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Application of Digital Urban Memory Transmission Model for Sustainability of Cultural Heritage

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Abstract

In this study, a model for preserving and maintaining the memory value of cultural heritage was put forward and the application of the model was made in a designed digital environment. The model can be applied in teaching, transferring and keeping the memory values carried by tangible and intangible cultural heritage values of the world. Digital Cultural Heritage Memory Model (DCHMM) aims to transfer and interpret the urban memories of the settlements to a wide audience on the web and thus raising awareness on the protection and maintenance of these values. The cultural heritage values of the sample villages selected for the application of the model are aimed to be realized with the participation of the interactive user in the transfer of verbal, written and architectural memory values, the interpretation in the asking questions and giving ideas section, and the success of the application in the questioning section. Nine historical buildings that must be preserved and transferred to memory in three settlements of Niğde with a common historical past and that stand out with a variety of building types with significant urban memory value were selected for the field study. To provide data for the digital environment that evaluates DCHMM's applicability, the urban memory values (written-verbal-architectural memory elements) collected during the field study in the selected sample (three exchanged villages in Niğde- Yeşilburç Village, Uluağaç Village, Hançerli Village) were digitized according to the model's information, participation and questioning sections. 452 users from different age and occupation groups made the application of the model in the web environment in a six-month period. The digitized values obtained as a result of the study were interpreted in line with the targets in the sections of the model, and the model was brought to the literature with its application.

Keywords:
Cultural heritage, digitization, sustainability, urban memory

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INTRODUCTION

Cities, with their historical accumulations, provide ideal conditions for conducting research into the memory of the changing society's present and future movement. The causal relationship between the formation of the city's memory and the formation of the citizen's (society's) memory is inextricably linked. Rossi (2006) asserts that the flow of memory in human life and the concept of unity between the past and future of the city are intimately bound; indeed, the city shapes both. In essence, two main components are required for the formation of cities and urban memory. The first is the space for the formation of memory and the second is the humans who will remember and experience this space, ensuring its continuity. In this study, urban memory is limited by focusing on the human and space component in order to develop goals that will contribute to the discipline of architecture and urban conservation.

Every city has a memory like a living organism (Poete, 2010; Rossi, 2006). Cities transfer the traces of the past to social memory. A city's streets, monuments and architectural structures all contain significant historical narratives, while the planners and architects who organize the city embody society (Boyer, 1994; Özak, 2008). With time, memory accumulates in space and remembers. Due to the perceptual use of space in human memory from temporary memory for a long period of time, it passes to permanent memory with a variety of meanings such as social sharing, communication, and interaction. Memory spaces are places where people can relate to one another, connect, feel a sense of belonging, remember and reminisce. Monuments, squares, monumental structures, rituals and behaviours that are designed to preserve an experience become a repository of memory (Nora, 2006).

Space serves as both the product and the mentor while transferring social, cultural, communicative memory. The primary issue addressed in this study is the existence of settlements that are incapable of transmitting the values of urban memory to future generations over time. This central problem is composed of many sub-problems. The elderly population, which ensures the transmission of verbal memory values within settlements, disappears over time, and the traditions disappear with it. Due to the changes in human habits brought about by developing technology, the new generation has developed an apathy toward memory and its maintenance. Due to lack of awareness of original architectural values, memory spaces either cease to be used or become idle as a result of the meaning value imposed by the community in the settlement.

Indeed, all of these artificial memory elements can be used to transfer digital memory. Digital materials such as digital photographs, films, music, visuals, sound recordings, texts, museum objects, and manuscripts are recognized as part of national historical and cultural heritage and archiving activities for the protection and accessibility of digital cultural heritage are underway on a national and international scale (Özbağ, 2010). According to Öztemiz and Yılmaz (2017), the digitalization applications explained by the transformation of cultural heritage

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products in analogous media into computer-understandable forms eliminate the requirement for time and space in accessing information, thus laying the groundwork for the unobstructed accessibility and usability of cultural heritage.

If an open access platform for the systematic transfer of written, verbal and architectural information about settlements is created, urban memory values can be transferred to every segment of society, particularly the younger generation. Socially, economically and culturally sustainable planning can be accomplished simply by considering community decisions regarding settlement protection. Given people's rapid consumption habits in the digital age, the rate at which they use the virtual environment to see and explore a place, -and the expectations of the new generation in this regard-, traditional memory transfer methods should be replaced by web-connected platforms.

Nowadays, access to digital memory items for transferring urban memory values in a web environment is widely available. However, no web application based on a user-oriented model has been developed to facilitate the transfer of this data. The Digital Cultural Heritage Memory Model (DCHMM) was designed with the goal of bringing urban memory values to the digital environment, while also achieving the objectives of bringing people together, raising awareness and evaluating this, as well as involving the user in some decision-making. The primary objective is to rapidly reach large numbers of people and to interactively process the information stored in their memory.

