




Communication Features Facilitating Appreciation of Cultural Heritage Values for IDN

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Abstract. Cultural heritage values are defined as a set of characteristics perceived in heritage by certain individuals or groups. Cultural heritage values highlight the motivations for the conservation of heritage properties by national and international organizations. These include value associations selected by experts and communities. Heritage values of communities are passed down over generations and help in conservation. Historic and traditional (pre-digital) narratives communicated values but not all sources were credible. Current efforts using digital technologies for the communication of cultural heritage disproportionately focuses on engagement and spectacularization. This has had a negative effect on research towards the sharing of cultural heritage values through Interactive Digital Narratives (IDN). We believe that a number of communication features can be beneficial to value appreciation especially when using IDN. In this paper, we discuss values included by the designer(s) and also appreciated by the user(s) of IDN in the communication of cultural heritage. We address four types of features that are suggested as being influential for the communication of cultural heritage values, namely 1) narrative significance, 2) multiperspectivity, 3) dialogue facilitation, 4) contextualization. We go through six case studies and show how to exploit these IDN features to effectively communicate the associated values of cultural heritage to a larger audience.

Keywords: Cultural heritage values · Cultural heritage communication · Communication features · IDN Design · Value appreciation

1 Introduction

Cultural heritage values can be defined as a set of characteristics perceived in heritage by certain individuals or groups [7] and different individuals or groups may have different typologies and ranges of values [2].

Researchers have been working on the concept of heritage value, its meaning, classification, and relevance. National and international charters concerning Cultural Heritage (CH) have also discussed the aspects of values pertaining to

it. The ICOMOS Venice Charter, 1964, states that it is our common responsibility to safeguard historic monuments in “the full richness of their authenticity” [10]. In particular, the Nara document, 1994, introduces authenticity as the “essential qualifying factor concerning values”. The document points out that judgements of values must be done within their cultural contexts since it is not possible to “to base judgements of values and authenticity within fixed criteria”. It acknowledges that both “the judgement of values” and “the credibility of related information” may vary across cultures and even within one culture. Hence, each culture must identify and assess the specific nature of its own heritage values and also understand the credibility and truthfulness of its related information sources [11].

All the values of a specific CH can be summarised under its ‘Cultural Significance’. The Australia ICOMOS Charter for Places of Cultural Significance (The Burra Charter) defines cultural significance as the “aesthetic, historic, scientific, social or spiritual value for past, present or future generations”. The charter explains that cultural significance “is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects”. It also declares that the conservation of a place must not give “unwarranted emphasis on any one value” [2]. Hence, heritage properties can have many types of values that are equally significant and are built on various types of associations by the people.

Both the Burra Charter and the Nara Document point to a common idea that has shown up a bit more frequently in academic discussion of the late 20th to the early 21st century. It is the idea that the community may associate a set of heritage values to a heritage property (place, person or historical event) based upon their memories, their sense of place, or their intangible attachment to the events at a place. Research has shown that these are only quantifiable via a study and open acceptance of the ‘community perspective’. The community perspective is something that may be under-appreciated in an official ‘statement of significance’ or in some cases may even be in opposition to what the expert or the administrative approach to a heritage property might be. This can be clearly seen by looking at literature where researchers have been interacting with members of a community to understand their perspectives [5, 18, 27].

The goal of this paper is to analyse cultural heritage communication projects to uncover communication features that bring about an appreciation of CH values in a digitally connected world by the use of Interactive Digital Narratives (IDN). The following section highlights the importance of values in the conservation and communication of CH along with the method by which IDN projects were selected for our analysis (supported by a table). In Sect. 3, we analyse the selected IDN case studies from the perspective of CH values, which have not only been included by the designers within the project but also have been perceived by the users. Further, in Sect. 4, we discuss what features enabled the value appreciation within the surveyed IDN projects. This discussion is accompanied by a table that shows the points where CH values were perceived in the selected projects. Finally, in Sect. 5 we conclude with a view towards the future.

2 Importance of Values in Cultural Heritage Conservation and Communication

Expert assessments are top-down processes, where value associations are provided to outstanding heritage properties. This can be seen in the ‘statement of significance’ attached with the properties on the world heritage list by UNESCO. These statements help with both conservation and communication of the heritage. A detailed body of research backs up expert perspectives and discussions. In contrast, individuals and communities perceive characteristics in any given CH which is then acknowledged as heritage values by the ‘insiders’ or the members of the community who associate the heritage property as part of their history and culture. Analysing these associations leads to a ‘bottom-up’ understanding of the concept of CH values. However, studies of the community perspectives on heritage are few and far-between [18].

