Information Technology as Cultural Heritage Preservation Tool

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Abstract

The task of cultural heritage preservation is a major endeavor that has political, economic and societal, in addition to the cultural implications. It requires the active participation of many stakeholders and needs to be founded on scientific grounds with attention to privacy/ethical issues. We argue that Information Technology, if utilized properly, can play an important role in the cultural heritage preservation by serving as a tool that can aid the process in many ways[7]. It allows better, cheaper and longer term preservation of archival material in digital form. This applies to printed matter as well as to multimedia objects (voice, pictures, video). The Internet allows access, independent of distance, both to reach the archival materials and to contribute objects. Access/modification can be controlled/regulated/monitored with minimal human effort. Virtual tours/exhibits, better annotation, and multilingual support can improve reachability to larger audiences. Presentation methods employing computer graphics/multimedia/Virtual Reality and GIS tools can help better querying and digestion of data. IT offers new cooperation possibilities in cultural heritage preservation such as *crowd sourcing* which helps the democratization of the process by allowing more people to contribute even in small ways, while still observing strict safeguards. *Storage distribution and mirroring* help smooth access and guard against interruptions/bottlenecks/failures, technical and otherwise; The o*pen access* culture of the Internet is an impediment to restrictive practices by custodians, while still giving the tools to preserve the privacy of individuals. Reductions in storage and bandwidth costs, better connectivity and the increase in computational power of devices and the ubiquitous nature of computing as well as the pervasiveness of multilingual tools for Information Retrieval are all factors that contribute to a better integration of IT resources into the cultural heritage preservation effort. IT, however, comes at a cost: better access also means more frequent malicious access attempts; misinterpreting the role of IT as an end rather than a tool and IT workers as policy setters rather than implementers; lax treatment of the real artifacts on the assumption that digital objects are a substitute; plus the usual failures that plague IT systems: deployment delays, bugs, unclear access rights management and the dominance of technical issues at the expense of scientific/cultural aspects of the work.

We argue that *digital*, or IT-enabled preservation of cultural heritage, is here to stay, due to its economic, technical, cultural and societal advantages[7,8]. We claim that in the Palestinian context IT may allow for preserving aspects of Palestinian Cultural Heritage, which are while endangered, may not be the focus of a critical mass of researchers/entities. Examples are: Palestinian Dialects, folk music/poetry and virtual reality models of destroyed population centers.

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I. Introduction:

Information technology (IT) has been playing an increasingly important role in many human activities from education to transport to the media to health and more. The rapidly increasing sophistication and decreasing costs of IT services and products rendered many tasks easier and much less costly to implement in ways that were not achievable before the IT era. IT-based devices and methods are already part of the newer culture where the Internet and associated technologies are fast becoming the medium of choice for publication and search. We believe that archiving effort is one activity where IT, if properly utilized, can make a qualitative difference in archiving, more so in places suffering from physical isolation with severe restrictions on the freedom of movement as is the case in Palestine. Open, accessible, secure, distributed, collaborative, while still credible, archival work can be greatly helped by IT[2,7,11,13,17]. We argue that IT is important for archiving in Palestine and point to the sources of this importance and the new horizons for cultural heritage preservation that are facilitated by its use. We also discuss possible extensions and newer modes of operation in the archival effort that can be based on publicly available IT resources. This is supported by the experiences in other nations including in less developed countries[3,5,6,9,15,16,21,23]. We also point out that utilizing IT as a tool in archival work is not risk free and point to possible conflicts and ways to avoid them. The literature on the role of IT in archiving or even on the disciplines resulting from the fusion of the two is quite extensive[6,22]. However, we try to limit our discussion to the components of relevance to the archival effort in Palestine.

I.1. Cultural Heritage and Archives:

The term *cultural heritage* refers to the legacy assets, artifacts and attributes pertaining to the relationships within a certain group/society and their manifestations in terms of physical and literary/scientific output (formal an informal) characterizing the society/group, its social norms and political outlook. Included here are tangible assets such as architectural objects: buildings, monuments, landscapes scientific/literary products such as manuscripts and culturally significant natural assets such as biodiversity and natural landscape, as well as intangibles assets such as folklore, traditions, languages/dialects, crafts and knowledge[20].