MATERIALS AND METHODS

The main structure forming the study's method is based on identifying the problem, putting forward a hypothesis, proposing a new model to test the hypothesis's validity, testing the model's applicability, and evaluating the data obtained from users for transmission space memory (Figure 1). In order to test the model's applicability, a sample was selected to provide data, and a field study was conducted involving the preservation-oriented determination and documentation of selected cultural heritage items. The hypothesis was accepted and suggestions were made based on the numerical data obtained following the application of the model. The DCHMM presents the user with the oral, written and architectural memory values of intangible and tangible cultural heritage assets with a protection-oriented focus, "Information", the interpretation is "Participation" and the evaluation is made through the "Question Asking" and "Game" sections.

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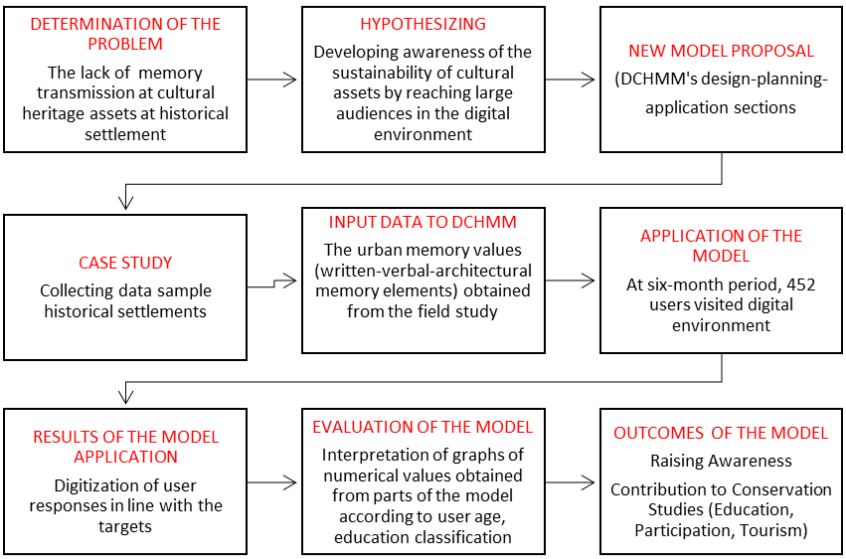

Figure 1. Flow Chart of the Method of Study

Nine historical buildings that must be preserved and transferred to memory in three settlements of Niğde with a common historical past and that stand out with a variety of building types with significant urban memory value were selected for the field study. To provide data for the digital environment that evaluates DCHMM's applicability, the urban memory values (written-verbal-architectural memory elements) collected during the field study in the selected sample (three exchanged villages in Niğde- Yeşilburç Village, Uluağaç Village, Hançerli Village) were digitized according to the model's information, participation and questioning sections. Three architectural memory structures were selected from each village. These were the Yeşilburç Church, which is distinguished from the other churches in Niğde by its bell tower and was later used as a mosque, the Yeşilburç Baths, some of which have been demolished, and Taş Mansion, which exemplifies Greek civil architecture through its façade, plan scheme and ornamental features throughout the village. In Uluağaç, the symbol of the village, the old Greek School, the Church and the civil architectural example known as Çatal Fountain, and the building memory location were chosen. The Greek School has survived to the present day, but a large part of the church was destroyed during a period of time and both structures are now inactive. Hançerli Village is a well-known village in Niğde with its water. The Hançerli Mosque (Church), the fountain on the church's retaining wall, and the nearby laundry all have a connection with water and are examples of religious and civil architecture that depict the daily lives of the Greeks at that time. To collect data for verbal, written and architectural memory transfer and to test the hypothesis of transfer, a field study on the memory of people and places in settlements was conducted in three sample settlements. In the verbal memory transfer section, it is aimed to transfer information about the life style, traditions and language of the people living in the settlements after the common population exchange. Those who migrated to Yeşilburç Village from Krifce have been