Table 1. Search terms for the literature review and their evolution

Phase of search	Terms	Objectives of search	Remarks
Initial search	Values, Cultural Heritage Value, Cultural Heritage Communication, Collective Memory, Conservation, Framework for Cultural Heritage Conservation, Cultural Communication, Cultural Learning, Cultural Heritage Sites	Terms with large scope	Included many variations of studies - some were theoretical and some were research reports of surveys or projects
Filtered search	Edutainment, History Games, Serious Games, Memory Studies, Narrative, Storytelling, Digital Storytelling, Interactive Experience, VR/AR Phygital Experiences, UI/UX principles, Values in Design of CH Applications, Museum App, Visitor Experience Study, Value Transfer, Heritage Value Communication	Terms related to digital projects and theories on designing digital applications	Emphasis on technical strategizing and spectacularization is observed
Final search	Game Studies, Multimedia Information Systems, Interactive Digital Storytelling, Embodied Interaction, Tangible Interaction, Audio Design, Audio-Visual Narrative, Evocative Experience, Emotional Experience	Terms covering digital projects that communicate CH	Research reporting gives new search terms but CH value assessment in studies are noticeably under-represented

A study that looked into the community values of Akaroa landscapes in New Zealand uncovered that the Maori community associated their naming traditions, burial traditions, lookouts and signalling, whaling, fishing, and walking/trading routes, with the landscape. These values differed from the values associated to the same landscape by the later European inhabitants, such as, land clearance, saw-milling, cheese factories, and traditional farming activities [27]. The methods and model suggested in the study throw light on CH values from the community perspective. In a contemporary sense, such associations may not be immediately appreciated using an ‘outstanding’ or ‘universal’ approach to value assessment. Research shows that the statements made by the members of the community regarding their cultural associations and the communal sense of values have been interpreted with difficulty by practitioners. Experts show a tendency to ‘correct’ the people rather than to understand and evaluate them from their cultural viewpoint [18].

The communal perception of values presents a unique set of opportunities and challenges for the CH professional who wishes to conserve and communicate heritage. To better understand communication projects that convey information and values associated with CH properties, we have collected and reviewed published literature. The search terms used during different phases of searching and the evolution of the search objective over a period of two years are shown in Table 1. The search process organically led us to the understanding that digital applications communicating about CH properties do not see themselves as carriers of CH values. They are in effect a ‘digitization’ of information that is previously available with certain sources which are mostly curated by experts. Community perception of heritage properties are rarely accounted for, if ever. In the following section we shall discuss a few IDN projects that have presented community perspectives alongside expert associations. Cultural heritage communication (CHComm) projects should, in principle, account for the dimension of CH values because ‘every act of heritage conservation is a communicative act’ [12].

3 Analysis of Case Studies

The content for communication of CH requires historically accurate information that is presented in a manner which appeals to the user. In a survey covering the relationship between CH and storytelling, stories were described as ‘vessels’ for wisdom, beliefs and values. Storytelling itself is described as a tool to bridge the gap between people over time and across cultures, thereby becoming a means for the preservation and dissemination of CH [4]. Traditionally, CH values and information were communicated via oral tradition, folktales, performing arts, books, paintings, and inscriptions on built structures [14, 24]. All these methods have created narratives that would be accessible across generations and across cultures over time.

In the last two decades, digital communication has assumed the mantle of carrier of CH values. Users in the younger age-groups are comfortable interfacing with digital applications but awareness of the existence of digital CHComm

applications is not as good as it can be [9]. Studies regarding effectiveness of User Interface and User Experience (UI/UX) design are increasingly available [3,15]. Very few studies cover the process of content preparation, the emotional impact generated by the content and the appreciation for CH values seen from the end user [16].

