating the relative costs associated with the object.

3.1 Quantitative and Qualitative Evaluation and Tools

Researchers have long debated the relative value of qualitative and quantitative inquiry [16, 17]. Qualitative research, uses a naturalistic approach that seeks to understand phenomena in context-specific settings, any kind of research that produces findings not arrived at by means of statistical

procedures or other means of quantification. Logical positivism, or quantitative research, uses experimental methods and quantitative measures to test hypothetical generalizations. Where quantitative researchers seek causal determination, prediction, and generalization of findings, qualitative researchers seek instead illumination, understanding, and extrapolation to similar situations [17].

Quantitative research methods were originally developed in the natural sciences to study natural phenomena. Examples of quantitative methods accepted in the social sciences include survey methods, laboratory experiments, formal methods (e.g. econometrics) and numerical methods such as mathematical modeling. Quantitative researchers collect 'facts' and study one relationship of 'facts' with another. They measure using scientific techniques that are likely to produce quantified and general solutions. In quantitative research methods, the test group normally consists of a large group of participants. The main purpose is to deliver representative results [17].

Qualitative research methods are developed in the social sciences to enable researchers to study social and cultural phenomena. Examples of qualitative methods are action research, case study research and ethnography. Qualitative data sources include observations, interviews and open-ended questionnaires, documents and texts, and the researcher's impressions and reactions. Qualitative research is focused on social process and requires the author to think abstractly and critically analyzing situations, obtaining valid and reliable information, and a sense of observation and interaction [18].

Qualitative research is common in social and behavioural sciences. It is often used to describe the culture of an organisation, system or community. Qualitative research provides an overview of the broad range of non-numerical measurement approaches. There are various qualitative **approaches** such as the *ethnographic approach* and the *Grounded theory*. The *ethnographic approach* to qualitative research comes largely from the field of anthropology. The emphasis is on studying an entire culture. Originally, the idea of a culture was tied to the notion of ethnicity and geographic location (e.g., the culture of the Trobriand Islands), but it has been broadened to include virtually any group or organization. That is, we can study the "culture" of a business or defined group (e.g., a Rotary club). *Grounded theory* is a qualitative research approach that was originally developed by Glaser and Strauss in the 1960s [15]. The self-defined purpose of grounded theory is to develop theory about phenomena of interest. As the researcher begins to gather data, *core theoretical concept(s)* are identified.

Although most researchers have traditionally advocated one approach or another, today, a growing number of researchers suggest combining qualitative and quantitative research methods into one study [16, 17, 19, 20, 21]. Indeed Martin and Turner [21] claim that the two approaches are complementary to the extent that they should not be adopted in isolation.

Strauss and Corbin [17] claim that qualitative methods can be used to better understand any phenomenon about which little is yet known. They can also be used to gain new perspectives on issues about which much is already known, or to gain more in-depth information that may be difficult to convey quantitatively. Thus, qualitative methods are appropriate in situations where one needs to first

identify the variables that might later be tested quantitatively, or where the researcher has determined that quantitative measures cannot adequately describe or interpret a situation.

The Mixed methods approach combines quantitative and qualitative data. The mixed methods research draws from the strengths of both quantitative and qualitative research, and strives to minimize the weaknesses of both in single research studies and across studies [22]

On the basis of combining qualitative and quantitative methods, we chose to use a variety of instruments in order to evaluate MOSAICA system. The quantitative tools include online pre and post closed-item questionnaires and the analysis of access logs. The qualitative tools include semi-structured interviews among users. All tools aim at testing cognitive, affective, and operative aspects concerning the usage of MOSAICA. The analysis of each tool and the synthesis of all the findings together produce an important overview of MOSAICA system social impact, as well as portray possible changes in users' attitudes towards more pluralistic and open-minded views.

4. EVALUATION RESEARCH PLAN

The evaluation research included three stages: a) pre-pilot study b) pilot study c) main study. The pre-pilot study included 20 participants who validated the research tools: questionnaires and interviews. The Pilot study included 107 university students from 3 universities in Israel who explored two VE demos on Jewish women cultural heritage. The main study included 266 participants, including: high-school students, university students, museum workers, and librarians from Israel, France and Poland. Over all, more than 390 users participated in our societal evaluation research.

Hands-on workshops were conducted in order to introduce MOSAICA system to the participants in both the pilot and main studies. In addition to the workshops, MOSAICA system was presented to individual persons and small focus groups (up to 5 people) of museum workers, archive employees and librarians. Focus group interviews were conducted in order to gain better understanding of the users' opinions about the usage of MOSAICA system. Figure 1 summarized the societal evaluation stages and participants.

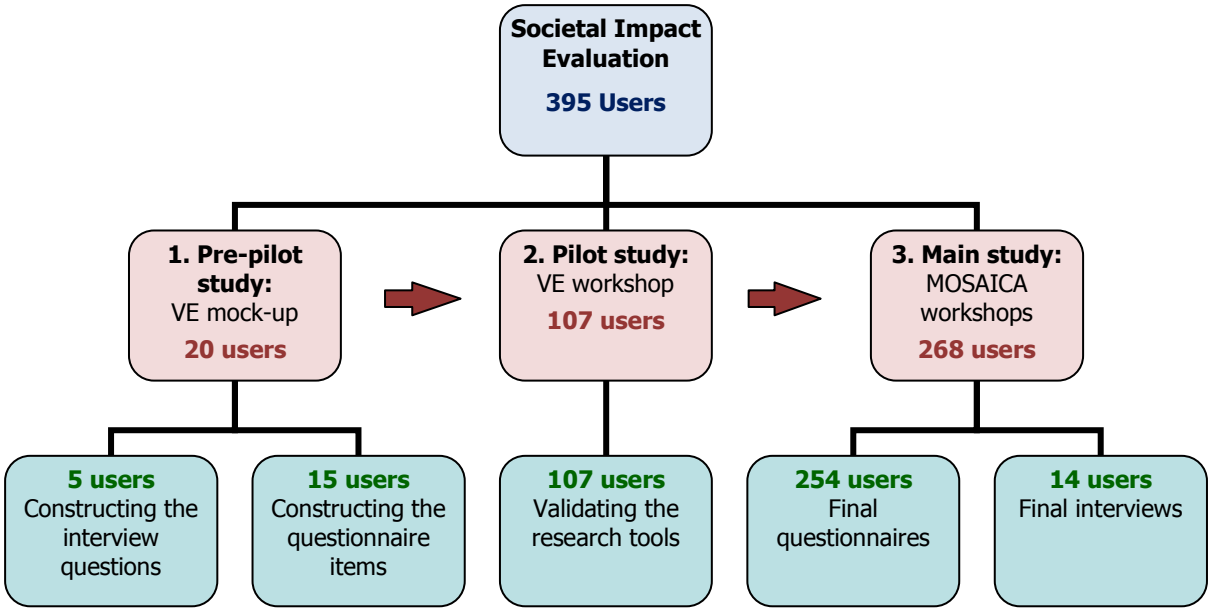


Figure 1. The stages and participants of the societal impact evaluation research

MOSAICA workshop and the three evaluation research stages are detailed in the following sections.

4.1 MOSAICA workshop plan

User groups were invited to a presentation that was provided in conjunction with hands on exploration of MOSAICA. More than ten MOSAICA workshops were conducted in Israel, France and Poland. The meetings were two-hours long, providing an overview of MOSAICA system, allowing users to gain practical experience and to provide feedback related to the system's functionality. Each workshop included an average of 25 participants. All workshops were held in computer clusters. First an expert from MOSAICA consortium demonstrated the system's interfaces, tools, and functionalities. Participants were provided with step by step instructions showing MOSAICA's explorative, guided, and collaborative usages. Then, participants were encouraged to explore MOSAICA, either by following an assignment sheet (Appendix A) or by individual discovery. As part of the evaluation study, the workshop participants were asked to answer online pre- and post-questionnaires.

The workshops were designed to examine the different aspects of MOSAICA system usage: functionality, user satisfaction, and educational gains, via participants' responses to the open-mindedness and usability questionnaires.

Each workshop included the following activities:

(1) Users respond to an online pre-questionnaire on disposition towards open-mindedness and pluralistic views.

(2) An expert presentation of MOSAICA system and its' functionalities.

(3) Users exploration of MOSAICA, including the semantic directory, GIS maps, and Virtual Expeditions.

(4) Users respond to an online post questionnaire on disposition towards open-mindedness and MOSAICA usability.

(5) Experts and users participate in a concluding discussion on MOSAICA system and its' usage.

Figures 2 and 3 show students from a Druze and Muslim high-school in Israel participating in a MOSAICA workshop.

Figure 2. High-school students using MOSAICA's investigate tool in Ramah workshop

Figure 3. A students using MOSAICA's explore tool in Ramah workshop

4.2 Pre-Pilot Study Plan and Participants

The pre-pilot study included a literature review on evaluation methods, usability of web-based systems, and societal impact in means of open-mindedness and pluralistic views. Based on the VE methodology, developed in WP4, two VE mock-ups on Rosalind Franklin and Rita Levi-Montalcini were developed. Based on the literature, the disposition toward open-mindedness questionnaire and the usability and educational outcomes questionnaire were developed. The pre-pilot study was conducted with a small

group of university students in order to examine the reliability and the validity of both the disposition toward open-mindedness and the usability questionnaires. It was also conducted in order to finalize the semi-structured interview questions and examine users' first reactions to the VE demos.

Adopting Nielsen and Landauer's approach to usability testing and societal impact of online systems [23], first version of the questionnaires was developed and tested among 15 participants, and a first version of the semi-structured interviews was developed and tested among 5 participants. The users' comments and suggestions, from both groups, were implemented in the final version of the research tools (see section 5 in this report) and VE methodology (WP4).

4.3 Pilot Study Plan and Participants

The pilot study consisted of five MOSAICA workshops and the implementation of the improved research tools. More than 100 undergraduate students participated in this stage.

MOSAICA workshop population (N=107) included undergraduate students from three higher education institutions in Israel: Institute 1 (N=41), Institute 2 (N=43) and Institute 3 (N=23). All of the students studied technological subjects – Education in Technology and Science at Institute 1, Industrial Engineering at Institute 2 and Computer Science at Institute 3. The students' population included students from diverse sectors: Jewish (N=69), Muslim (N=36) and Christian (N=2). Their age ranged from 18 to 25. More than half (54%) were female students.

A selected number of participants (N=10) were interviewed and all responded to the pre- and post-questionnaires. Quantitative data were statistically analyzed and qualitative data was content analyzed. Results and conclusions were written providing an objective feedback about the research tools and plan.

4.4 Main Study Plan and Participants

The main study included 268 participants from museums, libraries, universities, and high-schools in France, Poland and Israel: 14 participated in focus group interviews and 254 participated in ten MOSAICA workshops and answered the online questionnaires. The participants came from diverse cultural and religious backgrounds such as: Jewish, Christian (Catholic, Protestant), Muslim, Druze, and Atheistic. The institutions that participated in this study were:

In Poland: Jagiellonian University, Cracow University of Economics, and University of Economics in Katowice. In France: Ort Strasbourg. In Israel: Technion University, Nesher high school, Ort Singalovski high school, Rameh high school. Another small group of participants included: private persons, museum employees, and librarians. Gender distribution was near 50%. Figures 4- to- 8 show pie-graphs of the participants' demographics.

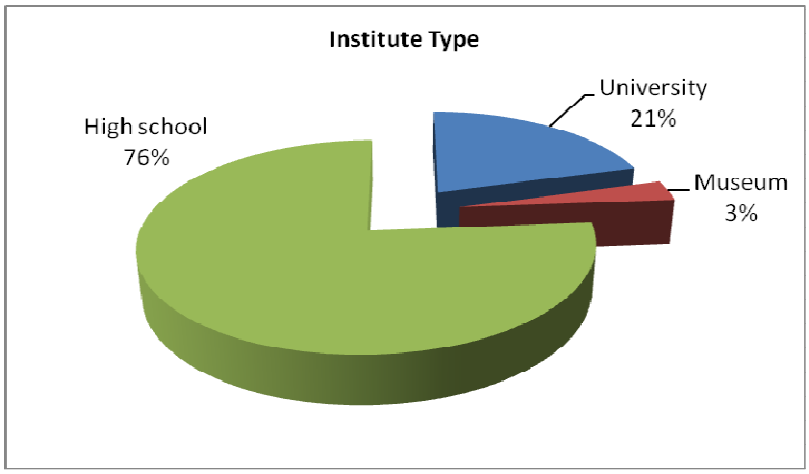
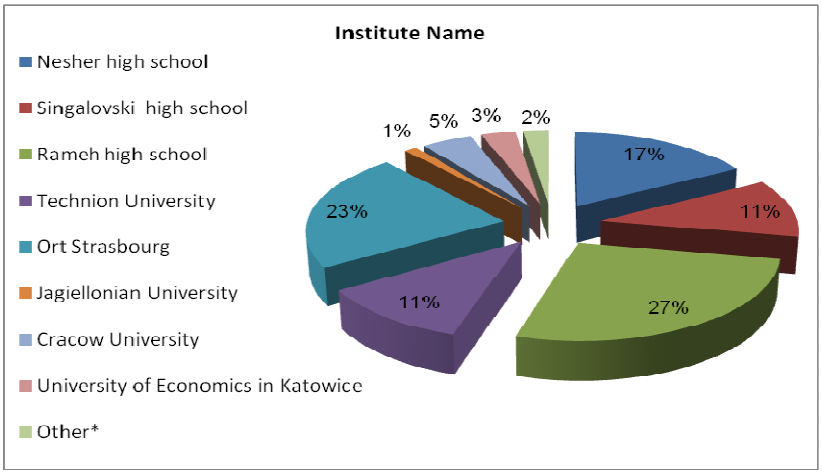