Cultural heritage is an essential component of national/group identity. It can serve as a unifying factor in nation building and may define the way a certain social group views itself and is viewed by others[2]. It is also a defining factor in the history of a nation/group and may give out information about its outlook, internal dynamics and external relations. Cultural heritage is passed from one generation to the other and thus is supposed to be subject to continuous preservation against possible destruction: natural and man-made. As experience and archaeology show, recovering cultural heritage is not an easy task, even in the short term, in the absence of deliberate and systematic preservation effort. When calamites strike and lives and national survival are at stake, people don't usually have the time and resources to care for their cultural heritage. The Palestinian, Iraqi, Egyptian, Malian and Syrian experiences are but clear examples of the difficulties of preserving cultural heritage at times of political upheaval. This seems to suggest that cultural heritage preservation effort needs to be continuous, and part of the everyday activities of the entities concerned. While cultural heritage preservation can have different manifestations, we are most concerned with *archiving* as the main preservation method for cultural heritage artifacts (say for voice/video materials where the storage medium itself is not be of real importance) as well as an auxiliary tool in preserving physical artifacts such as documents, buildings, crafts, and the likes.

Many countries realized the importance of sustained archival effort early on and have engaged in archive building to the degree that archiving became a scientific discipline[5,8,10,13]. For others, especially in the developing world, archiving effort is frequently sporadic and is not as sustained, despite the higher danger level to cultural heritage in these countries due to political instability.

I.2. Cultural Heritage Preservation and the Palestinian Context:

One may think that survival of Cultural Heritage is guaranteed by the mere continuing existence of a nation. Experience shows that it is not necessarily so. In the absence of a well coordinated effort and investment in preservation, major elements of the cultural heritage may be lost. What is today a given may become tomorrow a topic of heated debates in the absence of documentary evidence. People may not be aware of the value of cultural heritage items in their possession. A survey of the histories of the Palestinian Catastrophe as told by different historians (Palestinian, Zionist and post Zionist/Revisionist, and less directly involved foreign) attests to the complexities of writing history in the absence (or blackout) of documentation and testimonial data and proper preservation of witness accounts.

Cultural heritage preservation has been an important occupation in industrial countries for centuries now. This came out of the realization of the need to pass cultural heritage to future generations in as close to its original form as possible. Thus, archiving manuscripts and later other types of media, the folk culture and the preservation of natural landscape and biodiversity and archaeological artifacts were given prominence in countries like Germany, France, the US and others. The task has been a tough one: technologies had to be devised to record, maintain, regularly check and make available to the widest possible audience a large and growing array of materials. Programs to support preservation effort are being undertaken at the local (city, state), country (e.g. US[17], UK, Russia[3]) , regional (e.g. EU[5,13,14]) and world (e.g. UNESCO[19]) levels. Cultural heritage preservation effort is being undertaken in many developing countries such as Nigeria in Africa[NIG], India[9], Korea[21] and China[23] in Asia, Brazil in Latin America and Egypt in the Arab Region[15,16].

The role of cultural heritage in consolidating national identity made it a target of political manipulation or even attack, be it in an effort to replace it or parts of it by a different, competing heritage, as was the case for the colonial powers in the conquered countries, or even outright eradication/denial as was the case for (re)settlement occupation as was started in Palestine in 1948. The cultural heritage of Palestine is frequently denied, destroyed, arrested, corrupted or hijacked in an attempt to deny the existence of a functioning Palestinian society with its social, economic, cultural and natural heritage. Much of the cultural heritage of Palestine has disappeared: numerous cities and villages destroyed, monuments altered and converted for other uses, geographical entities renamed and lifestyles forcibly adjusted. All this in the absence of much to document the details of the architectural, social, economic, cultural and even linguistic aspects of Palestinian life. The surviving elements of the Cultural heritage such as family libraries and archives were appropriated and access to them was and is still denied, especially to Palestinian scholars. The systematic effort at eradicating the cultural heritage of Palestine was assisted by the harsh realities of the Palestinian exile and the demands of daily survival in the refugee centers in Palestine and the Diaspora. Inaccessibility of Palestine to most Palestinians contributed to the fading of the memory about the places and artifacts. The dispersion of Palestinians into many countries made it problematic to preserve certain elements of the cultural heritage like dialects, folk arts and music and cuisine.