Table 2. Details of case studies

Project	Heritage	Time period of coverage	Format	User Feedback method
Personalized mobile guide for Archaeological Museum of Tripolis, Greece [1]	Classical Greek Artefacts	~600 - 300 B.C	Mobile Application (Onsite and Offline)	Open ended group discussions
Audio narratives for a historic site of a World War I camp in the Alps, Italy [17]	Memories from World War I, Italy	1914–1918	Audio Guide (Onsite)	Observations and semi-structured interviews
ArkaeVision Archeo VR experience - Paestum archaeological site, Italy [19]	Temple of Hera II, Paestum, Italy	~500 B.C	Virtual Reality Application (Exhibition Setup)	Observations and questionnaire
Interactive website for the White Bastion Fortress in Sarajevo, Bosnia and Herzegovina [20–22]	White Bastion, Sarajevo, Bosnia & Herzegovina	Medieval period - 600–1300 Ottoman period - 1400 - 1800 Austro-Hungarian period - 1800 - 1900	4D Virtual Presentation (Website)	Online questionnaire and Semi-structured interview
Augmented tour through the Refugi 307 bomb shelter in Barcelona, Spain [23]	Bomb Shelter - Spanish Civil War era, Barcelona	1936–1939	Augmented Reality Experience (Onsite)	Open ended questionnaire
Serious historical video game- Czechoslovakia 38–89 [25]	Memories from the Occupation of erstwhile Czechoslovakia by Nazi Germany during WWII	1938–1989	Serious historic video game (Online)	Open ended comments from users both face to face and online through forums

In the last decade, CHComm projects have successfully used IDN as a tool for emotional engagement of users in various settings [8]. These innovations in technology and interactive narratives can be ably supported by content that inculcates CH value appreciation as one of its design pillars. Assessing the inclusion of values and uncovering their impacts on users of CHComm would mean answering two questions:

- a. Designer intention - What heritage values are evidently included in the communication application?
- b. User perception - Are there any identifiable impacts on users from the inclusion of the heritage values?

Published literature which documents the design, implementation and user evaluation of IDN projects for CH were studied to answer the above questions. Projects had to explicitly mention the terms ‘value’ or ‘significance’ and include qualitative or quantitative user feedback and discussion. Analysing the decisions that went into the design and implementation of an IDN project led to the understanding of the range of CH values that were included. Evaluating the reported user feedback allowed us to note the points that were appreciated by the users. Value associations that were included and appreciated were categorized for ease of understanding, based on previously published typologies seen in literature [6].

We have selected six projects in which we were able to identify CH value appreciation as reported by the researchers. All projects were designed and tested after 2015 and the research was published before 2021. Table 2 shows the specifics of the selected CHComm projects and their methodology of collecting user feedback. Two of these projects had their digital experiences online and we were able to interact with these projects first-hand in the course of our study [22, 26]. In one case we were able to discuss the activities done during the project and its post-implementation impacts with the creator [1]. The other three projects were discussed in detail by the researchers in their respective publications. This enabled us to uncover value associations that were intentionally included in the design phase by the designers. Every project provided user feedback reports either through quotes from open-ended interviews, semi-structured interviews or through summaries of such assessments. Therefore, inclusion of CH values by the designer(s) and appreciation of the same by user(s) is assessed based on reported design procedure and user feedback. Following subsections analyse each selected case with regards to the two questions posed above.

1 - Personalized Mobile Guide for Archaeological Museum of Tripolis, Greece [1]. The archaeological museum of Tripolis, Greece, is described as a peripheral museum from which the most popular artefacts have been relocated to central museums, such as the National Archaeological Museum of Athens. The artefacts that are currently displayed at the museum are not closely linked to each other and therefore do not lend themselves to a narrative presentation. This project describes the creation of personalized narratives based on broader concepts as a solution to this problem.

Designer Intention: ‘Thematic tours’ were created which would guide the user along a predefined route. The designers included socio-cultural values of the ancient times as part of the thematic tour. For example, “women in antiquity” was a specific theme selected by the designer to base the narratives regarding artefacts. Users who shared their Facebook profiles were matched with tours that were determined to be relevant to their interests. Users who did not share

their profiles could instead login as guests and receive a random thematic tour suggestion. The other tour options were also available for users to choose in case they did not want the suggested option. Every object that was part of a tour would have a short audio narrative based on the theme of the tour with subtitles for hearing impaired users. Visitors were free to pause and play the narratives and were also asked to provide an opinion at some points. This was done to encourage historical and social reflection.

User Perception: Post-visit the users were able to share their thoughts and reflections with other museum visitors, on a dedicated social media site as well as their personal social media. This method of personalised content delivery and post-visit social reflection was positively received by the users. Visitor comments showed individual and group reflection on different historical and/or social phenomena. Some themes on which reflections were invited included women's position in societies, the similarities between past and current societies, and the advances in art. Value associations that were perceived in this case study include historic, social and symbolic values.