Figure 4. Participants' percentile division by institute type



*Other: private people, museum employees, librarians

Figure 5. Participants' percentile division by Institute Name

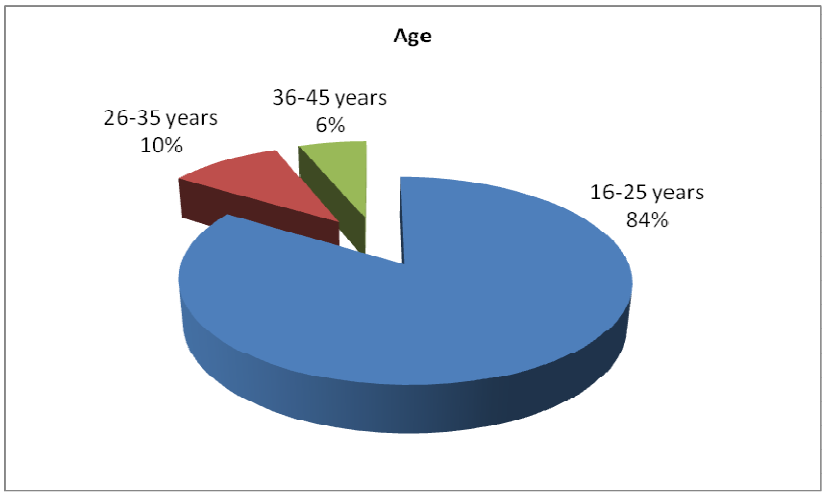


Figure 6. Participants' percentile division by age

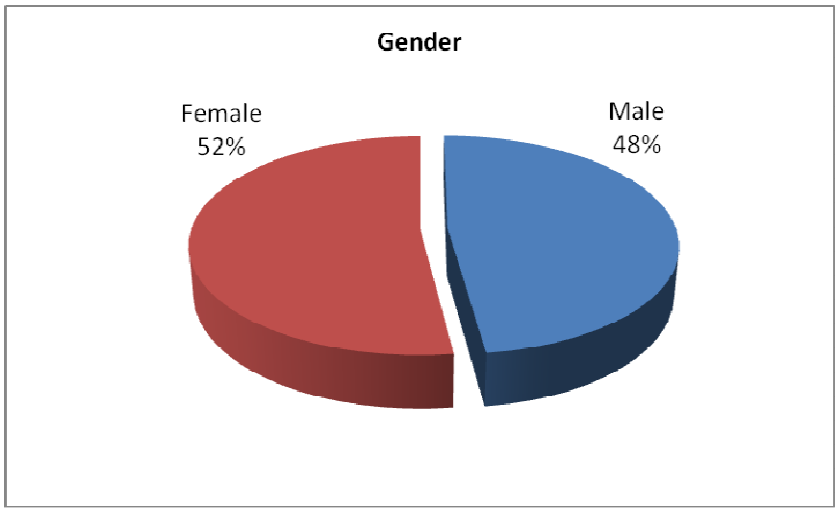


Figure 7. Participants' percentile division by gender

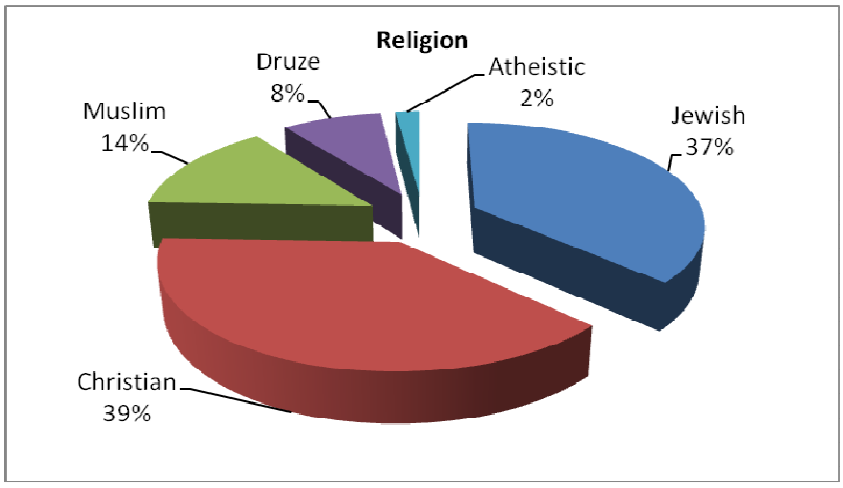


Figure 8. Participants' percentile division by religion

5. EVALUATION TOOLS

The evaluation research was based on the mixed methods research model, incorporating both quantitative and qualitative tools [16, 17, 21]. The quantitative tools included online pre- and post-questionnaires administrated before and after MOSAICA workshops. The pre- and post-questionnaires were designed and developed in order to analyze changes in users' disposition towards open-mindedness by examining whether a shift toward more pluralistic views occurred as a result of using MOSAICA. The qualitative instruments included semi-structures interviews, and content analysis of users' text-based comments in the online questionnaires.

The research evaluation tools included:

1. **Pre-questionnaire** - administered to the users two to three weeks before they used MOSAICA, in order to examine their prior disposition toward open-mindedness. The pre-questionnaire included 20

items on a 1-to-5 Likert type scale (1 - strongly disagree, 5 - strongly agree). The questionnaire, based on the California Critical Thinking Disposition Inventory [24], examined the users' disposition toward open-mindedness in five aspects: a) willingness to adopt different opinions, b) non-prejudice views, c) non-judgmental views, d) acceptance of others, and e) gender equity. For each one of the items the students were asked to add explanations (Appendix B).

2. **Post-questionnaire** - administered to the users right after they used MOSAICA. The post-questionnaire included two parts: (1) the disposition towards open-mindedness as in the pre-questionnaire described above and (2) a usability question based on a research tool developed by Barak and Rafaeli (2004) [25] consisting of 12 items on a 1-to-5 Likert type scale (1 - strongly disagree, 5 - strongly agree). This question was designed to examine the users' opinions about MOSAICA usage in three aspects: affective, cognitive, and operative (Appendix C).

The Online pre- and post-questionnaires are available at: http://qmosaica.paris.ort.asso.fr/anon/preq.php and http://qmosaica.paris.ort.asso.fr/anon/postq.php, respectively. Users responses to the online questionnaires were collected in specially designed pre-post-excel sheets. The collected data were analyzed using SPSS software for statistical analysis.

3. **Semi-structures Interviews** - conducted with a small group of participants (ten in the pilot study and 12 in the main study) after using MOSAICA. The interviews were tape-recorded and transcribed using a researcher logbook. The qualitative data produced from the semi-structured interviews assisted in gaining deeper understanding of the statistical results.

4. **Log analysis** – Conducted during a period time of a month from October 28 until November 27 in order to objectively track, monitor, and analyze that way users' use MOSAICA. Using Google Analytics web system enabled us to generate web pages for statistics of MOSAICA system visitors, page-views and page-views per visitors.

5. **Virtual Expedition Diary** - developed as a collaborative forum. It allows VE creators to communicate with other users. Each Expedition diary can be maintained by the VE creator, with regular entries of commentary and/or descriptions of events. Entries are displayed in a reverse chronological order (last shows first). MOSAICA VE diary forum is located at: http://qmosaica.paris.ort.asso.fr/diary (Appendix D). At this point, only three posts were added, by consortium partners from France, Poland and Israel that developed VEs for evaluation purposes. This tool was not used as part of the evaluation study and report.

Erreur ! Source du renvoi introuvable.9 summarizes the evaluation tools in a graphical way.

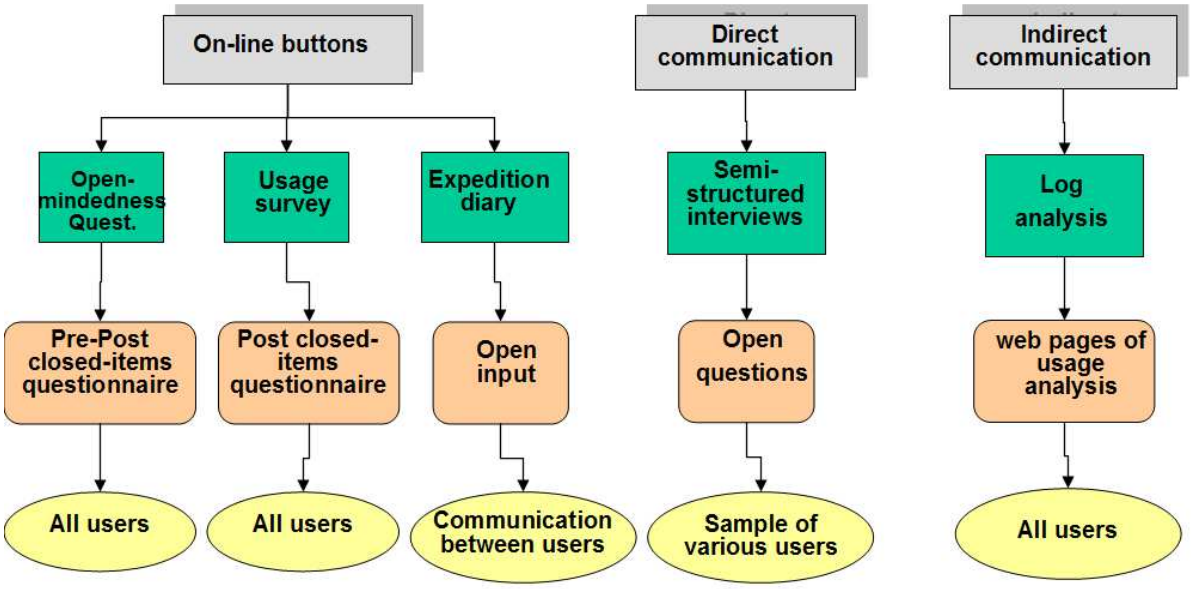


Figure 9. MOSAICA societal impact, usability and learning outcomes evaluation

In the following sections we will provide more thorough explanations about the evaluation research tools and their implementation.

5.1 The Open-Mindedness Questionnaire

Open-mindedness is an important societal aspect and impact. Open-mindedness requires that the individual would be prepared to entertain the thought that not only he might be wrong, but that others might be right. The individual also must be willing to revise his ideas in light of new information. MOSAICA's system not only presents cultural heritage resources, but requires users to participate in a quest, seek for information and answer questions. This process of discovering new information may lead to a change in users' opinions resulting in a more pluralistic view. The Open-mindedness questionnaire was designed and developed in order to examine changes in users' dispositions towards open-mindedness; examining whether a shift toward more pluralistic views may occur producing eventually a social impact.

The open-mindedness question was validated in two stages. The first stage included the use of 12 items evaluating disposition towards open-mindedness that were part of the California Critical Thinking Disposition Inventory (CCTDI), developed by [24]. After administering it to a group of 15 students, we found that CCTDI items were not clear enough to some of the participants and that some important issues related to open-mindedness were missing. Therefore, we added eight new items to strengthen the aspects of gender equity and non-prejudice views. In the second stage, the final version of the questionnaire was validated by five experts in educational technology, receiving consent of 100%. The questionnaires' internal consistency, measured by Alpha Cronbach, was 0.78.

5.2 The Usability and Learning Outcomes Questionnaire

Usability is a term used to measure how easily people can interact with a computer program in order to achieve a particular goal [26]. The way that users work with a program or system is a basic issue for the designers and developers. The primary notion of usability is that the program we want to test should be designed with emphasis on three basic needs to be accessible to users: Efficiency of use - the program should take less time to accomplish a particular task; Easy to learn - operating the program should be easy to learn, by reading the instructions and observing the program; Satisfying to use - using the program needs to be more fun and interesting than using other objects with the same purpose.

In our study, the Usability and Learning Outcomes Questionnaire was administrated at the end on the workshops, after users experienced working with MOSAICA. The questionnaire included 12 items on a 1-to-5 Likert type scale (1- strongly disagree, 5- strongly agree), based on a research tool developed by Barak & Rafaeli [25]. The items were categorized into three usability aspects:

Affective – operating MOSAICA should be interesting, enjoyable, and fun.

Cognitive – MOSAICA should be educational and new knowledge should be gained at its use.

Operative - operating MOSAICA should be easy to learn and should not involve technical problems.

The usability and learning outcomes questionnaire validation was based on researcher validation conducted by five experts in educational research from the Technion team. The questionnaire reliability was measured using Alpha Cronbach procedure, resulting 0.87 of internal consistency.

5.3 Semi-Structured Interview Questions

In order to achieve a holistic evaluation of MOSAICA's applications and to conduct a more personal dialogue with the users, semi-structured interview questions were developed during the pre-pilot and pilot study. The questions and their sequence are partially pre-determined, allowing new questions to be brought up during the interview as a result of what the interviewee says, thus leading to a more revealing and in depth interview.

The interview questions were based on the principals of Dumas and Redish [26] usability testing, consisting of three aspects: I. usage characteristics of MOSAICA, II. content comprehension, and III. open minded attitudes, as follows:

I. Usage characteristics of MOSAICA

I.1. Please describe the way you chose to explore MOSAICA system: Where did you start from and how did you carryon?

I.2. Which applications did you like most? Please explain why.

I.3. Did you find the applications comfortable/easy to use? Please explain in what way.

I.4. From your experience, what would you recommend to add or change in MOSAICA in order to make it more user-friendly and more interactive?