Many in Palestine were aware of the need to preserve the cultural heritage and to do it fast as the people who knew were decreasing in numbers and their ability to recall events and describe cultural assets was fading. Numerous attempts at archiving the Palestinian cultural heritage and narrative were undertaken by semi-governmental entities, but more so by NGOs and private individuals. This took the form of collecting/documenting materials on Palestine, especially pre-1948. Books on destroyed villages were published and large amounts of oral history recordings were produced. Additionally, several archival projects were undertaken in Palestine and in the Diaspora. This is in addition to many individuals who kept their own memoires, descriptions, and maintained their personal archives. Prominent in this regard are the efforts by research institutions (PSI, Documentation Center at Birzeit University), NGOs through Oral History Initiatives, the UNRWA through its archive effort and many more. These attempts had various points of emphasis and achieved different degrees of success. We believe that the lack of a general framework, coordination, sustained funding and publicity limited the reach and impact of these efforts. The small isolated archives couldn't be sustained for the longer term and the volatile nature of Palestine NGOs and varying views on the importance of archiving forced some to abandon their archival work and in many cases the valuable materials were left to deteriorate/destruct. Weak utilization of IT may have contributed to that.

It is in this environment that the current archival work at Birzeit, Awraq, was initiated: as an attempt to create an open umbrella for archival work dealing with Palestine, independent of the sources, location, type of media and affiliation. One of the basic elements was to give priority to artifacts in imminent danger of destruction, including old audio recordings, as well as endangered materials outside Palestine. An archive open to all potential contributors/users had to employ IT as the main platform. This was dictated by the current trends in archiving[3,8,12,17,18,23] but also by the peculiarities of the Palestinian context where many of the contributors/beneficiaries cannot move freely to/in Palestine. Of course Awraq is more about archiving than about IT, but we want to argue that the proper utilization of IT as an archiving tool can take us places that are not reachable otherwise.

II. Archival Work and New Technologies:

II-1. General:

Over the years, the advent of newer technologies opened new opportunities but also created new challenges for archival work. Printing made it easier to produce/duplicate manuscripts and photography made it possible to better document assets for easier preservation. However, both technologies also created new artifacts in the form of printed manuscripts and visual images themselves in need of preservation. The same applied to recording: audio and video extensively used for radio and TV transmissions with the associated recorded interviews and films. The new technologies were utilized in support of cultural heritage documentation but then they themselves became part of that: documentary films on various aspects of society and oral history techniques generated lots of recorded material in need of preservation. But Information Technology: an important tool of information processing and generation, and its widespread utilization and pervasive nature was a distinct development that created many challenges and opened opportunities for cultural heritage understanding and preservation[7]. The amount of data generated is vast and many talk about the doubling of the information available to mankind over short periods (from one century in 1900 to 25years in 1950, to one year now). It is no more true that computers simply store entered data for future recall. Rather, computers are generating large amounts of

data themselves. Logs of internet searches, transaction data, records of Internet and phone traffic and data from the huge infrastructure of video devices, black boxes in many machines and information mined from all of that are but pointers to the data explosion. The age of *big data* is already here, and will be with us in the longer term. The publishing and media industries are undergoing major transformations dictated by the use of IT and the Internet. Additionally, easier access to IT resources, and subsequently to online data, drew many new participants into the cultural heritage generation, and potentially preservation efforts: social media with its novel communications paradigms is attracting individuals in age groups that were not known for being collectively active in content generation. The social media content is not organized and may not even follow the basic rules of writing, but nevertheless it is there and many are seeing it as a main source of information about society and the trends among the masses. One may argue that any cultural heritage preservation effort needs to deal with such data as well.