2 - Audio Narratives for a Historic Site of a World War I Camp in the Alps, Italy [17]. A historic site of a World War I camp and trenches dug in the Alps is currently under the purview of Museo Storico Italiano della Guerra (Historical Museum of War in Italy). This project covers the design process of an on-site audio-based narratives system that looks to share the experiences of people from the times of World War I.

Designer Intention: The visitors of the Historical Museum of War in Italy are given guided tours through the camp and trenches from World War I era by the museum. The authors co-designed a system that can deliver audio-based narratives adapted from personal and historical records of the era. The system used custom made near-field communication devices to enable the user to choose what narratives they wanted to hear. The speakers were placed well above the line of sight of the visitors so that they could hear the audio but nothing would obstruct their vision. These narratives included perspectives of the soldiers in the trenches, common people living in the villages such as the wives of the soldiers during the war time, the administrative officer's perspectives and a poet's description of the time of war. These narratives were intended to add context to the site.

User Perception: The system delivered 'piecemeal' narratives that the visitors could choose to switch between on-site. This unique aspect contributed to the visitors appreciation of the narrative content, as observed by the researchers. Users appreciated how the community survived the war coping with fear and uncertainty all around. They stated that in many cases they felt a connection to the place because of the audio. Some users stayed silent as a mark of respect and to fully immerse themselves in the audio and in the place. Users commented that the disembodied sound in the location added more meaning and emotion

to the content. Value associations that were perceived in this case study include historical and social values of the time.

3 - ArkæVision Archeo VR Experience - Paestum Archaeological Site, Italy [19]. The ArkæVision Archeo is a VR experience within a virtual reconstruction of the Paestum archaeological site in the south of Italy where the ancient temple of Hera II is located. Hera was seen as the goddess of women and family in the ancient Greek religion and the VR experience provided a view into the everyday life in the ancient temple.

Designer Intention: Researchers created a narrative using the character of priestess ‘Ariadne’ and users could follow her along on an explorative path within the temple. They used scenography, dramaturgy, and other traditional film direction techniques to encourage user interest in life and culture during the 5th century BCE. Additional information was available to the user in the form of optional text that would be superimposed on top of the visualization. User profiling was done before the VR exploration categorizing users into groups such as children, common visitors and experts. The content was structured as a folk-tale, general narration or in-depth narration depending on the user type. The designers included interactions that highlighted the religious and socio-cultural values of the ancient times as part of the virtual reconstruction and guided experience.

User Perception: Users stated that they liked the experience within the VR environment and some users expressed interest in learning more about the ‘priestess’ character that guided them through the experience. Understanding the uses of the artefacts within a fully reconstructed VR temple, instead of the ruins that remain on the actual site today, was appreciated by the visitors. The true sense of wonder of the building in its full glory was impressed onto the minds of the visitors by the realistic lighting and colors. The recreation created a mental image which helped users relate to the religious practices of the time and were also shown to remember several aspects of it. Value associations that were perceived in this case study include religious, historic, aesthetic, social and symbolic values.

4 - Interactive Website for the White Bastion Fortress in Sarajevo, Bosnia and Herzegovina [20–22]. This project is a website that presents the evolution of the White Bastion Fortress in Sarajevo, Bosnia and Herzegovina across three distinct periods. The designers chose to call this as a 4D virtual reconstruction as the website included explorable 3D reconstructions of the fortress from three eras, thereby including the fourth dimension of time.

Designer Intention: Designers wished to present the historical evolution of the fortress over time. Videos discussing distinctive periods of existence of the fortress are shown after an introduction video. The videos are centred around an ‘immortal soldier’ character, who describes events that occurred in and around the fortress for each time period. In some sections of the video a narrator steps in

to describe certain overarching events of the particular time-period that affected the fortress. For example the soldier character describing an extended period of peace in the Ottoman era video says that “I thought my name would be forgotten, that Sarajevo would never again need its soldier.” Then after a brief musical interlude, the narrator steps in to say that “So it was until the campaign of Prince Eugene of Savoy in 1697...”. Going through the entire series of videos allows users to form a mental image of the fortress from the medieval era to the 20th century. A corresponding interactive digital environment shows the structure of the fortress at the time. Finding an object within the fortress and clicking on it will open another tab where the object itself is highlighted and can be interacted with in more detail. Once all the interactive environments have been explored, users can view a final video meant as a closing comment. The designers conveyed historic values especially the political and military history perceptions of each era by creating the character of an ‘eternal soldier’ of the fortress who provided a voice to the ‘will’ of the fortress itself. The narrative structure placed the focus of the experience on the varying contextual cultural importance of the heritage.