II. Content comprehension

II.1. How clear, coherent, interesting was the information presented in the applications? Please provide a detailed answer for each application you chose.

II.2. Choose two Jewish themes\concepts presented in MOSAICA and suggest some points of similarity and difference.

II.3. Define a question or raise an issue that you find it interesting to explore within MOSICA application.

III. Open mindedness and tolerance

III.1. In your opinion, can MOSAICA promote open mindedness and tolerance toward the Jewish culture? If so how?

III.2. To whom would you recommend MOSAICA? Why?

III.3. How would you convince other users to use MOSAICA?

The interviews were tape-recorded and transcribed using a researcher logbook. The logbook was content-analyzed and categories based on the analysis of researchers' logbooks were formulated. Three expert researchers reviewed the assigned categories in order to attain the trustworthiness of the findings. The qualitative data produced from the semi-structured interviews assisted in gaining deeper understanding of the statistical results.

5.4 MOSAICA website Log analysis

Log analysis provides an objective way for measuring and evaluating the usage of websites. Compiled and interpreted properly, log information provides a baseline of statistics that indicate use levels and support use and/or growth comparisons among parts of a site or over time [27]. Log file analysis, if performed carefully, can provide useful benchmarks and comparative measures to improve site structure, management, and usability. In our study we used Google Analytics web system for log analysis. Since MOSAICA was still under revision and improvements, the log analysis was conducted during a short period of one month - from October 28 until November 27. During this time, we tracked MOSAICA visitors, page-views and page-views per visitors.

6. THE RESULTS OF THE PRE-PILOT STUDY

The pre-pilot study was conducted among five users that were interviewed and 15 that answered the first version of the open-mindedness questionnaire.

6.1 Constructing the Interview Questions

The interviews in the pre-pilot stage were conducted as a free conversation between the researchers and the users, as users were exploring the two VE mock-ups on Jewish women cultural heritage. The VEs presented the life story and the social contributions of Rosalind Elise Franklin and Rita Levi-Montalcini, two prominent scientists. The focus group included five since education undergraduate students, three Muslim and two Jewish students, all in their third year of study. We choose this group of users since they have knowledge in education and technology and can assist us in formatting and finalizing the interview questions.

The interviews resulted in the following three general observations: a) the students seemed to be highly interested in the content presented in the VEs, b) VE exploration encourages discussions among students about cultural heritage preservation, c) The VE is a good and interesting way to explore cultural heritage. The following paragraphs present examples of the students' comments and remarks.

1. The students are highly interested in the content presented in the VEs.

• The usage of Virtual Expeditions gives a new interesting approach for receiving new information. The integration of different templates that focus on the same topic helped me get the whole picture and understand the topic in depth.	{MOSAICA usage, understanding the content}
• The VE exploration was so interesting that I intended to continue with it even after the time was up.	{ MOSAICA usage, General interest}
• I liked the way VEs present new material; it encouraged me to explore the VE screens very thoroughly, trying not to miss any active button, to open most Heritage Items and to read the text carefully.	{ MOSAICA usage, interest in the content}
• I think there is lack of computer programs that are oriented to culture preservation and are friendly to the end user. All that makes Virtual Expeditions a wonderful instrument for teaching and learning in schools and universities about cultural heritage.	{Interest in the content}
• The presentation of the content with different templates makes VE exploration friendly for users from different layers, but there are topics that will use only a limited number of templates (e.g., without genealogy tree and maps). Additional thinking is required	{ MOSAICA usage, interest in the content, improvement remark}

on how to use the advantages of VE to present these topics.

2. VE exploration encouraged discussions among students about cultural heritage preservation. One typical example was chosen to reflect the students' exploration process. In the following transcription, RE is the researcher, while ST1 and ST2 are respectively a Muslim student and a Jewish student who were engaged in exploring VE on Rosalind Franklin and discussing it.

ST1	I like the way the Virtual Expedition presents the life of Rosalind Franklin. It presents the material in several ways like maps or genealogy tree and makes the exploration interesting. It allows us to learn in an easy way about people who lived many years ago. I think it's very important, because this makes it possible to store information about ancestors.	{interest in the content}, demonstrating the importance of the system}
ST2	I think in our culture we don't pay enough attention to this issue. I don't know anything about my ancestors who lived generations ago.	{Cultural heritage and tolerance}
ST1	In our culture we do store information about previous generations as part of the family. But we are not using any technological innovations for it.	{ Cultural heritage and tolerance }
RE	Possibly, Virtual Expeditions can help store information inside the family in more intelligent and easy ways.	{store information, interesting contents}
ST1	Yes, it's really very friendly and comfortable to use!	{MOSAICA usage}

Another example is the following discussion between two Jewish students, ST3 and ST4, who were engaged in VE exploration, regarding cultural heritage preservation. Here too RE is the researcher.

ST3	VE exploration caused me to think about the reasons for presenting our culture and history. It is especially important nowadays, when some people are trying to distort parts of our history.	{Cultural heritage and open-mindedness}
ST4	You are right by I'm rather confused by the fact that VE allows each user to add his comments on Heritage Items. It will make it possible to give wrong interpretation to historical events.	{Cultural heritage and open-mindedness }
ST3	I'm not sure. As for me, it's more important just to start talking about these events in order not to forget them. Each person has a right to express his opinion!	{important contents
ST4	I'm still thinking that there is a need to revise the content of	{Objectivity of contents}

material added to VEs.

RE	Indeed, as the part of the MOSAICA project, there is an institution called the Board of Editors that is responsible to screen the material added by users.	{MOSAICA usage}

3. The VE is a good and interesting way to explore cultural heritage. Students' comments that support this observation are presented in the following.

- I liked the idea implemented in Heritage Items to present images taken from the Web and to add my own comments about them. {MOSAICA usage}
- Searching for Heritage Items is a challenge during the VE exploration process; it makes the learning process more interesting. {learning about Cultural heritage}
- The usage of Heritage Items is good for presenting cultural heritage because it allows to partition a sophisticated topic into simple parts and to give modern interpretation to the events by adding users' comments. {Cultural heritage and open-mindedness }
- I liked the fact that Virtual Expeditions present the information in small pieces (called Heritage Items). It helped me focus on one concrete idea each time and prevented the mix-up of different concepts. {content comprehension}
- The approach of using Heritage Items is innovative but I think that the number of Heritage Items should be greater and their search should be more sophisticated in order to make the VE exploration interesting for adults. {MOSAICA usage}

The students made several important remarks regarding ways to improve the VEs. First, they noted some technical problems. Some of the links didn't open and there were several editing mistakes in the text. Students referred to the issue of making the VE exploration interesting to users. They suggested improving the GUI by using new technologies for its development and defining the supervising institution that will be responsible for the revision of the published VE content. All the remarks were taken into consideration for the development of the VE creator and player.

The students' responses to the interview questions were categorized into three sections: I. Usage characteristics of MOSAICA, II. Content comprehension, and III. Open mindedness and tolerance. Each category was assigned with 3-to-4 relevant questions (see section 5.3), forming the final version of interview tool.

6.2 Constructing the Open-Mindedness Questionnaire

The open-mindedness question was validated in two stages. The first stage, in the pre-pilot study, the questionnaire included only 12 items that were part of the California Critical Thinking Disposition Inventory (CCTDI), developed by Facione and colleagues [24]. After administering it to a group of 15 students, we found that CCTDI items were not clear enough to some of the participants and that some important issues related to open-mindedness were missing. Therefore we added eight new items to strengthen the aspects of *gender equity* and *non-prejudice views*. The gender equity items included negative and positive statements such as: When solving a problem, men suggest more logical solutions than women, or: Men and women are equally logical. The non-prejudice views items included negative and positive statements such as: Bias opinions are necessary to preserve our culture and traditions, or: Bias opinions can be dangerous.

7. The Results of the Pilot Study

The pilot study population included 107 undergraduate students from three higher education institutions in Israel. All of the students studied technological subjects – Education in Technology and Science at Institute 1, Industrial Engineering at Institute 2 and Computer Science at Institute 3. The students' population included students from diverse sectors: Jewish (N=69), Muslim (N=36) and Christian (N=2). Their age ranged from 18 to 25. More than half (54%) were female students. The results of the pilot test are presented in three sections: Disposition toward Open-Mindedness, MOSAICA Usability Evaluation and Users Interviews

7.1 Disposition toward Open-Mindedness

In the pilot study, for each of the 20 items in the disposition toward open-mindedness questionnaires, the post mean was higher than the pre mean, indicating that the VE mock-ups had a positive effect on users' dispositions towards open-mindedness. The highest net-gain between pre and post results was observed for items "Men and women are equally logical" (Mean net-gain =0.63). This result can be explained by the fact that the Virtual Expeditions focused on the stories of two Jewish women: Rosalind Franklin and Rita Levi-Montalcini, who, in spite of gender inequality and discrimination, were able to make significant contributions to science.

Table 1 presents the results of paired t-test comparing the results of the pre- and post-questionnaire.

Table 1. Paired t-test comparison of open-mindedness pre- and post-questionnaires

	N	Mean	SD	t	p<
Pre-Questionnaire	107	3.42	0.55	8.60	0.01
Post-Questionnaire	107	3.79	0.49		

The results of the paired t-test show that there is a statistically significant enhancement of the users' disposition towards open-mindedness before and after the Virtual Expeditions exploration.

In the post-questionnaire, no statistically significant difference between Jewish female students and non-Jewish female students was observed, while such a difference was observed in the pre-questionnaire. Our preliminary results indicated that the VE exploration has a potential to reduce the differences in dispositions towards open-mindedness between users from different genders and different cultures. The second observation indicates that the topic of VE plays an important role in influencing users' dispositions towards open-mindedness. A stepwise multiple regression analysis resulted in the following findings:

- Students' pre-questionnaire results explain almost 40% of their post-questionnaire results.
- Students' gender explains only 4% of the post-questionnaire results.
- Students' sector does not influence the post-questionnaire results.
- No interactions between variables were found.

Based on the statistical analysis, we assumed that the exploration of VEs has a potential to promote users' positive disposition towards open-mindedness. In addition, the students' responses to the questionnaire items, assisted in establishing its' internal consistency, in terms of Alfa Cronbach = 0.78.

7.2 MOSAICA Usability Evaluation

According to users' response to the VE usability items, in terms of affective, cognitive and operative aspects, the highest mean was observed for the item "VE usage is a good way to present old documents and pictures" (Mean=4.57, SD=0.79). The lowest mean was observed for the item "Exploring the VEs improved my understanding of the Jewish cultural heritage" (Mean=3.49, SD=1.15). The fact that the mean for each one of the usability items was above 3.0 (where 3.0 the neutral grade according to 1-to-5 Likert type scale) means that students favoured the VE exploration usability. Overall, students asserted positive views related to all the VE aspects: operative, cognitive and affective. No statistically significant difference was found between students by religion or gender; meaning that the students' gender or religion had no influence on their opinions about the VE usability. The students' responses to the questionnaire items, assisted in establishing its' internal consistency, in terms of Alfa Cronbach = 0.87.

7.3 Interviews of Users

A focus group of five users - computer science undergraduate students, all in their first year of studying, were our participants, as follows: Student A – male, age 25; Student B – male, age 24; Student C – male, age 25; Student D – female, age 23; Student E – female age 21. The rational for this selection was to validate semi-structured interview questions. The users' responses to the interview questions were categorized into three sections, as defined in the pre-pilot study. The users' responses are presented below.

Usage characteristics- we asked the users to answer a few questions about the way they use the Ves. Their answers are presented in Table 2.

Table 2: Usage characteristics of the 5 users in the research

Question	User	Answer
1. Please describe how you chose to start your "journey" in the VE (which VE you started from, and what template – the story, timeline, maps, family tree and gallery)	A	By order of appearance
	B	First Rosalind, used the signs in the main page, then by order of appearance.
	C	First Rosalind, then by order of appearance. Scanned all the parts of the VE first and then explored them in depth.
	D	First Rosalind, then by order of appearance.
	E	By order of appearance
2. How well did you find the use of the VE easy and convenient? (Not at all-Very little-Reasonable-Very good-Great)	A	Great – the information is very graphic, there's no "overloading" of text anywhere. The menu in the VE is very specific and directs the user to the information very well. Stated he understood what to do by the graphics more than the directions in the VE.
	B	Great – the menu is very clear. Stated that in "the story" the font is a little hard to read.
	C	Great – the galley is inconvenient because he didn't find what to click on. The timeline in the most convenient template since it's very obvious what to do there.
	D	Very good – in the gallery you need to look where to click, and you might miss something.
	E	Great – it's very graphic, and very clear what to do, even without reading the instructions.
3. How well did you find the information in the VE interesting? (Not at all-Very little-Reasonable-Very good-Great)	A	Great – the period in which the two women lived in, during the WWII, is very interesting and he's very interested in researches in science in general. Also the fact that they were females in a very masculine field at that time.
	B	Great – the menu is very clear. Stated that in "the story" the font

Question	User	Answer
		is a little hard to read.
	C	Not at all – didn't find any interest in reading about Jewish women scientists.
	D	Great – because it's interactive and very convenient to use. Also the information is presented "to the point" and not tiring to read.
	E	Very good – the information is presented in an interesting way
4. What activity was the most pleasurable in the VE? Why?	A	From the story because everything is compiled together there, you can see the whole story.
	B	The galley because it's the most visual and interactive, and is like a game. Stated that the previous name it had – "Treasure Hunt" was much better.
	C	The pictures with the short excerpts in the gallery were the most enjoyable.
	D	The gallery and the timeline because these are the most interactive parts.
	E	The gallery because it's like a game. The graphics are very nice. It's also a unique way to present information.
5. According to your experience and activity in the internet and after your acquaintance with the VE, what would you recommend to add to the VE in order to make the user more interactive?	A	Add a guest book (stated that he wouldn't write there, but would like to see what other people wrote there) or a presentation of pictures.
	B	Add more links, and a guest book or a place for comments. Make the family trees of the various VE's connect to each other.
	C	To make everything bigger and bolder if there's a colorful background.
	D	The "back to crossroads" button is not prominent enough. The main page in every expedition is a bit messy.
	E	I would add a guest book or a place to add comments.