II-2. IT Relevance to Archival Work:

What distinguishes IT is that it offers technologies and methods that allow for more successful cultural heritage preservation, including the following:

1- A unified approach to different types of media: text, voice, image and video as well as location tagged and time stamped data all of which can be stored/manipulated in the same computerized system.
2- Affordable and practically unlimited storage capabilities, be it local (on hard disks) or in the cloud. This makes it possible to store the large amounts of data required for any reasonable size archive, and also allows for data redundancy (duplication) to guard against possible losses and for better access.
3- The digital nature of IT products and the prevailing backup/duplication practices allow the preservation of data in good quality. Practically indefinitely. This is in contrast to the limited "shelf life" of earlier analog technologies.
4- Ubiquity and global reach: IT products and access to the Internet are no more confined to the technically savvy or to those who can afford it, but practically available to everybody. Access can be through multi-use devices like mobile phones/tablets/PCs/Laptops and cheap (or perhaps free) wireless connectivity at work, at home and at service locations. This allows many to reach open access material and contribute to the cultural heritage preservation process even from far away places.
5- IT allows better search for stored cultural heritage material independent of location and practically in real time. It also allows for cheap (or free) communication that is not subject to border checks and independent of the distances involved, something that makes it easier to conduct interviews, convene conferences and hold debates.
6- Cross language information retrieval independent of language proficiency on part of the users. The tools for that are maturing and have been deployed in many systems. We believe that integrating such tools into the archival system is a worthy investment because it takes the archived material to people who wouldn't otherwise have accessed it. In the Palestinian context one can associate better visibility to the outside world with better protection against attempts at disrupting the archival work by hostile parties.
7- Security measures to guard against unauthorized access and to protect data during storage and transmission and to maintain data integrity as well as tools for authentication and access control to help overcome the shortfalls of open access.

8- Novel methods for cultural heritage preservation such as virtual reality techniques which enable the simulation of large physical objects and allow for information tours in three dimensional space: an experience much more satisfying than what can be gleaned from images or video.
9- Networking possibilities, including multipoint access to archival material through links on popular cultural heritage portals.

However, viewing IT as an all positive `contributor to cultural heritage preservation may be too optimistic. In all other areas where IT has been used extensively, there have been many potential negative implications, resulting from inadequate preparation and skewed views on the potential of IT and its limitations. IT usually comes at a cost: better access also means more frequent malicious access attempts to data and attempts at its unauthorized manipulation; misinterpreting the role of IT as an end rather than a tool and IT workers as policy setters rather than implementers of designs by relevant stakeholders; lax treatment of the real archival material on the assumption that digital images are substitutes; security preaches, denial of service attacks intended to bring down the system, miscommunication between archivists and IT people. This is in addition to the usual failures that plague IT systems: deployment delays, mismatch between technologies and goals, bugs, unclear or poorly documented access rights and management and the associated privacy concerns, and the dominance of technical issues at the expense of scientific/cultural aspects of the work. Archival planning needs to address each of these potential shortcomings and factor solutions into the design process with continuous monitoring and follow-up to resolve any issues early on. In addition, IT generated data itself is an artifact in need of preservation: a major challenge given the size and pace of growth.

In general, one can view the computerized archival system as having two components: one to index the physical holdings and to track the current status of each artifact including storage location, access rights, restoration schedule and the likes. This is more of a library-style Information system. The other is to keep digital copies of the archived materials. These copies may be duplicates of the originals or may be the originals themselves as in the case of audio/video recordings. This is the more interesting aspect that we concentrate on here.

III. IT in Archival Work and Possible Extensions:

The value of IT in archival work was evident long before IT became so pervasive. To a large extent, archival work is about longer term storage of huge amounts of data and having easy but controlled access when needed. IT tackled elements of both from the beginning. The idea of storage (memory) organization/hierarchy and having different types of data (in terms of immediacy of need) stored using different media and at different distances from the central processor was always part of computing. The advantages of digital storage over analog was also evident especially in terms of longer term survival. However, advances in IT and expansion to multimedia and the advent of the Internet made it natural to integrate IT as a main component of the archiving process, both in terms of collection, storage/organization, presentation, access and management. It is safe to say that practically all aspects of archival work can involve the use of IT resources as a main component. This is not limited to industrial countries but can be seen elsewhere as well[3,7,9,11,13,15,17].