User Perception: The user evaluation for this project was shared in three different publications. Non-expert users were asked questions relating to the historic information content that they saw and interacted with to test their learning. A majority of Bosnian users and all the non-Bosnian users answered questions correctly. They also commented that they felt immersed in the past while watching the videos [20]. Expert users from an interdisciplinary development team including a psychologist, communicologist and a film director among others commented on the content. Expert comments stated that the novel way of presenting information invoked curiosity and the application was attractive and engaging. Various improvements were also suggested to many aspects within the application [22]. In another evaluation to understand the usefulness of Interactive Digital Storytelling (IDS) in education, teachers considered it as important while students gave it lesser importance. Majority of the users reportedly preferred historic fidelity over artistic liberty in the IDS content [21]. Users and experts alike appreciated the character of the eternal soldier and the overall presentation. The change in historic values and social value associations over time was perceived by the users.

5 - Augmented Tour Through the Refugi 307 Bomb Shelter in Barcelona, Spain [23]. This project was implemented within the Refugi 307 bomb shelter in Barcelona, which was built during the Spanish civil war. It is meant to augment the guided tour experience provided by the Barcelona History Museum.

Designer Intention: School children visiting the underground bomb shelter were taken on a guided tour and presented with context-specific projections of events from the time of the Spanish civil war. Hand-held digital projectors with videos and images arranged in a predetermined sequence were given to

one member in each group. As the group passed through various rooms in the bomb shelter, children were told stories of the Spanish civil war and relevant multimedia was projected onto the walls. These ranged from a video of a plane dropping bombs shown at the entry of the shelter to an explanation of how a room, such as the infirmary, was used and how the furniture in it was arranged. The application explicitly attempted to engage emotional and critical thinking of the children in order to improve the contextual understanding of the historical events.

User Perception: Children were observed as they tried to visualise and even physically position themselves to understand the living situation within the bomb shelter during the war. For example, a child crouched under one of the benches in the shelter and commented that it would have been too small to fit them. Observations of the children and later interactions with them acknowledged a strong emotional impact. Children stated that they felt like they were travelling through time and also that they felt sad having seen drawings by other children from the 1930s (during the Spanish civil war). A child from an initial test group drew the picture of children from war-torn Syria in 2011 as a response to their visit. Value associations that were perceived in this case study include the emotional impact and the collective memory shared by the community. A direct effort was made to highlight the social values and the historic values apart from many wartime experiences from recent memory.

6 - Serious Historical Video Game - Czechoslovakia 38-89 [25,26]. This project covers the design process and user evaluation of a serious war game based on a semi-fictionalized retelling of World War II events during the German occupation of erstwhile Czechoslovakia. Subsequent iterations of the game have also been created based on the findings from the version discussed here.

Designer Intention: The game lets the user take control of a central character who is the grandson/granddaughter of J. Jelinek, a Czechoslovakian national, who was arrested after the assassination of Reinhard Heydrich, “Reichsprotektor” of the Nazi-occupied Czech Territories. This character is looking to uncover the truth surrounding their grandfather’s arrest and comes across multiple people who share their experiences and memories from the time. The creators wanted to explore the potential of a historically accurate and serious wargame as an educational tool. They created multiple fictional characters based on accurate testimonies from the survivors of World War II.

User Perception: User feedback on an educational version showed a lot of positive response in terms of learning of the history, from school students and teachers. The game helped students appreciate how people survived the war and how the nation navigated through its tumultuous military and political history [25]. The main (public) version of this game which was released online received comments from various people who expressed appreciation for the handling of the topic through multiple ‘eyewitness testimonies’ that showed the injustices and loss faced by the people at the time. Online dialogue surrounding the game

showed how people reflected on contemporary political discourse in relation to the historic narratives presented in the game. There were some notable negative reactions to the minority perspectives shown in the game as some users perceived them as foreign or unworthy of being included in to their idea of the national history. The public version of this game titled “Attentat 1942” has gained international attention [13]. Value associations that were perceived in this case study include historic, social, cultural and symbolic values.