The users' responses presented in Table 2 suggests that: most of the users explored the VE by order of appearance; one of them scanned all the VE's first and then started exploring again, this time in depth. Users find the gaming element innovative and interesting. All of the users except one found it interesting to read about Jewish women scientists. Three users suggested adding a guest book, since it's a common feature in many websites.

Content comprehension - we asked the users to answer a few questions regarding the information presented in the VEs. The results are presented in Table 3.

Table 3: How well the users understand and recall the information in the VE's

Question	User	Answer
1b. Describe what you remember after you explored the VE.	A	Rosalind died of cancer at the age of 38. Rita graduated with summa com laude in the age of 27. Established a research lab, won a Nobel prize, was a doctor.
	B	Rita Levi learned medicine and graduated with summa com laude, won the Max-Winston award and the Nobel prize. Rosalind studied in a girls school in London, is famous by her research in genetics and biochemistry.
	C	Both have a small family, Rita was born in Italy and Rosalind in London.
	D	Rita dealt with research regarding growing cells, and went to school against her father's wishes.
	E	Rita had a twin sister and was born in Italy. She won the Nobel prize.
2. Which points of similarity do you find between Rosalind and Rita? How are they different?	A	Similarity – both are Jewish women who practiced science and this wasn't common in their time of living. Difference – one of them won a Nobel prize and the other one died. They also practiced different fields in science – Rita in biology and Rosalind in chemistry.
	B	Similarity – both were scientists in a period when it wasn't accepted for Jewish women to practice such fields. Both excelled in their fields despite the difficulties. Difference – one of them died.
	C	Similarity – both are Jewish women scientists and both excelled in their fields. Difference – one of them is still alive.
	D	Similarity – both were scientists in Europe. Difference – they didn't live in the same place.
	E	Similarity – both were Jewish women who practiced science. Difference – one of them still lives, Rita won the Nobel prize and Rosalind didn't.
3. Rita Levi Montalcini lives today in Italy in her nineties. If you could meet her, what would you ask her? Why?	A	What did you do underground during WWII?
	B	How did you deal with rejection of your abilities during the earlier period of your life?
	C	Did you know Rosalind Franklin?
	D	How did your father react to your decision to start studying?
	E	Based on your experience, what advice would you give me for my future career as a woman in computer science?

As can be seen from Table 3, all the users remembered details about Rita's life. Some of the users described Rosalind's life in addition to Rita's. This might be because all the users viewed Rita's VE last, and hence remembered it better. Another explanation can be that Rita's life was more interesting to them. Also, by observing the results of question 2, we can clearly see that the fact that both women were Jewish and practiced science was well emphasized in the VEs, since all the users mentioned it as a similarity between the two women.

Open-mindedness and tolerance - we wanted to see how the users felt about the tasks completed, and if they would recommend the VEs to a friend. The results are presented in Table 4.

Table 4: Openness and tolerance

Question	User	Answer
1. With what information did you feel empathy? Why?	A	With nothing because I'm not a woman.
	B	None, because none of the information is relevant for the time I live in.
	C	With the fact that they studied in the university, since I'm a university student too.
	D	They were women in a masculine world, and I'm also a student in a faculty where most of the students are men.
	E	The fact that they were women who practiced subjects that were considered masculine, and I'm also studying a "masculine" profession.
2. To what types of populations would you recommend to introduce the VE to? Why?	A	Women and students. Because I don't think it will interest men.
	B	Women, men, students, teachers and Jewish. I think the way the information is presented is not suitable for Christians and Muslims because you should put more emphasis on the aspect of them being women, and not on them being Jewish.
	C	Women, men, students, teachers, Jewish, Christians and Muslims. Because it should be of interest for everyone.
	D	Women, men, students, teachers, Jewish, Christians and Muslims. Because everyone should know there're also Jewish women in science.
	E	Women, men, students, teachers, Jewish, Christians and Muslims. Because everyone should know what Jewish women can achieve.
3. If you had to recommend the VE to other users, in what way would you recommend or	A	I would say it's user-friendly, contains a lot of information and has very interesting stories.
	B	It has interactive and innovative parts, and presents the information in a very interesting way.

Question	User	Answer
try to convince?	C	You should enter the VE because there's a lot of interesting information in there.
	D	I would say it's very interactive and easy to operate and has interesting information.
	E	I would say it's very interesting and interactive.

By observing the results in Table 4 we can learn the following conclusions: half of the users felt empathy towards the women because they're also students. Most of the users agreed that the VEs should be presented to various populations to increase awareness of Jewish women in science. Only one of them (a male user) thought that these subjects are suitable for women only. All the users recommend the VE's to other users on the basis of interest, interactivity and easy to operate.

8. THE RESULTS OF THE MAIN SOCIETAL EVALUATION STUDY

This chapter describes the results of the main evaluation study in four sections. We start with the results of the Disposition toward Open-Mindedness questionnaire, we describe users' attitudes concerning MOSAICA usability, we present users opinions as reflected in the semi-structured interviews, and at the end, we log analysis of MOSAICA website.

The main study included 266 users from museums, libraries, universities, and high-schools in France, Poland and Israel (detailed in section 4.4). All users participated in MOSAICA workshops (section 4.1), answering a pre- post-questionnaires, before and after exploring MOSAICA. Twelve users were interviewed separately to gain in depth insights and learn more about users' opinions and views about MOSAICA.

8.1 Disposition toward Open-Mindedness

Users' responses to the pre- and post-questionnaires, after negative items were recoded, show a positive increase in their disposition towards open-mindedness, as presented in Table 5.

Table 5. Means and standard deviations (SD) and t-test of users' responses to the pre- and post-questionnaires

Questionnaires	N	Minimum	Maximum	Mean	SD	t	p<
Pre	254	2.00	4.25	3.42	0.35	2.02	0.05
Post	254	2.00	5.00	3.49	0.38		

Results indicate an increase in users' dispositions toward open-mindedness after using MOSAICA system during the workshops. Users indicated medium-high mean scores. A paired t-test comparing the results of the pre- and post-questionnaires indicated a statistical significant difference between the pre and post means ($t_{(252)}$=2.02, p=0.045). These results can be explained by the fact that MOSAICA enables users from different demographics and religions to learn about the traditions of other cultures.

Table 6 presents the means and standard deviations for each of the 20 open-mindedness items displayed by five categories: Willingness to adopt different opinions, Non-prejudice views, Non-judgmental views, Acceptance of others, and Gender equity.

Table 6. Means and standard deviations (SD) of users' dispositions towards open-mindedness, by categories

Category	Item	Item type	Pre		Post	
			Mean	SD	Mean	SD
A. Willingness to adopt different opinions	3. I should change my opinion if I'm proven to be wrong.	Positive	3.85	1.16	3.95	1.08
	4. Open-mindedness has limitations. (*)	Negative	3.07	1.14	2.94	1.24
	13. It's important to be open-minded about different world views.	Positive	4.21	0.91	4.57	0.77
	16. It's better to keep constant opinion rather than open yourself to different opinions. (*)	Negative	2.28	1.11	2.25	1.11
B. Non-prejudice views	2. I am concerned that I may have prejudice opinions.	Positive	2.58	1.08	2.73	1.14
	5. Bias opinions can be dangerous.	Positive	3.51	1.15	3.74	1.11
	7. Bias opinions are necessary to preserve our culture and traditions. (*)	Negative	2.66	1.10	2.62	1.19
	17. I think there are justified prejudice opinions. (*)	Negative	3.32	1.14	3.23	1.14
C. Non-judgmental views	9. Most of the time I'm trying to be less judgmental.	Positive	3.41	1.05	3.60	1.08
	14. I regularly judge and criticize the behavior of others. (*)	Negative	2.69	1.14	2.63	1.15
	15. I prefer not to judge the customs and culture of other nations.	Positive	3.55	1.11	3.54	1.08
	18. Behavior that is different than mine is not accepted by me. (*)	Negative	1.98	1.09	1.90	1.07
D. Acceptance of others	8. People from other religions should study our culture more than we should study theirs. (*)	Negative	2.06	1.18	1.98	1.15
	(*) 10. It is important to learn about the traditions of other religions.	Negative	3.96	1.08	3.88	1.05

	12. It makes a lot of sense to study about different faiths and beliefs.	Positive	3.76	0.98	3.87	1.05
	19. My customs are more respectable than the customs of others.	Positive	1.92	1.03	2.01	1.11
E. Gender equity	1. When solving a problem, men suggest more logical solutions than women. (*)	Negative	2.19	1.15	2.02	1.21
	6. Men and women are equally logical.	Positive	3.37	1.31	3.48	1.32
	11. Men are more talented than women this is why they progress more in their careers. (*)	Negative	1.99	1.13	1.93	1.21
	20. Women deserve equal employment opportunities as men.	Positive	4.14	1.06	4.36	1.07

* Negative items that were recoded

Results show that the means of the positive items slightly increased (Mean net-gain = 0.11) whilst the means of the negative items decreased (Mean net-gain = -0.08). These results are encouraging since the users had a relative short time to experience the use of MOSAICA system (a four to eight hours workshop). The highest difference between pre and post results was observed for item 5: *Bias opinions can be dangerous* (Mean net-gain =0.23) and item 9: *Most of the time I'm trying to be less judgmental* (Mean net-gain =0.19). Item 13: *It's important to be open-minded about different world views*, received the highest mean (4.57) in the post-questionnaire.

In order to understand which of the open-mindedness categories contributed to the indicated mean difference, a paired t-test was performed, comparing the results of the pre-questionnaire with the results of the post-questionnaire for each category (Table 7). The negative items in each category were recoded to preserve an increasing positive scale of 1-to-5.

Table 7. Paired t-test comparison of pre- and post- questionnaire mean scores of users' dispositions toward open-mindedness, by categories

Category	N	Pre		Post		Net gain	t	p<
		Mean	SD	Mean	SD			
Willingness to adopt different opinions	238	3.72	0.62	3.72	0.65	0.00	0.31	NS
Non-prejudice views	236	3.07	0.65	3.08	0.63	0.01	0.11	NS
Non-judgmental views	236	3.49	0.61	3.63	0.66	0.14	2.50	**0.05**
Acceptance of others/strangers	236	2.95	0.37	3.00	0.39	0.05	0.23	NS
Gender equity	239	3.92	0.82	3.96	0.84	0.04	0.68	NS

NS- Non Significant

The results of the paired t-test show that there is a statistically significant enhancement of the users' disposition towards non-judgmental views as result of MOSAICA usage. This result indicates that the use of MOSAICA encourages users to be less judgmental and less critical about the behavior of others. Gender equity received the highest mean score on both the pre- and post-questionnaires. This category also received the highest standard deviation, meaning that users presented divers opinions related to this category. Some set forth the importance of women's role in society and some hold a more traditional way of thinking.

Users' disposition towards open-mindedness among different population groups was examined by institution type, religion, age, and gender. An Analysis of Covariance (ANCOVA) indicated no statistical differences among these groups. This means that MOSAICA has the same positive effect on users from different age groups, gender, religion and country related to enhancement of dispositions toward open-mindedness.

8.1.1 Dispositions toward Open-Mindedness - Analysis of Users' Explanations

The users expressed 934 remarks and comments in the pre-questionnaires and 1156 in the post-questionnaires. The remarks, presented in French, Polish, Hebrew and Arabic were translated to English and were divided into positive remarks – those that describe positive dispositions toward open-mindedness, negative remarks – those that describe negative dispositions toward open-mindedness, and ambivalent remarks – those that are indecisive. Findings indicated more positive remarks at the end of MOSAICA workshop (N=987), than at the beginning (N=705). Tables 8 - 12 present examples of

the users' assertions in the post-questionnaire, each table relating to a different category.

Table 8. Willingness to adopt different opinions - examples of users' remarks in the post-questionnaire

Positive assertions	Negative assertions	Ambivalent assertions
Yes, I do change my opinion if someone proves that I am wrong (Museum user). If someone really proves that I am wrong then I usually do not have a problem to change my opinion (Christian stu.). It is possible to keep a constant opinion and be open to different opinions at the same time (Christian stu.). It is better to be open-minded, although some elements of our outlook on life should not change (Museum user).	I cannot accept everything (Christian stu.). I do appreciate people who do not change their mind very often (Christian stu.). There are views which I can not abandon even if they are wrong for others, because they follow my way of thinking and believes (Muslim stu.).	It is worthwhile to listen to people having different point of view and confront it with the own one. But we shouldn't give up too easily and quickly (Christian stu.). I know that I should but sometimes it is difficult to recognize that someone has proven I am wrong. We are convinced that we are infallible and want to defend our own opinions (Christian stu.). Each person has to be open, but on the condition that fits his customs and traditions (Muslim stu.).