III-1. Archival Work Requirements:

To be credible, an archiving system needs to take care of the following points:

1. Preserve the archived material in the best physical form possible and under all circumstances: natural disasters, man inflected attacks, equipment and infrastructure failures and natural wear and tear.
2. Grant authorized users adequate access to the archived material.
3. Make it possible for organizations and individuals with legitimate material in need of preservation to access the archiving system to post their holdings and interact with the editorial body of the archival work.
4. Procedures to ascertain the authenticity of the archived material, the identity of participants, legality of postings and the documentation of this process as part of the metadata component of the archived items.
5. A review process to deal with legal/privacy considerations of the archived material: this is needed to ensure that the published material do not violate any applicable laws and are in agreement with contracts signed with the providers.
6. A system to log changes to the archived materials, individually and in aggregate. This is especially important in the Internet environment characterized by frequent changes.
7. A transparent infrastructure/technological base that is adaptive to new methods/technologies of relevance to the effort at hand, especially given the pace of advances in IT.
8. Balance between openness and care for legal and privacy issues: also to encourage potential participants to contribute their materials with assurances that the needed degree of confidentiality is maintained without sacrificing the material authenticity.
9. Context awareness and cultural sensitivity, in the sense that it should take into consideration the limitations of its potential users. For example, in the Palestinian context the realities of occupation as they pertain to freedom of movement, control over the infrastructure and thus the information highway, hostility towards cultural heritage preservation efforts and the worldwide distribution of Palestinians need to be accounted for.

Properties of digital storage and adopting best practices in system design and implementation that take care of and strictly enforce backup policies, access control mechanisms, system distribution and redundancy/mirroring, man-machine interface design take care of many of the technical elements. The adopted workflow needs to guarantee the timely editorial intervention when needed, and maintain monitoring/control of the entire process. One needs to benefit from world experiences but one also hopes that the cumulative experience in automation at the University, a major contributor to achieving the desired goals.

III.2. Ways IT can help Archiving Effort:

The use of IT can facilitate the archiving effort in more than one way. The following aspects may be relevant to the Palestinian context:

1- Have a distributed environment for archival material collection that is in line with the Palestinian Diaspora all over the world with emphasis on hard to reach places like the refugee camps in Lebanon/Syria and the Palestinian Communities in Latin America. The equipment needs are not likely to be a problem as scanning/videotaping equipment cost is generally not prohibitive

(through ownership, rental or usage fees). However, to ensure quality one needs to set guidelines regarding acceptable material in terms of resolution of pictures and recordings. A user should know what type of equipment he/she needs to use and where it can be accessed, the quality characteristics of the input data. There needs to be a simple method to deposit/mail the physical objects to the archive certification authority. Guidelines for meta data should be clear and specify the possible languages, characteristics of descriptive statements. Interactive support through chat sessions and possibly live calls may be offered in addition to FAQ repositories. Multiple entry points to the system can also help. This includes through popular sites inside and outside the country and through links on prominent cultural portals worldwide.

2- Security measures to ensure the integrity and survival of the various components of the system. This includes guarding against malicious attacks, mirroring of the data and maintaining multiple backup copies of the material in compliance with the best practices in the industry. While free access is a virtue that one should strive to maintain, it is by no means in contravention of requiring users to identify themselves through a simple registration system, that also enables the archive administration to remain in contact with its user base and to seek feedback on ways to improve the experience. The registration system should be inclusive and aim at encouraging people to get involved in the effort but without requiring them to do that as a precondition for access.
3- Emphasis on system usability in terms of easy to understand functionality and an intuitive work flow especially when it relates to potential contributors to the archiving effort. A good usability review is a must and user satisfaction should be assessed frequently with changes introduced and communicated to the users. It may help to have the system offer interaction possibilities between the users and the admins as well as between the users themselves (comments, blogs, wikis…). However, one needs to exercise care and look for a balance that encourages productive and informative interaction without degenerating into fruitless discussions due to the controversial nature of some of the material, which means that a certain level of tolerant moderation is needed.
4- Multilinguality of the system. The choice of languages will need to take into account the user base. However, one may want to rely on Cross-Language Information Retrieval (CLIR) methods for better access to the archived material without the need for manual translation, say by allowing the integration of CLIR tools into the system. An outreach to handicapped people through proper media and tools may be a major plus.
5- Multi-platform accessibility. The fast change in technology is drawing more people into using the Internet, many through mobile technology: tablets, smart phones and other handheld devices. It is important that any archiving effort take note of the shifting technologies and usage patterns and make the system available for multiple platforms to allow better reach. One needs to observe that many locally developed systems lack this feature and thus more work is needed here.