Summary of Cases: All cases show instances of intentional CH value inclusion by the designers and points of value appreciation by the users. They were successful in generating emotional responses from the users beyond the mere communication of historic information. The impact of the narrative delivered various values of the communities from the past and facilitated dialogues within their contemporary contexts. National and regional identity, opposition to disliked regimes and struggles at the personal and communal levels were conveyed alongside political, administrative and military discourses of their time. Changes in socio-cultural values and in some cases how little has changed over time could be realized through these experiences. What might otherwise have been limited by brief explanations or illustrations attached to sites and artefacts were turned into evocative narratives. This attempt to go one step beyond a traditional ‘descriptive’ presentation of information is what elevates the design of these IDN projects.

4 Identifying the Communication Features Facilitating Appreciation of CH Values

The analysis covers six different styles of interactive narratives. We covered projects that featured a story based on a central character [25], piecemeal narratives built from historical records [17], a thematic narrative built on disparate museum objects [1], a slice of life experience in a virtual reconstruction [19], a chronologically structured retelling of the events surrounding the heritage property [21] and an experiential exploration of the site with narratives projected on its wall [23]. Table 3 presents the summary of the findings from the six IDN projects selected for analysis. We attribute the four features listed below as instrumental to the effective communication of CH values in IDNs.

1. **Narrative** structure was used to highlight the **significance** of certain values as seen in traditional narratives.
2. The projects featured **multiple perspectives** and varying values from disparate groups, especially the *community perspective*.
3. **Facilitating** and sometimes initiating an extended **dialogue** about the content of the narrative on digital platforms were supported.
4. The recreations of the original **contexts** in which the heritage properties or events would have existed *over the years* were appraised.

Table 3. CH Values conveyed in the Case Studies and the features of communication that enabled the value appreciation (Abbreviations: Narrative Significance - (NS), Multiperspectivity - (MP), Dialogue Facilitation - (DF), Contextualization - (CO))

Case Study	CH Values	Features
Personalized mobile guide for Archaeological Museum of Tripolis, Greece [1]	<ol style="list-style-type: none"> 1. Socio-cultural values- Reflection on the role of women by comparing ancient history to life today 2. Historic values- Appreciation of the historic artefacts in the museum 3. Empathy, Identity- Understanding perspectives of different users on the same information 	NS, MP NS, CO DF
Audio narratives for a historic site of a World War 1 camp in the Alps, Italy [17]	<ol style="list-style-type: none"> 1. Surviving war - Understanding wartime life of people as compared to normalcy 2. Administrative and Political history- Understanding the consequences of the war 3. Fear, Uncertainty, Loss- Experiencing the difficulties of front-line officers and soldiers 4. Appreciation of military strategy- Being in a trench and participating in warfare 	NS, CO NS, MP CO, NS CO, MP
ArkaeVision Archeo VR experience - Paestum archaeological site, Italy [19]	<ol style="list-style-type: none"> 1. Religious values - Understanding ancient religious practices and rituals 2. Appreciation and wonder for the art and architecture - Paestum temples Architecture recreated 3. Socio-cultural values - Understanding the roles of members of society in comparison to contemporary practices (Priestess vs. Priest) 4. Historic value - Appreciating the myth of Hera 	NS Technological fidelity + CO NS, CO NS
Interactive website for the White Bastion Fortress Bosnia and Herzegovina [20-22]	<ol style="list-style-type: none"> 1. Administrative and Political history- Understanding how and why the White Bastion fortress developed into what it is today 2. Pride, Fear- Struggles in the life of a soldier through multiple eras 3. Military history- Understanding the techniques and implements of offense and defense 4. Social development- Understanding how the region developed and what influenced it 	NS, MP CO CO, MP NS, MP
Augmented tour through the Refugi 307 bomb shelter in Barcelona, Spain [23]	<ol style="list-style-type: none"> 1. Surviving war- Understanding wartime life of people as compared to normalcy 2. Togetherness- Communal identity 3. Loss and Injustice- Facing wartime horrors 4. Military and Political history- Understanding the consequences of the war 5. Solidarity with refugees- Empathy towards those suffering from war 	NS, CO CO, DF CO, MP NS, CO DF, CO
Serious historical video game - Czechoslovakia 38-89 [25,26]	<ol style="list-style-type: none"> 1. Surviving war- Understanding wartime life of people as compared to normalcy 2. Inclusiveness- Understanding fate of minorities 3. Loss and Injustice- Facing wartime horrors 4. National and Regional Pride 5. Military and Political history- Understanding the consequences of the war 	NS, CO MP CO, NS CO, DF NS

Specific CH values were delivered to the user by a combination of communication techniques or features. Each feature and its inclusion in an IDN comes with its own advantages, nuances and caveats. The satisfactory integration of these and other aspects in the design of an IDN such as the UI/UX format, research requirements of the communicator(s) or the objectives of the organization(s) that fund/host the digital communication application can be a demanding task. At this juncture, an exploratory discussion on what these features are and how each feature can be included in the design of an IDN is warranted.