Table 9. Non-prejudice views - examples of users' remarks in the post-questionnaire

Positive assertions	Negative assertions	Ambivalent assertions
I try not to have bias opinions (Museum user). I think that prejudice views are dangerous to our society (Muslim high school stu.)	There are views which I can not abandon even if they are wrong for other (Muslim high school stu.) I am not concerned; I do have bias opinions (Christian stu.) Surely I have bias opinions, I think as most people do (Museum user)	No race or sexual orientation bias opinions, but I do have bias opinions related to subcultures (library user) I try to be watchful not to let my bias opinions rule over me. But you can't be sure that you will never be undergone by them (Christian stu.)

Table 10. Non- judgmental views - examples of users' remarks in the post-questionnaire

Positive assertions	Negative assertions	Ambivalent assertions
I try not to be judgmental at all (library user) I don't like to judge others (Christian stu.) We all must accept different behaviors to be able to cooperate in society (Museum user) I have no right to judge the actions of others (Muslim stu.)	I am judgmental, why not? If I do not heart anybody, I can't see a problem (Christian stu.) I do judge culture of other nations there are no reasons not to do it (Christian stu.)	I try not to be judgmental, but it not always succeeds (Christian stu.) I usually judge people, but I do not tell them about that (Christian stu.) Theoretically I shouldn't criticize, but there are customs which are barbarity in my opinion (Christian stu.)

Table 11. Acceptance of others - examples of users' remarks in the post-questionnaire

Positive assertions	Negative assertions	Ambivalent assertions
Everybody should discover the world according to his/her interests and passions independently on origin (Christian stu.). Learning other religions, reducing the gaps between religions (Muslim stu.)	.. There are so many interesting things in our culture, not everyone should study other cultures (Christian stu.) Our civilization and tradition only belong to us, and strangers are not forced to learn about us (Muslim stu.)	It is difficult to say. It is not necessary, but on the other hand it is nice to know something more about other cultures (Museum user)

Table 12. Gender equity - examples of users' remarks in the post-questionnaire

Positive assertions	Negative assertions	Ambivalent assertions
In my opinion women and men do not differ in intellect and logic, but they have different approach to solving problems. Both sexes think logically but according to different conditions (Christian stu.)	Men think in a more logical way, women involve emotions and feelings (Jewish high school stu.) Men to have more experience than women feelings (Muslim high school stu.) Men often follow their minds unlike women who often follow their hearts feelings (Muslim stu.)	It seems that men are more logical, but it does not deprecate women (Museum user)

8.2 MOSAICA Usability and Learning Outcomes Evaluation

Users' views about MOSAICA usability as indicated in their responses to each of the 12 items in the post-questionnaires are presented in Table 13.

Table 13. Users' opinions about the usability of MOSAICA system, by categories

Category	Item	Item type	Post	
			Mean	SD
A. Affective	2. I found MOSAICA usage annoying and uncomfortable. (*)	Negative	2.24	1.15
	6. Using MOSAICA gave me motivation to use such kind of programs in the future.	Positive	3.33	1.19
	10. MOSAICA content was not interesting to my opinion. (*)	Negative	2.20	1.07
	12. Exploring MOSAICA was challenging and exciting.	Positive	3.27	1.11
B. Cognitive	3. Exploring MOSAICA and the VEs encourages thoughts about Jews and their lives.	Positive	3.41	1.02

	5. Exploring MOSAICA improved my understanding of the Jewish cultural heritage.	Positive	3.01	1.14
	7. Exploring MOSAICA enhances open-mindedness towards a multicultural society.	Positive	3.42	1.11
	11. MOSAICA didn't contribute to my understanding of Judaism. (*)	Negative	2.59	1.22
C. Operative	1. MOSAICA's interfaces are friendly and easy to use.	Positive	3.66	1.00
	4. The move from one screen to another was quick.	Positive	3.14	1.38
	8. MOSAICA system is a good way to present old documents and pictures.	Positive	4.04	0.97
	9. I encountered technology problems while using MOSAICA. (*)	Negative	2.73	1.40

* Negative items that were recoded

The results presented in Table 13 indicate that all positive items received a mean of more than 3.00 points, on a scale of 1-to-5, where as all negative item received less than 2 points. The highest positive opinion refers to the item: *MOSAICA system is a good way to present old documents and pictures.*

Users' overall views about MOSAICA system usability, after the negative items were recoded, are presented in Table 14, indicating positive responses in general and in all three usage aspects: affective, cognitive, and operative.

Table 14. Means and standard deviations (SD) of users' opinions about MOSAICA usability, in general and by categories

Category	N	Minimum	Maximum	Mean	SD
Affective	244	1.00	5	3.54	0.81
Cognitive	244	1.00	4.75	3.28	0.80
Operative	245	1.00	5.00	3.53	0.87
Total mean	245	1.00	4.75	3.45	0.67

An analysis of the mean scores of the different usability categories: Affective, Cognitive, and Operative by users' age group, gender, and religion, was conducted via a series of ANOVA tests. The analysis showed no statistically significant difference between Jewish, Christian, Muslim and Druze users or between men and women. However, statistically significant difference was found between age groups. Users from the age groups of 16-25 and 26-35, found MOSAICA much more easy to use than older

users - age group of 36-45 ($F_{(2,226)}$=3.69, p<0.05). This result can be explained by the fact that young users are more familiar with web 2.0 systems and therefore found MOSAICA interfaces friendly and had no problem to quickly move from one screen to another.

8.2.1 Usability and Learning Outcomes - Analysis of Users' Explanations

The users expressed 615 remarks and comments in the post-questionnaire. The remarks, presented in French, Polish, Hebrew and Arabic were translated to English and were divided into positive, negative and ambivalent assertions related to MOSAICA usability. Findings indicated more positive remarks at the end of MOSAICA workshop (N=305), than negative remarks (N=194). Tables 15 - 17 present examples of the users' assertions in the post-questionnaire, each table relating to a different category.

Table 15. Affective aspect - examples of users' remarks in the post-questionnaire

Positive assertions	Negative assertions	Ambivalent assertions
Interesting and fun to use (Christian stu.) Very interesting idea and I am sure I will search for similar tools ready to use at the market (Christian stu.)	Information is too immature in my opinion (Christian stu.). Exploring MOSAICA was not challenging and exciting because some functionalities do not work properly (Christian stu.).	"Investigate" is quite nice, although there is a problem with playing annotated films (Christian stu.) It is not irritating, but it is uncomfortable. For example it is difficult to guess that virtual expeditions editor is in the tag Resources (Christian stu.)

Table 16. Cognitive aspect - examples of users' remarks in the post-questionnaire

Positive assertions	Negative assertions	Ambivalent assertions
It helped me understand the Jewish culture (Muslim Student). Mosaica can widen your knowledge (Christian stu.). It Helped me understand some basic things I know nothing about (Muslim Student).	I know Jewish culture heritage very well and MOSAICA could not influence my understanding of it (Christian stu.) I didn`t feel that the system gives us much information on civilizations (Muslim Student	...possibly after longer usage thoughts about Jews would be encouraged (Christian stu.). Mosaica hasn't influenced my understanding of Jewish culture, but I found out several things about which I had no idea, because I am a layman in the area of Jewish culture heritage (Christian stu.). I found out quite a lot about Jewish culture, because I didn't know too much about it. But I am not sure whether I understand it better (Christian stu.)

Table 17. Operative aspect - examples of users' remarks in the post-questionnaire

Positive assertions	Negative assertions	Ambivalent assertions
Interface is OK (Christian stu.) Using MOSAICA was easy (Jewish high school stu.) It is displayed Beautifully (Jewish high school stu.)	The interface is not easy to use, but in my case it can be also caused by problems with English (Christian stu.) The website works very slowly (Christian stu.) I had difficulties in loading the system (Jewish high school stu.).	It depends. Virtual expeditions editor is fatal, but there are also elements which I assess OK. For me it is OK, but I am afraid that common users (not used to IT tools) may not manage to overcome several issues (Christian stu.)

8.3 Semi-Structured Interviews

The semi-structured interviews were conducted with a relatively small group of participants (N=14) after using MOSAICA. The interviews were tape-recorded and transcribed using a researcher logbook. The interview questions were based on the principals of Dumas and Redish [26] usability testing. Correspondingly, the users' responses were categorized into three themes: a. usage characteristics of MOSAICA, b. content comprehension, and c. Open-minded attitudes. The interviews were conducted in Israel among librarians and archive workers. We chose to interview librarians and archive workers since they have knowledge and experience with the use of thesaurus, archives, classification and documentation. The participants' answers are presented in three categories: Usage characteristics of MOSAICA, Content comprehension and learning, Open mindedness and tolerance.

The study included the following participants (all names are fabricated):

Arion (Ar), Dina (D), Mira (M), Tania (T), Morial (Mo), Luba (L), Miriam (Mi), Adi (A), Eti (E), Nira (N), Pnina (P), Lea (Le), Ruti (R), Jane (J)

The activity included:

Presentation of MOSAICA's goals and vision (5 min).

Demonstration of MOSAICA system: Investigation, Explore, Add new resource (20 min).

Display of VE Demo (5 min).

Interview (30-50 min).

A transcript of an interview with one of the focus groups is presented in Appendix E.

The following is examples of the participants' responses.

Usage characteristics of MOSAICA:

M: How will the user know where the information he wants to upload should be integrated into MOSAICA? It might be a problem if the user is not familiar with the MOSAICA ontology.

Mr: The annotation process the user has to follow is some how complicated, and the user might annotate the resources not in the most suitable files, according to MOSAICA's rational.

L: I thing the MOSAICA sight may raise interest in older people, as they can upload their families' legacy. They often come to the library, have the time and will be able to create their family's story for the younger generations.

Mr: From my experience working in the library, sometimes telling personal stories is a lot more interesting to read than history textbooks, and leaves more impression on the reader. Anna Frank's diary is a good example to that.

L: As MOSAICA is supporting an English version only, I think that for older people and young students it will create an obstacle.

A: It will be better to have the option of automatic translation to Hebrew, as some sights provide, for people who cannot speak English fluently.

Le: I loved the idea of using MOSAICA as the forum option looks very attractive. I came to Israel from Riga and maybe I can make connection with people from my community who are in Israel nowadays or who remained back there.

A: It is a great idea to use the MOSAICA's forum because if I read somebody else's VE and I have more information to contribute or have some comments, I can contact the person who created the VE and share information directly.

D: The Investigation, Explore, and Add new resource are more technical, and might be boring to use. The exploration of a VE or the creation of a VE seem to be more exciting and challenging.

Ar: I would love to skip the technical parts and concentrate on the story I would like to present to the world. The Idea that I could publish 'my story', …it does not matter if it is about my family or about a topic that I am an expert on, …and that people can read and learn from it, is great.

Content comprehension and learning:

Mir: The VE's concept looks very promising and has great potential for learning from stories which are introduced in an attractive way.

R: The creation of a new VE encourages the user to make an active inquiry regarding the chosen subject, collect and arrange the information to be uploaded. These activities, in my opinion can really promote better comprehension of the subject.

P: Since I am very active at HOD HASHARON municipality, I have a special interest in uploading pictures and documents which I have been collecting for many years regarding HOD HASHARON. I want to share this information with others and MOSAICA seems to be a very appropriate learning environment for this kind of information.

M: For search purposes, I think there are other better tools on the web, but as an archive for saving different formats of resources… it is like Emule or Kazaa, sharing resources of different types, but in a more clever and sophisticated way.

D: I think that MOSAICA is a good system for searching and learning, because not all people know how to search Google in a correct way and either get too many, too little or wrong information. MOSAICA can assist those who seek correct, pinpointed, screened, well monitored information that is related to the Jewish culture.

J: I think the content presented in MOSAICA is coherent and clear. I would recommend enlarging the font size. In some cases, I found it difficult to read.

T: I think that the content is clear, but it is not interesting until it is presented as a narrative via the Virtual expeditions. I think that the VE s makes MOSAICA interesting.

L: the fact that I can add resources in a relative strait forward way is great in my opinion. I think that one can learn a lot from the explore tool.

Open mindedness and tolerance:

L: I came to Israel from Russia and in my opinion, also Christian individuals will be interested in uploading information and exploring MOSAICA's archive, as the Jewish community and the Christian one were connected, and had a close relationship. That way, MOSAICA can promote tolerance.

P: My son was requested to write a project during his Jewish History studies in University. He found meaningful information in Moslems sights on the Web. So I think that Christians or Moslems will also be interested in Jewish sights for various uses. While doing so, they can also learn more of our Jewish tradition and legacy.

Ad: I think this is a little pretentious, although being exposed to other cultures and traditions might help people understand better other people.

M: I do not think it is an issue of being an internet tool, but rather a tool for story-telling. Story-telling has a great affect on peoples' emotions, thoughts and beliefs.

T: I agree, as librarians, we all know the strengths of stories. However, having these stories presented on the web, free for everyone, every where makes it more affective and effective.

A: If we show that the Jewish people contributed to art, music, literature, science, maybe others will not tag us a "money chasers". The same with other religions, such as the Islamic culture, that contributed much to art, music, mathematics and more. It is important that the young generations will be open to each others' narratives.

D: the small stories, the personal stories may make the difference. MOSAICA is a good platform for that. You should think about initiating collaborative projects that includes students from different cultures and religions all around the world. For that MOSAICA can be a great platform.

To conclude, the users are concerned with the technical procedure of annotating. They were concerned that this process might be done incorrectly by naive users that lack the skills or the knowledge. They liked the story-telling concept that is behind MOSAICA's virtual expeditions. In their opinion, telling personal stories is a lot more interesting to learn from than looking at a collection of resources. They also liked the idea of VE diary – a forum for sharing ideas and opinions.