III.3. Possible Extensions of Current Archiving Effort:

The goal of archiving is to preserve the society heritage as is. It is our view that aspects of life that are endangered by internal or external factors should be included as targets for archiving. This may require the archival work to go beyond the usual and current content of emphasis. In addition to standard documentation: written materials, photos, recordings: video and audio especially those of historical value and material from individuals and media outlets. We believe that, with the help of IT, the following should be considered as possible extensions of the current effort:

1- Traditional artifacts such as embroidery and traditional equipment such as olive presses, agriculture tools, amulets and traditional medicine devices and the likes. We are not arguing that archives are the right place for preserving the physical objects but rather for documenting their properties, shapes and uses though proper media: photos, videos and text.
2- Palestinian dialects: there is a large diversity of dialects in Palestine and it is our view that many of them are threatened with extinction as more younger people opt for the "standard" Palestinian dialect. Recordings of the spoken language should be preserved for future studies. It is worth noting that Arabic dialects and dialect material are acquiring added importance as an information source especially in the West, in view of the spread of social media. One would assume that such an effort will be guided by experts in linguistics and related disciplines.
3- Folk poetry and songs, not only as texts but with the music and accompanying instruments: this can take the form of audio and video recordings. Issues of intellectual property need to be taken into account in the process.
4- National dishes and their regional variants, especially recipes for dishes that are no more offered in homes or food outlets. One can start with a web site to solicit recipes for these dishes and once a consensus is reached one can proceed to document that.
5- Much of the newer Palestinian narrative and peoples' views, especially of younger generation, are being expressed in web based forums: web sites and social media. The web is a volatile medium in the sense that there are no guarantees that the data will be there in the future or will be the same. Therefore, an effort at archiving the Palestinian web is needed to preserve the narrative and also to be able to observe/study developments. This is a huge effort and a major expense in terms of the needed resources. It may be undertaken as a complementary effort with its own resources but still be accessible from the archive web site.
6- One would assume that the national structured data like court records (civil and religious) , land registration, vehicle registration, civil records (births, deaths) and less structured data such as minutes of meeting of major decision making bodies (Presidency, Cabinet, Legislative Council, and so on) and the likes are being kept for perpetuity. Most understand the value of such records for the study of the period but also most realize that much of the Palestinian historical data has been lost, and what remains of it is poorly kept but nevertheless is serving as a valuable research tool. There is a danger that the current documentation practices may not guarantee the survival and availability of the records for future generations. Here too it is too much for an archive project at a single university to assume responsibility for maintaining these records. However, advocacy for such maintenance is essential to the collective memory of the country. The University may set a good example by archiving its own documents in a scientific manner (something we believe is not being undertaken) and make the tools and expertise available to the parties undertaking the effort at the national level. In cases when the amount of data is real large one may need to forgo the comprehensive archiving in favor of selective archiving through sampling in a manner that preserves the essential features of the underlying activity. Alternatively, one could make the arrangements to have BZU (say the library) serve as a repository for (select) national publications. It is also possible to task individual University units to take care of archiving relevant documentation on behalf of the country: the Institute of Law regarding court materials, the Institute of Public Health regarding health data, and so on. Cooperation with other competent and interested entities nationwide may also help.