1. **Narrative Significance (NS)** of values in presentation - A narrative that highlights the various qualities of CH value associations presents a holistic view to the user. IDN projects discussed here presented contents by highlighting certain values in their core structure. A heritage property such as a church, mosque, temple or a similar place of worship attached to an existing religion may be aesthetically pleasing but the discussion surrounding it could give prominence to the religious values. The designers of the projects we studied, deliberately chose certain CH values as the core of their narrative. The struggles of the people and the community were the basis for 3 out of 6 narratives. The CH values which took centre stage were appreciated by users in all cases as evidenced by the user feedback. For example, users responded to the narratives about the role of women in antiquity by reflecting on the contemporary status of women in the case of artefacts in Tripolis museum. The socio-cultural values communicated by the narrative significance delivered the expected impact in this case with some users commenting that this understanding must be taught in schools [1]. The act of walking into the virtual reconstruction of a historic temple to be greeted by a priestess who then proceeds, to guide the user through experiencing the rituals within the temple was described as much more impactful by the users. Some users expressed a curiosity to learn more about ancient life and religion due to the narrative significance of religious values [19]. Presenting the cultural heritage values in relation to contrasting values of its time or comparable contemporary values of today is an effective method of communicating heritage information and its associated values. Choosing a narrative significance that encourages comparisons to personal values or contemporary communal values can increase the impact of the CH value appreciation. The ideal narrative would be able to present the significance of certain value associations in a new light.
2. **Multiperspectivity (MP)** in the narrative - There can be multiple perspectives and values surrounding a heritage property and these are likely to change over time. If a project shows coverage of a range of perspectives, then it is likely to generate an appreciation for the associated heritage values in the user. These diverse perspectives are authentically represented by faithfully recreating them in the narrative. Credible perspectives that are under-represented in the 'mainstream' or popular discourse would lead to a lasting impact on the user due to their novelty. Some narratives are very focused on certain values and strongly highlight a singular perspective, such as in the case of refugees living in a bomb shelter during the Spanish civil war [23].

This is not detrimental to value appreciation but it might not give the complete picture of the heritage property. Some relevant information and inherent values are lost in the communication. Some projects cover heritage properties that are not directly associated to any living culture, which leads to not having a community perspective, as it can be seen in the case study of the Hera Temple experience [19]. This also causes projects to not have many different perspectives to present. Making the user a ‘protagonist’ of the experience can be seen in the case of the narrative covering the WWII memories [25]. This setting was then used to deliver multiple and contradicting perspectives to the user. Other cases have the user taking on the role of an observer or listener that reflects upon the context provided by the narratives and the site. User feedback in every case has shown that users appreciated the opportunity to understand multiple authentic perspectives. Many responses showed the extent of the emotional impact and enhanced understanding of the CH values shared in the applications. Some users reacted negatively to perspectives that they did not personally agree with as in the case of users who did not consider it necessary to include minority perspectives in the historic experiences of WWII era Czechoslovakia [25]. Such reactions are a clear sign of effective communication of the CH values shared through a multi-perspective approach.

3. **Dialogue Facilitation (DF)** for CH values of user-interest - Understanding user perspectives towards the heritage and its associated meanings is a valuable asset for any designer. An evolved understanding of user perspectives is reflected in the content design based on the target audience expectations. Exploration of user and expert opinions sometimes uncovered new value associations that were previously overlooked by the designers. All projects obtained and assessed user and expert feedback after its implementation. Only one case included in-depth expert discussions prior to or during the design of the application which initiated dialogue in the public sphere. Designers of Czechoslovakia 38-89 reported that “dissenting opinion and critique” was generated by their narratives since they chose to include topics that “still resonate in the Czech public sphere and continue to influence the political scene”. This is another clear impact of effective communication of CH values [26]. It is also worth noting that facilitating dialogue among users after the narrative experience can bolster the understanding and appreciation of CH values in users. In the case of the Tripolis Museum project, a digital platform was provided to users where they could interact with each other and share opinions about the application. This led to CH values being discussed and re-shared in social media which furthered the self-reflection and appreciation of those values by users [1]. Initiating dialogue as part of the narrative and facilitating it through application design helps foster better appreciation and further propagation of the values. Facilitation of dialogue with both users and experts at the early design stage of an IDN is therefore beneficial to the impact of the values shared.