The Investigation, Explore, and Resource tools are looked upon as more technical tools that might be boring to use. On the other hand, the exploration of a VE or the creation of a VE, seem to be more exciting and challenging. Users asserted positive opinions related to MOSAICA as a system for searching and learning. They think that the content presented in MOSAICA is coherent and clear and that users can learn a much from the Explore tool. Some users believe that MOSAICA can promote tolerance among people. Other users think that this idea is too pretentious, although they did say that being exposed to other cultures and traditions might help people understand better other people.

8.4 MOSAICA website Log analysis

For the log analysis we used Google Analytics system for a period of one month, from October 28 until November 27. During that month, MOSAICA home page was visited 967 times, more than 5,200 pages were viewed with a page per-visit ratio of around 5.45. The average time on site was 8 minutes and around 23% of new visits.

Analysis of MOSAICA access logs show that in one month, the number of visitors per-day grew from around 10 visitors (mainly consortium partners) to around 30, with peeks of more than 50 users in one day – participants in two MOSAICA workshops (Figure 10).

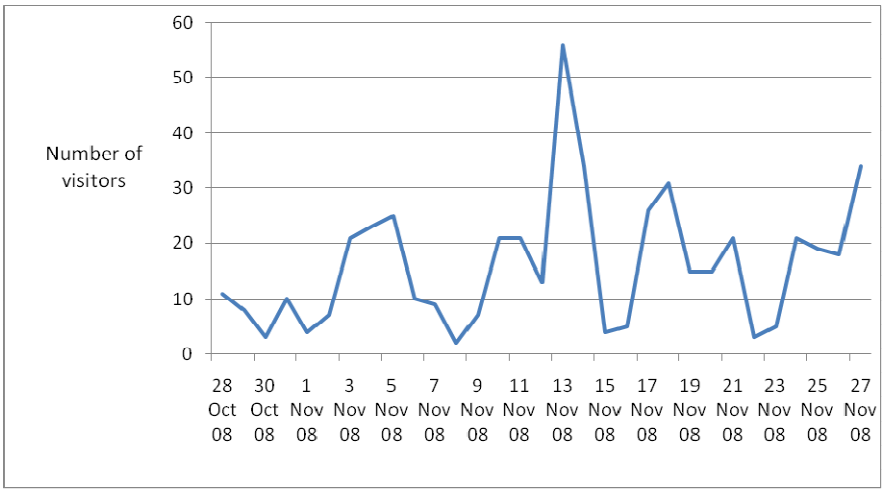


Figure 10. The number of MOSAICA system visitors per-day during one month

About half of our visitors (51%) use Internet Explorer as their preferred browser, and about half use Firefox (48%). The rest (1%) uses other browsers such as Opera and Safari. Out of 1337 attempts to enter MOSAICA system, 1084 (81%) used the "Investigate tool", 684 (51%) used the "Explore tool", and 545 (41%) used the "Resource tool".

Analysis of the results show that in one month, the number of page-views per day grew from around 50 (mainly consortium partners) to 300 and more, with peeks of more than 600 page views in one day (November thirteen). It is important to note that the days that the numbers of MOSAICA decreases are Saturdays or Sundays (Figure 11).

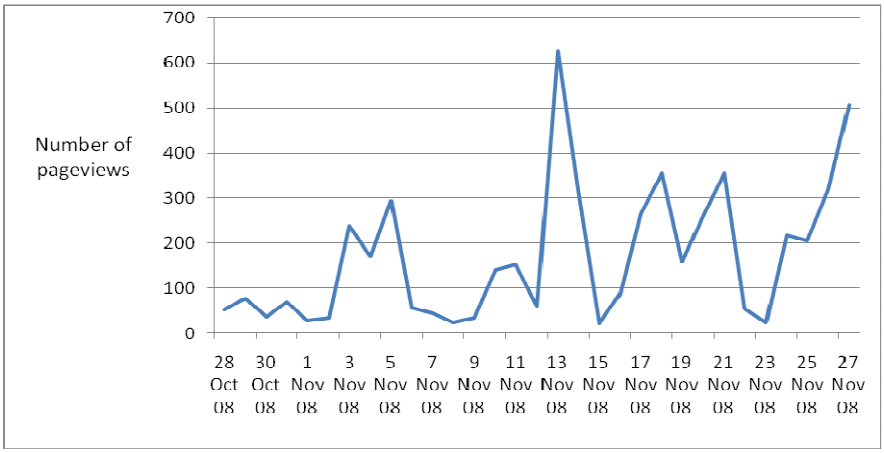


Figure 11. The number of MOSAICA system page-views per-day during one month

Log analysis of MOSAICA system indicated an increasing number of page-views per visitor (Figure 12).

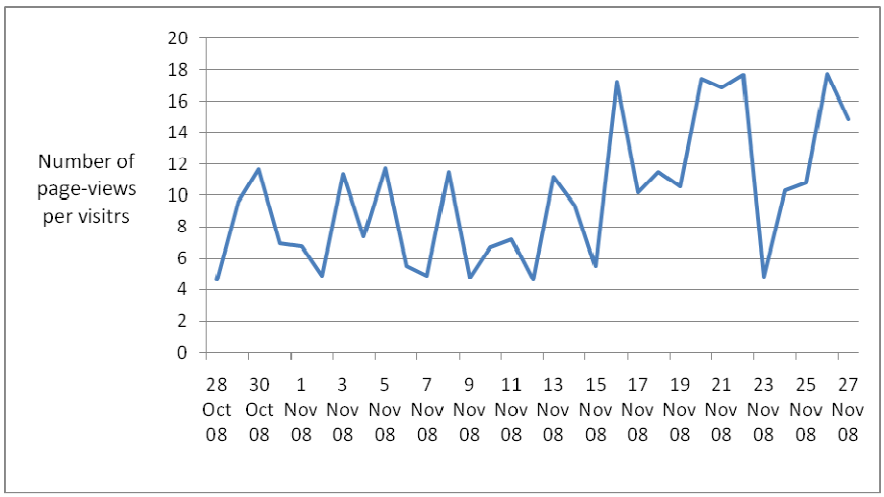


Figure 12. The number of page-views per visitor

Figure 12 shows that as time passes, more of MOSAICA system's tools were gradually used.

9. SUMMARY AND CONCLUSIONS

MOSAICA system objective is to develop a toolbox of generic technologies for intelligent presentation, knowledge-based discovery, and interactive and creative educational experience catering for a broad variety of diversified cultural heritages. A major impact expected from MOSAICA is to promote the use of diversified cultural heritage in the education for cultural pluralism and racial, religious and cultural tolerance. In this line, the objective of this study was twofold: to evaluate MOSAICA's potential impact on users' disposition towards open-mindedness, and to evaluate MOSAICA's usability and its' potential to promote better understanding of the Jewish cultural heritage.

Hare [28, 29] classified open-mindedness as one of the eight qualities central to the educational

enterprise. The comparison of users' disposition towards open-mindedness before and after using MOSAICA showed that the exploration MOSAICA tools enhanced users' disposition towards open-mindedness in general; but more specifically it enhanced users' *Non-judgmental views.* This suggests that after exploring and learning about concepts and traditions of the Jewish culture, the users held less judgmental views related to the traditions of other cultures. Results indicated an increase in users' dispositions toward open-mindedness after using MOSAICA system during the workshops. Users indicated medium-high mean scores.

Bias opinions can be dangerous, *it's important to be open-minded about different world views* and *Most of the time I'm trying to be less judgmental*, are items that received the highest difference between pre and post results. These results can be explained by the fact that MOSAICA enables users from different demographics and religions to learn about the traditions of other cultures. These results are encouraging since the users had a relative short time to experience the use of MOSAICA system (a four to eight hours workshop).

Gender equity received the highest mean score on both the pre- and post-questionnaires. This category also received the highest standard deviation, meaning that users presented divers opinions related to it. Some set forth the importance of women's role in society and some hold a more traditional way of thinking.

No statistically significant difference was found among religion, gender and age groups. This means that MOSAICA has the same positive effect on users from different demographic backgrounds.

The users expressed hundreds of remarks and comments in the pre-questionnaires and 1156 in the post-questionnaires. The remarks, presented in French, Polish, Hebrew and Arabic were translated to English and were divided into positive remarks – those that describe positive dispositions toward open-mindedness, negative remarks – those that describe negative dispositions toward open-mindedness, and ambivalent remarks – those that are indecisive.

Users asserted positive remarks related to MOSAICA's role as a promoter of tolerance and open-mindedness. Similarly, users indicated positive views related to MOSAICA system's usability in all three usage aspects: affective, cognitive, and operative, and found MOSAICA to be a good way to present old documents and pictures. Analysis indicated no statistically significant difference between Jewish, Christian, Muslim and Druze users or between men and women. However, statistical significant difference was found between age groups. Users from the age groups of 16-25 and 26-35, found MOSAICA much more easy to use than older users. This result can be explained by the fact that young users are more familiar with web 2.0 systems and therefore found MOSAICA interfaces friendly and motivating.

Interviews among small groups of users showed that they are concerned with the technical procedure of annotating. They were concerned that this process might be done incorrectly by naive users that lack the skills or the knowledge. They liked the story-telling concept that is behind MOSAICA's virtual expeditions. In their opinion, telling personal stories is a lot more interesting to learn from than looking

at a collection of resources. They also liked the idea of VE diary – a forum for sharing ideas and opinions.

The Investigation, Explore, and Resource tools are looked upon as more technical tools that might be boring to use. On the other hand, the exploration of a VE or the creation of a VE, seem to be more exciting and challenging. Users asserted positive opinions related to MOSAICA as a system for searching and learning. They think that the content presented in MOSAICA is coherent and clear and that users can learn a much from the Explore tool. Some users believe that MOSAICA can promote tolerance among people. Other users think that this idea is too pretentious; although they did say that being exposed to stories of other traditions might help people better understand other cultures.

Indeed, the power of storytelling lies in persuasion: as a means of entertainment, education, or preservation of culture. Storytelling can affect listener both emotionally and intellectually at the same time. MOSAICA system demonstrated ability to enhance users' disposition towards open-mindedness. It strengthens the claim of Murray [30] that the usage of hypertext narratives, similar to MOSACA cultural heritage resources, has a potential to represent the simultaneity of the processing that goes on in the brain - the mixture of language and image.

The usage of MOSAICA system presents a good example of the shift toward more pluralistic views, occurring as a result of connecting educational theories and technology progress. MOSAICA is used here as a Mindtool [31]. It demonstrates that applying knowledge construction tools that users learn with, not from, can lead to statistically significant enhancement in users' disposition towards open-mindedness.

While the study showed positive results related to the design and the usability of the MOSAICA, it has several limitations. First is critical mass. Although the study included close to 400 participants, this number of users is still small compared to the system's world-wide potential. Second, is content control. Many users raised concerns regarding the validity and reliability of the content added to MOSAICA in the form of tagged resources.

The evaluation research suffered from time constraints, due to which the post-questionnaires were administered just after the workshop has finished, when the users were still under the impression of the compelling stories. While the statistically significant results indicated a positive change towards open-mindedness, these are short-term effects which need to be examined in the long-term.

There is no doubt that the success of MOSAICA system depends on deeper understanding of the processes and motivations of humans to share information. What are the system-based incentives for people to contribute and create their own VEs? How can the design of the VEs improve the users' tendency and willingness to contribute? We believe that the study of these important questions will promote the growing body of knowledge on Web-based environments for learning, knowledge sharing, and cultural heritage preservation.

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11. APPENDICES

Appendix A – MOSAICA Workshop Assignments

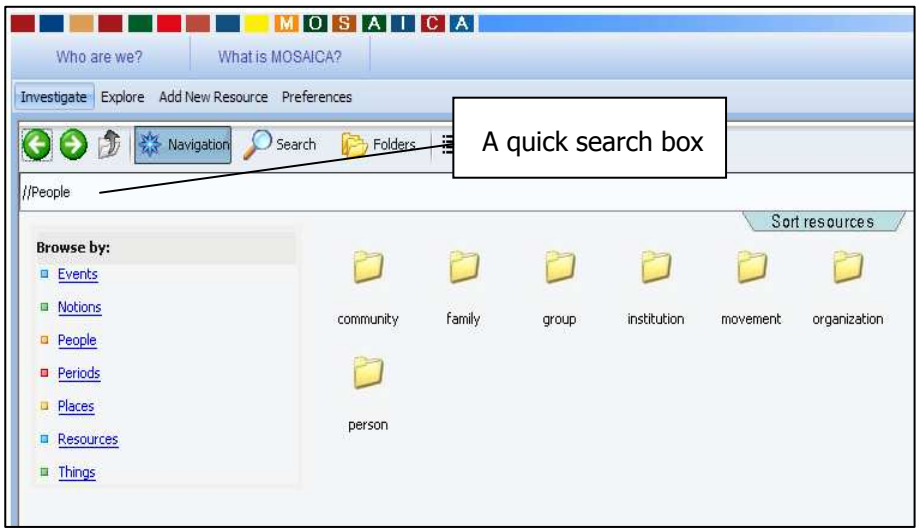
MOSICA is a system that includes several online tools dedicated for the preservation and presentation of the Jewish cultural heritage. MOSAICA's website: http://212.179.43.184:8081/mosaica-test/Mosaica.html. New users must register to the website by clicking on the 'Register' button. A returning user can enter by clicking the 'Sign in' button.

The site includes 4 main tools: Investigate, Explore, Resources and Virtual Expeditions.

Assignment 1: Investigate - search for Jewish cultural heritage resources

Clicking on the 'Investigate' button enables you to look for audio, video, drawings, photos and other files that are catalogued according to the following seven categories: Events, Notions, People, Periods, Places, Resources, and Things. Each category includes folders that contain sub-folders.