7- Archiving practices, laws, declarations and news items relating to Palestine, especially by the occupation authority and its representatives. Issues like movement restrictions, discriminatory/racist laws/regulations/declarations, ill treatment at crossing points, practices on family reunification and academic freedom need to be accorded proper documentation/archiving.
8- A derivative of this effort is a campaign to introduce awareness on part of those involved in knowledge generation on ways to adopt the "archive ready" approach to knowledge generation by making sure that documents are correctly labeled with sufficient meta-data to allow future access without the involvement of the product creator. Publicity campaigns, training sessions and connections with regional and international bodies may help in this regard.
9- Also, it is our view that people involved in archiving and librarians need to be made aware of IT potential and limitations in archiving. This is by no means to say that they need to be able to do IT work themselves or even supervise it: that's better left to the experts. Rather, the goal is to make them able to factor IT related considerations into their strategic planning.
10- The digitization of archival material needs to go beyond digital storage of images. One must make clear that simply scanning documents and storing multimedia objects may not be adequate. A major effort needs to be directed at making the material digitally searchable. Current technology doesn't allow easy expression of searches for multimedia objects in terms other than text. Thus one can expect that the major search queries will be textual and thus the material should also be stored in a form that facilitates such queries. Documents need to be entered also as text. Pictures, video and audio need to have extensive textual annotations. Multilingual annotation is desirable but one can resort to CLIR methods when that is not possible. Text entry: both meta data in multiple languages and full text digitization of documents and audio material is labor intensive and costly. So it should be approached carefully. One may require certain fields (say meta data) to be compulsory and then work on the other components as resources become available so as not to hamper the archiving effort. Both voluntary and paid labor can be used to accomplish the task. IT can help a lot in this regard be it in terms of crowd-sourcing of certain tasks (like transcription and data entry) through own system or through commercially available systems like Amazon Mechanical Turk which allows outsourcing certain tasks to groups of laborers and manages the process including the (micro) payments[1]. One may check the experience of using supervised voluntary student labor for that purpose, something that was extensively utilized for work on the Arabic Ontology at BZU.

With all these possible extensions, caution must be exercised so that one doesn't lose focus and the current effort is not overwhelmed by the extra work. It may be a good investment to have an extensible design of the archiving system so that it can grow to cover additional components or allow other entities to use it if they decide to take responsibility for these components. For example, the botanic garden may want to document the Palestinian flora and fauna as part of their own effort and make the material accessible through the archives. The museum may want to take care of the physical objects of cultural value and their accessibility to the general public while the archive stores documentary material on these objects. The ministry of culture and the Inaash Osra Charitable society may decide to undertake the folklore aspect of the archiving effort and connect to the main site. An educational campaign needs to be instituted to transfer the knowledge gained and to encourage archival work and cultural heritage preservation aware practices. In all cases one needs to try to involve academic departments in the effort and maybe allocate resources to relevant research.

IV. Conclusions and Remarks:

We have surveyed several aspects of utilizing information technology in the service of cultural heritage preservation in general and archival work in particular. Our aim was to give some pointers to the potential of IT and how to utilize technology to make archiving more general in span, to involve more people in the process, to put in place safeguards to protect the information while still allowing easy access and maintaining the openness of the archives. We argued that this utilization of IT allows the archivists to implement ideas and offer services that were not possible without IT. We also expressed the conviction that IT is especially important in the Palestinian context characterized by the fragmentation of the country and its cultural heritage, the lack of control of over natural resources and infrastructure and the dispersion of Palestinians the world over with severe restrictions on movement of persons and products, on communications and import/export activities. However, we also made it clear that IT has to be treated with care and shouldn't be viewed as more than an enabling tool for the archival work and that computerized archival systems need to be well designed and overseen by experts who understand the goals of archiving and maintain the adherence to these goals without letting technology considerations take the driver seat. We also argued that archiving computer generated data is a challenge that needs to be addressed. Many issues on the intersection of IT and archival work were not the focus of this paper. Examples are the academic programs and training/continuing education in Information Sciences, already an important academic discipline but is not emphasized locally[18]. We talked about cultural heritage and archiving but didn't elaborate on the roles of other potential players even at the same institution: libraries, museum/gallery and the botanic garden, though we believe that they play complementary roles and IT may help the integration of their efforts. It is our hope that collaboratively, one can implement an archiving system that has the functionality and expansion possibilities in line with the best practices worldwide but also that incorporates solutions developed locally to generate a unique product that can serve as a test bed for archival work locally and regionally. We didn't really address the adequacy of the technical infrastructure for the recommended actions. We do believe that there is much to build on in terms of technical expertise/resources/infrastructure and also experience integrating locally developed IT tools into international working cultural portals, but we also believe that much needs to be done/learned. One of the goals was to initiate a discussion of the role of IT in archiving and to try to involve archivists, subject matter experts and IT professionals in the hope that their coming together may help each party understand where the others stand and facilitate their work together for the good of the archival effort[12]. There is a risk that one party may view the presentation as too technical while another may see it as shallow on specific technical solutions and needs estimates. Our hope is that discussions will help create the right environment for an interdisciplinary collaboration and bring into play the better elements of all worlds and thus have the product serve as an example for successful development locally and regionally.

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