4. **Contextualization (CO)** of heritage to highlight appropriate CH values - Contextualization is the use of design elements or narrative devices to communicate the ground reality of a heritage property in its time or within its cultural context. An empty battlefield with a memorial wall cannot adequately share the horrors and realities of the battle and the long-lasting consequences of a protracted war. The ruins of a temple or a collection of artefacts with detailed descriptions cannot help a visitor fully appreciate the purpose of the space/artefact at the time of its active use. Contextualization adds the missing details by recreating the use of the space/artefact in the narrative. Contextualizing heritage values using the site or the storytelling delivered a deeper understanding and a stronger emotional impact. This is evident in all cases as users were able to appreciate how the values reflected in the people's actions at the time and its tangible manifestations in history. The context provided by the site and/or the narrative encouraged self-reflection and provided users with an accurate basis for understanding the heritage as seen from the user responses. The project covering the history of the White Bastion fortress explains why certain decisions were made by the lords and how it impacted the regular soldier who guarded the fortress. Some parts of multimedia presentation go on to convey its impacts on the people in the region. Users were able to appreciate the necessity of a fort and were also able to see as to what happened when it was not well-maintained. Being able to explore different 3D models showing the fort architecture from various eras of its existence enhanced the user appreciation of military history [20]. Contextualization is effective but can be tricky to implement. In the Arkaevision VR experience, the technological fidelity of the virtual Hera temple contributed to the contextualization apart from the narrative features. In essence, contextualization enhances the understanding of the heritage and increases the value appreciation of the user. Creating an IDN environment that places the heritage in an appropriate setting for its time and culture contextualizes CH.

Our approach to the searching and analysis of CHComm projects resulted in a pattern-finding process that uncovered the aforementioned features. The four features discussed here stood out as the common elements in the effective communication of CH values. Inculcating these four features into a design philosophy can generate a process for developing an ideal IDN that includes CH values and helps propagate them. A graphic representing this is shown in Fig. 1. Not every CHComm project needs to use all of these features but taking cues from the ideas discussed here can improve the implementation of any IDN. Conserving authentic CH values and communicating them with fidelity to future generations is an invaluable responsibility of heritage experts, designers and related professionals.

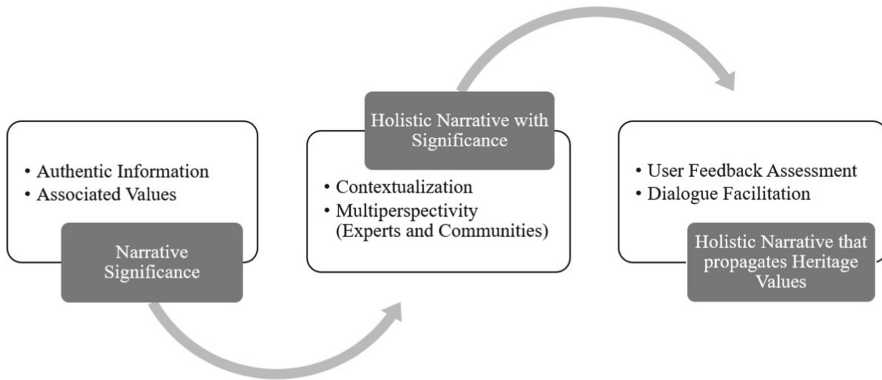


Fig. 1. Process for developing an ideal narrative that includes and propagates cultural heritage values

5 Conclusion

Digital applications for the communication of cultural heritage have effectively employed interactive digital narratives to create emotional experiences. Using a narrative structure that highlights significant cultural heritage values in relation to contemporary personal or community values through comparisons and contrasts is a reliable approach to effectively communicate cultural heritage values. Authentic perspectives that are not always in line with the mainstream or accepted narratives but nevertheless reflect community perceptions help with conserving and propagating cultural heritage values. Dialogue facilitation between users, experts and designers prior to, during and post the design of an application improves the quality of the cultural heritage value appreciation. Contextualizing the narratives in their appropriate cultural and temporal settings enhances user understanding. Evocative experiences have been shown to improve learning and retention in educational settings while also driving user engagement in comparatively ‘casual’ environments. An ideal IDN would integrate all the four features uncovered in our analysis. Further research is needed to craft a design framework that helps interested designers develop IDNs which takes relevant cultural heritage values into account and aids their propagation.

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