If the subject of the search is known, the search process can be shortened by writing the name (or parts of it) in a quick search box that appears in the upper part of the tool.



In this assignment you are asked to find examples of the following Jewish cultural heritage resources:

Jerusalem, Moses, Moshe Mendelssohn, Purim, Chanukkiya.

Assignment 2: Explore - discover places and events by using a map

Clicking on the 'Explore' button enables you to look for places and events that are connected to the Jewish cultural heritage according to their geographical location**.** Furthermore, MOSAICA system enables you to receive relevant semantic relationships for the different resources.

In this assignment you are asked to use the Explore option and find information about: Babylon Talmud, Abraham, Jacob's ladder, Purim holiday, Masada, Moses, and Egypt.

Assignment 3: Resources - add your own resources to MOSAICA system

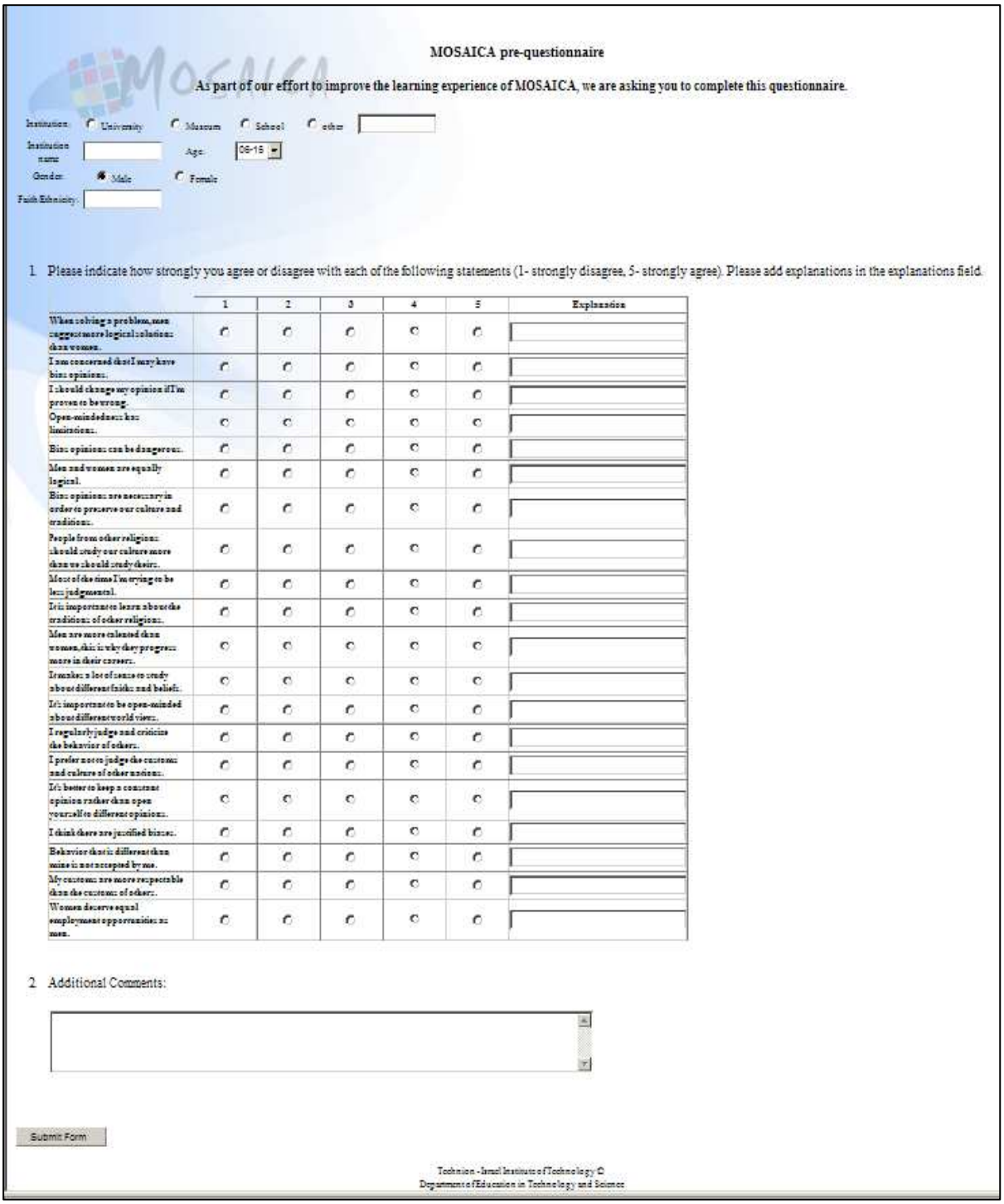
Clicking on the 'Resources' button and then on 'Tag a web resource' enables you to add audio, video, drawings, photos and other files to MOSAICA system. In order to do it, you have to choose a resource, copy its URL address, and paste it in the designated box. Next step is tagging it, which means, adding: a header, the type of the resource, the name of the donor, and following the rest of the instruction presented in the system.

In this assignment you are asked to tag a web resources relating to Sukkoth holiday.

Assignment 4: Resources - create your own VE and share your ideas on the VE diary

Clicking on the 'Resources' button and then on 'Create a Virtual Expedition' enables you to create your own VE. You can also share your ideas and comment on other users' VEs by using the VE diary tool at: http://qmosaica.paris.ort.asso.fr/diary.

Appendix B - The Online Pre-Questionnaire



MOSAICA pre-questionnaire

As part of our effort to improve the learning experience of MOSAICA, we are asking you to complete this questionnaire.

Institution: ○ University ○ Museum ○ School ○ other

Institution name: Age: 06-15

Gender: ● Male ○ Female

Faith/Ethnicity:

1. Please indicate how strongly you agree or disagree with each of the following statements (1- strongly disagree, 5- strongly agree). Please add explanations in the explanations field.

	1	2	3	4	5	Explanation
When solving a problem, men suggest more logical solutions than women.	○	○	○	○	○	
I am concerned that I may have bias opinions.	○	○	○	○	○	
I should change my opinion if I'm proven to be wrong.	○	○	○	○	○	
Open-mindedness has limitations.	○	○	○	○	○	
Bias opinions can be dangerous.	○	○	○	○	○	
Men and women are equally logical.	○	○	○	○	○	
Bias opinions are necessary in order to preserve our culture and traditions.	○	○	○	○	○	
People from other religions should study our culture more than we should study their's.	○	○	○	○	○	
Most of the time I'm trying to be less judgmental.	○	○	○	○	○	
It's important to learn about the traditions of other religions.	○	○	○	○	○	
Men are more talented than women, this is why they progress more in their careers.	○	○	○	○	○	
It makes a lot of sense to study about different faiths and beliefs.	○	○	○	○	○	
It's important to be open-minded about different world views.	○	○	○	○	○	
I regularly judge and criticize the behavior of others.	○	○	○	○	○	
I prefer not to judge the customs and culture of other nations.	○	○	○	○	○	
It's better to keep a constant opinion rather than open yourself to different opinions.	○	○	○	○	○	
I think there are justified biases.	○	○	○	○	○	
Behavior that is different than mine is not accepted by me.	○	○	○	○	○	
My customs are more respectable than the customs of others.	○	○	○	○	○	
Women deserve equal employment opportunities as men.	○	○	○	○	○	

2. Additional Comments:

Submit Form

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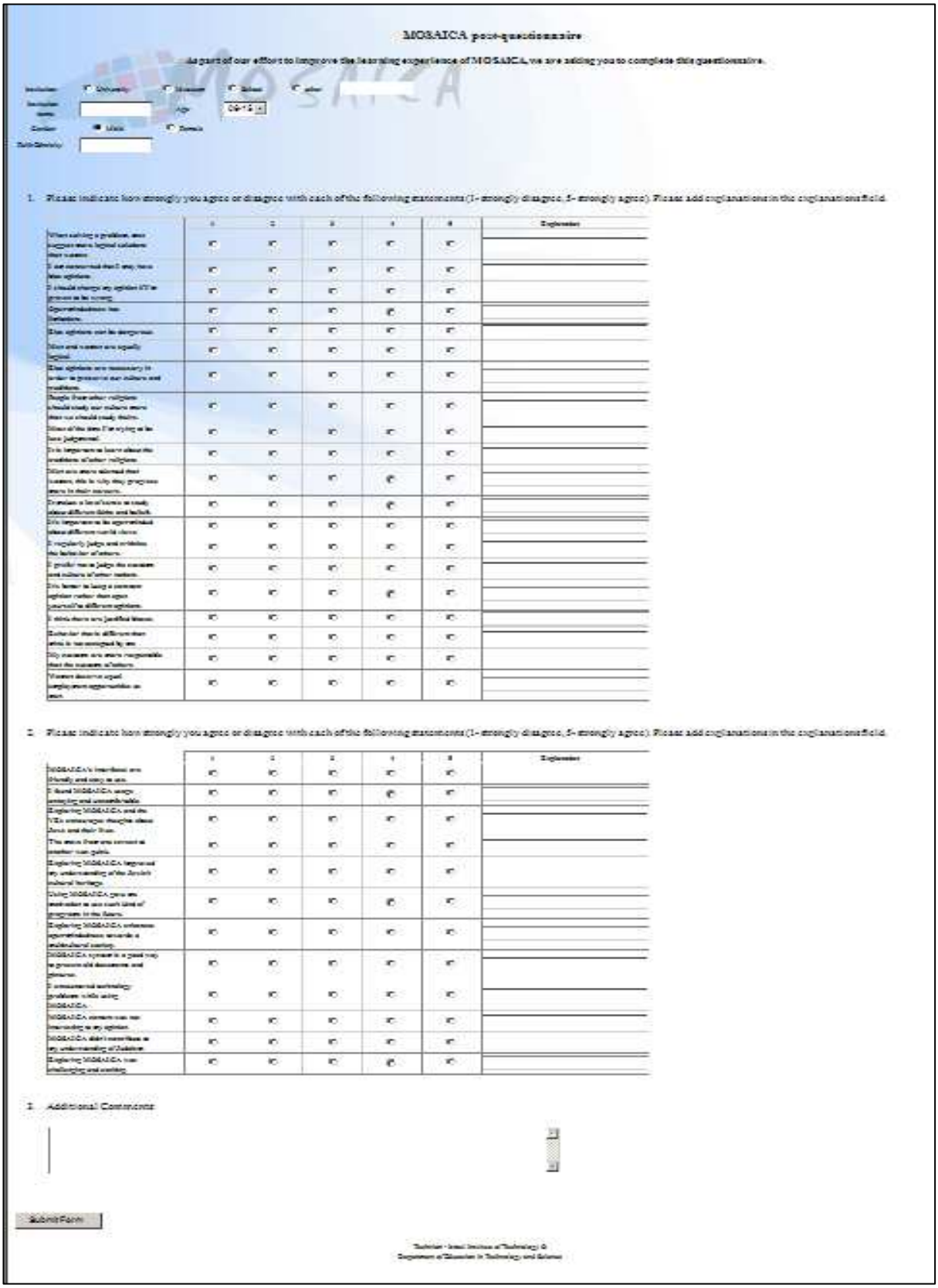
Department of Education in Technology and Science

Appendix C - The Online Post-Questionnaire



MOSAICA post-questionnaire

As part of our effort to improve the learning experience of MOSAICA, we are asking you to complete this questionnaire.

1. Please indicate how strongly you agree or disagree with each of the following statements (1- strongly disagree, 5- strongly agree). Please add explanations in the explanations field.

	1	2	3	4	5	Explanation
When solving a problem, one should use more logical solutions than random						
I am convinced that I say new, wise opinions						
I should change my opinion if I'm proven to be wrong						
Experimentation has limitations						
Wise opinions can be dangerous						
Wise and unwise are equally logical						
Wise opinions are necessary in order to preserve our culture and traditions						
People from other religions should study our culture more than we should study theirs						
Most of the time I'm trying to be less judgmental						
It is important to learn about the traditions of other religions						
Most wise people understand that humans, due to very deep, progress more in their concepts						
Friendship is beneficial to study about different faiths and beliefs						
It is important to be open-minded about different world views						
I regularly judge and criticize the behavior of others						
I prefer not to judge the customs and cultures of other nations						
It is better to keep a common opinion rather than open yourself to different opinions						
I think there are justified biases						
Behavior that is different than mine is not accepted by me						
My ancestors are more responsible than the ancestors of others						
Women deserve equal employment opportunities as men						

2. Please indicate how strongly you agree or disagree with each of the following statements (1- strongly disagree, 5- strongly agree). Please add explanations in the explanations field.

	1	2	3	4	5	Explanation
MOSAICA's interfaces are friendly and easy to use						
I found MOSAICA's design annoying and unacceptable						
Exploring MOSAICA and the VEs encourages thoughts about Jews and their lives						
The views that are correct in another man point						
Exploring MOSAICA improved my understanding of the Jewish cultural heritage						
Using MOSAICA, you are motivated to see more kind of immigrants in the future						
Exploring MOSAICA enhances open-mindedness towards a multicultural society						
MOSAICA's power is a good way to preserve old documents and pictures						
It unnecessarily technology problems while using MOSAICA						
MOSAICA's content can not be interesting to my opinion						
MOSAICA didn't contribute to my understanding of Judaism						
Exploring MOSAICA was challenging and exciting						

3. Additional Comments

Submit Form

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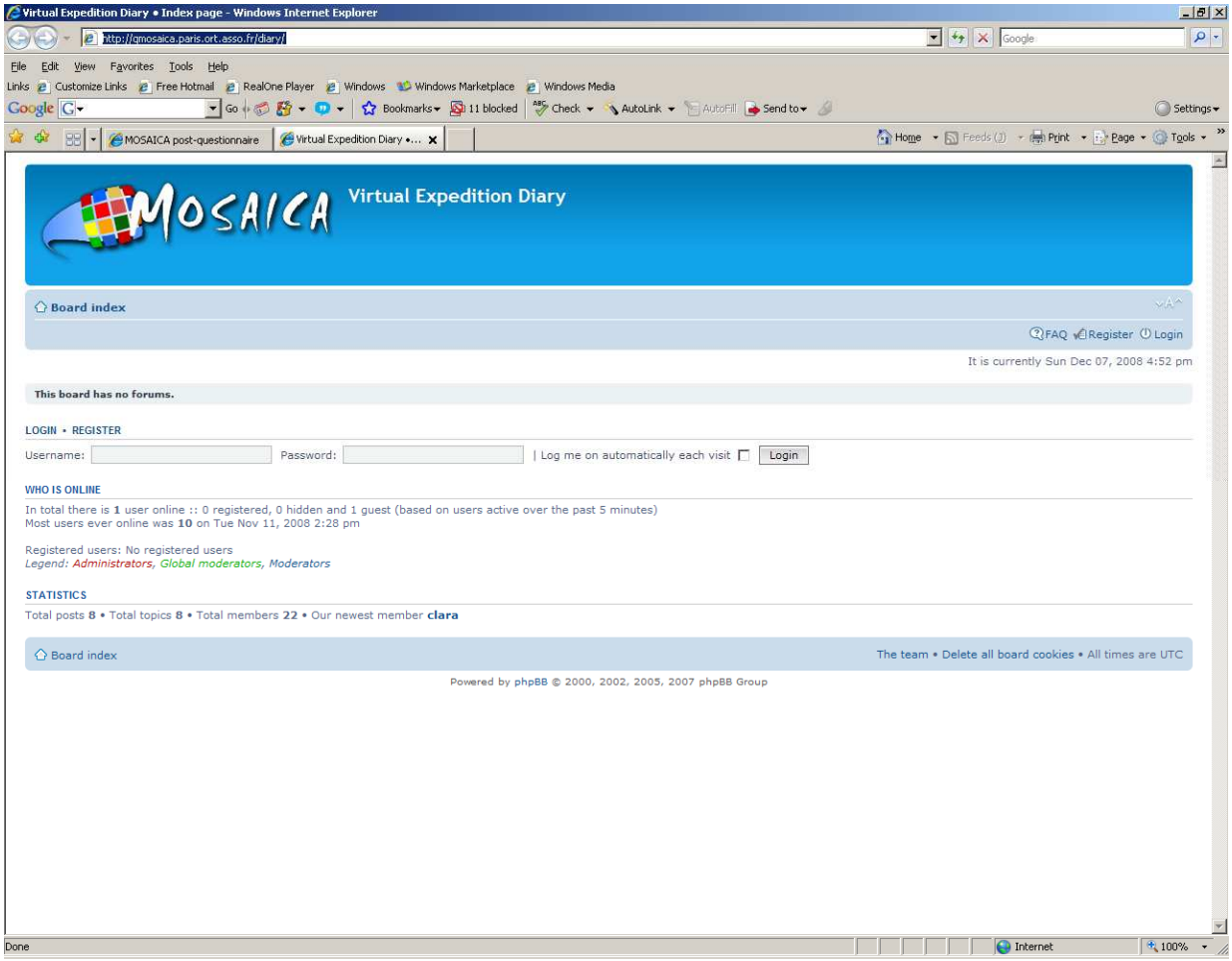
Appendix D - Virtual Expedition Diary Screen Shot



Appendix E - A Transcript of an Interview with Librarians and Archive Workers

Participants: Arion (A), Dina (D), Mira (M), and Tania (T)

Date: 12.10.08

Activity: Presentation of MOSAICA's goals and vision (5 min).

Demonstration of MOSAICA system: Investigation, Explore, Add new resource (20 min).

Display of VE Demo (5 min).

Interview (30 min).

We chose to interview librarians since they have much knowledge and experience with the use of thesaurus, archives, and categorization.

Content analysis of the participants' answers resulted in three categories: Usage characteristics of MOSAICA, Content comprehension and learning, Open mindedness and tolerance.

The interview wording:

Part I: an open discussion among the participants as I was showing them MOSAICA system and its different applications.

A: I find it is a very interesting system. However it seems that it has too much functionality. You explained to us that MOSAICA allows the preservation of old documents and pictures, it also allows searching in different formats: regular search, advanced search and the use of interactive maps. It even allows the presentation of heritage items, via story telling (tell, show) or questions. This might be confusing for regular users… although, I personally, would like to experience using such a complex system.

D: I think this is great. MOSAICA can be used by experts in Judaism that will present their collections and share their knowledge, like museums and professors in the academia. It can also be used by regular users that wish to preserve documents and pictures of their family and tell their life story.

M: The 'Add a new resource' is a very good tool for tagging and categorizing. It is simple for use and strait forward. As a professional librarian, I am an expert in classification and will be able to take a resource (person, artifact, place, custom, etc.) and with a lot of patients, make the correct connections to other resources. I will be able to make the correct classifications and think about all the options for relating one resource to the other. However, I am not sure that a young student will have the experience, knowledge, and patients to tag a resource in an appropriate way. Maybe you need to provide a more rigid framework for tagging… this is something that you need to consider. I mean… force users to connect each resource to a certain place, time period, f it is a person to related siblings etc.

D: well, I disagree with you on this point since regular users will not have the patience to classify and tag resources as we do here in the library. I do not think they will like to be forced to invest a lot of work as they tag resources.

T: It is important that resources and tagging will be filterized. It might be dangerous if regular users will be allowed to add resources and tag them without being monitored or inspected by experts.

M: I think that MOSAICA needs a monitoring tool, such as an editorial board that will provide license only for professional people.

D: Clearly, the uniqueness of MOSAICA is that it allows all users, young and old, regular users and professionals to use it in a comfortable way. I am not sure monitoring is needed, but you might be right. Do you need a username and a password in order to enter MOSAICA?

A: I think the MOSAICA can be seen as a new and innovative search engine that allows you to find the exact resource without having to deal with "garbage", "noises" and unnecessary search results.

T: I think that MOSAICA can be used for another purpose which was not mentioned. If experts are contributing to it, it can be used as a tool for research. If I want to study about the Book of Nahum, for instance, as you showed us, I can learn much from the documents in MOSAICA. Are users able to print documents or pictures? Are they able to "cut and past" from MOSAICA into word document? I think this might be an important feature.

M: All that is connected to the science of Judaism… this is our tool. This is the tool to use. This is a new perception of internet tools and it will take time for people to understand this. People are now used to Google or Wikipedia, this is a whole new conception.

D: In fact, if changing the sub-files, under the classes: people, places, events etc., this tool can be used as a shell for other religions and cultures… I think it is very sophisticated. In fact, this tool can be a great platform for knowledge sharing and collaboration among different cultures and societies. MOSAICA can be used as a window for stories of different cultures, the equal and the differences… I mean … for the same instance ('Jerusalem' for example), different cultures can tag different resources and interpretations. This can be a beginning of an interesting dialog.
M: …or an "interesting" dispute...

D: Well… yes… this is not a simple issue, still it is important to raise different opinions and points of views. It is important to talk about it. I can imagine a collaboration between Jewish and Arab schools, working on similar cultural projects, using MOSAICA to add resources and learn from existing ones.

M: It is not clear to me why we need another system on the Jewish culture and tradition. There are so many similar systems on the Web...

A: This is because you didn't understand the new concept MOSAICA system brings within it. This could be a wonderful platform for sharing documents, pictures, videos and more. Imagine that a distant relative of your from the US wants to add documents and pictures of his family. While seeking his family name, he reaches a person with a similar family name, but it turns out that this is a relative of yours and that you have just added resources to this instance. He can then share his documents and papers and help you complete a genealogy tree or the story of your family.

D: I think that this can also be true with more generic topics, not only your personal family. For example, if I am interested in Nahums' book, as was presented to us earlier, I will add my documents and pictures that I have in my possession. The same can be done by other people from all around the word, thus having a growing body of knowledge on this topic. If I understood correctly, since the technology is new, peer-to-peer, there is no problem with memory capacity or space on a specific server.

M: Well… this means that this system can serve regular users (such as me) or content experts. Can we try the system now? I have interesting pictures of my grandfather's village in Poland and his family before WWII.

T: It is a wonderful tool for school children and private people, I am still not convince that it is suite to be a pool of resources for seeking expert knowledge like an encyclopedia. Meaning that if I am searching for information on Chanukah holiday, I will probably not use MOSAICA, but rather Wikipedia or Britannica Encyclopedia.

T: … I might be wrong, maybe it is difficult for me to accept this new idea.

M: If I understand correctly the concept of the VEs, it is purposely done so users will be stimulated to seek information, solve riddles and answer questions. This is an excellent idea especially for children, but also for adults. You can see that we are all fascinated by this idea.

D: Presenting a lesson in such a way is wonderful. If I was a teacher, I would love having such a tool… Asking students to reveal as much information as possible on a certain topic, or even more so, asking them to create their own VE on a topic they choose to learn.

T: It is a beautiful idea. It is almost like participating in a game.

Part II: Participants answers to the interview questions

1. Which applications did you like most? Please explain why.

T: well it depends, you showed us four tools: what you called a VE (I think …, yes) Virtual Expedition, Investigation, Explore, and…Add new resource. Each serves a different purpose so it is difficult for me to choose my favorite tool.

D: The Investigation, Explore, and Add new resource are more technical, and might be boring to use. The exploration of a VE or the creation of a VE seem to be more exciting and challenging.

A: I agree with D. I would love to skip the technical parts and concentrate on the story I would like to present to the world. The Idea that I could publish 'my story', …it does not matter if it is about my family or about a topic that I am an expert on, …and that people can read and learn from it, is great.

M: For search purposes, I think there are other better tools on the web, but as an archive for saving different formats of resources… it is like Emule or kazaa, sharing resources of different types, but in a

more clever and sophisticated way.

D: I think that MOSAICA is a good system for searching, because not all people know how to search Google in a correct way and either get too many, too little or wrong information. MOSAICA can assist those who seek correct, pinpointed, screened, well monitored information that is related to the Jewish culture.

2. Did you find the applications comfortable/easy to use? Please explain in what way.

A: At the beginning I thought that the system is not very user friendly, clicking here and there, adding more data, more information, but after a while, I started to understand who to work with the system and it seems OK.

D: I also think that MOSAICA is user friendly, taking into consideration its complexity and all its tools and different functionalities.

T: Well… It will take me time to learn to work efficiently with this system. I will need to get used to it. One needs to open a lot of folders until reaching a certain topic or person.

M: Wait a minute, there is an option to write one word in the search bar. T, you forgot that there is the 'shortcut' option!

T: Yes… well… this does make life easier if you know the term you are looking for… OK.

3. From your experience, what would you recommend to add or change in MOSAICA in order to make it more user-friendly and more interactive?

M: the most important thin is to add a user-guide including a thesaurus – a concepts key so users can be familiarized with the system as well with the concepts and instances.

D: Yes, this will make the user's life easier, providing that those who tagged the concepts did it correctly.

T: We discussed this issue earlier, but I think that it is important to have an editorial board that would monitor and control the material added by users.

4. How clear, coherent, interesting was the information presented in the applications? Please provide a detailed answer for each application you chose.

M: I think the content presented in MOSAICA is coherent and clear. I would recommend to enlarge the font size. In some cases, I found it difficult to read.

T: I think that the content is clear, but it is not interesting until it is presented as a narrative via the Virtual expeditions. I think that the VE s makes MOSAICA interesting.

D: the fact that I can add resources in a relative strait forward way is great in my opinion. I think that one can learn a lot from the explore tool.

5. Define a question or raise an issue that you find it interesting to explore within MOSICA application.

T: I would like to explore more about my family.

D: I am interested to learn more about the source of Jewish holidays.

M: It would be interesting to learn about connection between people, places and events that are new to me.

6. In your opinion, can MOSAICA promote open mindedness and tolerance toward the Jewish culture? If so how?

A: I think this is a little pretentious, although being exposed to other cultures and traditions might help people understand better other people.

M: I do not think it is an issue of being an internet tool, but rather a tool for story-telling. Story-telling has a great affect on peoples' emotions, thoughts and beliefs.

T: I agree, as librarians, we all know the strengths of stories. However, having these stories presented on the web, free for everyone, every where makes it more affective and effective.

A: If we show that the Jewish people contributed to art, music, literature, science, maybe others will not tag us a "money chasers". The same with other religions, such as the Islamic culture, that contributed much to art, music, mathematics and more. It is important that the young generations will be open to each others' narratives.

D: the small stories, the personal stories may make the difference. MOSAICA is a good platform for that. You should think about initiating collaborative projects that includes students from different cultures and religions all around the world. For that MOSAICA can be a great platform.

7. To whom would you recommend MOSAICA? Why?

D: As I said before, I would recommend MOSAICA mainly for school students to conduct collaborative projects with colleges around the world.

T: I think that MOSAIOCA can be a helpful tool for Museums and libraries to add, share and present data and information online.

M: I think that MOSAICA is good for regular, private people. It can be an excellent way for them to write their family story. I, personally, would very much like to use this system to tell the story of my family. This can be an ever-lasting story, each generation can add information to the previous one. Every time a related newspaper article is published , a song is written, an event happens, all can be documented in MOSAICA.