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continuing their traditional halva festivals since Thessaloniki in Yeşilburç Village, where they settled. Information about this halva festival, which is a common memory element, was conveyed with information about the village and its past values in the interviews made in the information part of the study. An example of the folk songs that convey the Greek language they spoke after they migrated to Uluağaç Village, the video listened to by Arzu Bakır (1921-2019), one of the first-generation immigrants, is given in the information section in Uluağaç village. Information about the habituation processes and changing lifestyles of those who came to the village were obtained. In the interview with the 3rd generation immigrant Erdem Beyazıt (1938-) who came to Hançerli Village, the video about the first people who came to the village, the Dermuson beans, which is called the old name of the village, their livelihoods after the migration, their lifestyles and cultures were shared. Prior to the field study, the official inventory was scanned, and all relevant information and documents were provided. The surveys of the memory spaces in the settlements under the architectural conservation discipline were conducted, and documentation studies were conducted by taking general environment, indoor and outdoor photographs, also using aerial and satellite photographs. 3rd generation individuals in sample settlements were interviewed verbally. During the interviews, the participants' private photograph archives, letters and diaries, all of which are considered written documents were also considered. The oral history study for immigrants to Greece was examined, and Stavros Anestidis' speech on "Shared Memory of Asia Minor's Greek Orthodox Population" was considered (After the archive?, 2017).The Asia Minor Research Institute's oral history study for immigrants to Greece was examined, and Stavros Anestidis's speech on "Shared Memory of Asia Minor's Greek Orthodox Population " was taken into account (Afterthearchive?, 2017). Restitution projects were derived from interviews and traces identified in the documentation of the structure for the original conditions of these spaces, and alternative functionalization suggestions were presented for the restoration projects' selection. After the generated data was input, DCHMM's web application was completed in the web environment. After the data entry, the application of the model in the web environment was not aimed at a certain user group. The main purpose is that users of all ages and education groups experience the application for the target desired to be reached as a large user mass. Therefore, a distinction is not required between those who know and those who do not know the settlements and historical buildings selected as samples in memory transfer. The findings of the results obtained according to the age and education level of the user were interpreted according to the memory transfer.

DESIGN, PLANNING AND APPLICATION SECTIONS OF DIGITAL CULTURAL HERITAGE MEMORY MODEL (DCHMM)

DCHMM's digital application environment follows a three-step procedure. The initial step is to design the model. The problems of common urban memory values that were not conveyed in the sample historical settlements selected in the field study were first determined at the planning stage, and a hypothesis for their solutions were formed. The solution method was then determined and the model's application process was implemented utilizing various computer programming languages**.**

Designing Digital Application Environment of DCHMM

All of the research on the transfer of common urban memory values are focused on the concept of a web application that can be used to test hypotheses. Conceptual studies on learning techniques and the memory-perception relationship were examined to determine which transfer technique (passive, active) could be more effective for the user in the interfaces created, studies were conducted on how to digitize and present the urban memory values that will provide targeted memory transfer and ideas were exchanged with expert computer engineers.

Planning of DCHMM's Section

DCHMM's planning approach is based on in the exchange of ideas, with the assumption that architects and computer engineers can collaborate and communicate simultaneously. The process from designing the model to execution and evaluation is divided into five stages because a process management method is required based on planning (Table 1).

Table 1. Planning stages of DCHMM

Main Stages	Information	Allotted time
a. Model design and software	Designed digital memory model transfer to web application software	1-6 months
b. Case Study	Collection, documentation and practical classification of verbal, written and architectural urban memory elements of selected settlements	1-9 months
c. Data input to the model	Digitization of collected verbal, written and architectural urban memory elements	9-12 months
d. Application process of the model	Introducing and implementing DCHMM on the web after it is ready after data entry	12-16 months
e. Evaluation process	Grouping the information obtained as a result of the model applied and used in the web environment for 6 months, evaluating them graphically and with the feedback received	16-18 months

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Design and software of DCHMM

The model's first stage, which was based on the idea of transferring urban memory to people in a digital environment, included illustrations of how this may be accomplished in a methodical manner. The drafts of three settlements that are unable to transfer the value of urban memory have been developed in order to address the issues of how the qualities of memory spaces (architectural structures, exchange people, their rituals) can be improved in the three settlements selected among the Niğde settlements that have lost or are in the process of losing their architectural memory values. It was attempted to answer the questions of how the information from each settlement may be presented together in a flow chart, reinforcing it and what evaluation techniques will be used to assess the level of awareness of the presented information. Preliminary web application drafts were produced to give diversity in evaluation based on user interaction, and the most suitable software and interfaces were discussed with computer software experts in order to convert the drafts on paper to the computer environment.

Case study for collecting data

Data on verbal, written-architectural memory aspects of each settlement selected as samples were obtained in the field study. A drone was used to take aerial photographs of the settlements, as well as general documentation of the study area. Following the completion of preliminary research on the memory spaces of each settlement with a history of population exchange, the documentation of the buildings was completed in accordance with the discipline of architectural protection. Buildings were surveyed and indoor and outdoor photographs were taken as part of the documentation. Verbal interviews were conducted with the people in the settlements to obtain the data using questionnaires that had been prepared in advance and the interviews were audio and video recorded.

Data input to the model

It is necessary to digitize the verbal, textual and architectural urban memory elements collected for the settlements in order to enter data into DCHMM software. The old photographs of the settlements collected during the digitization stage were scanned by the .jpeg extension and the memory locations were named. The dimensions of each memory space reported by the survey were transferred to the computer environment in two and three dimensions using the AutoCAD and ArchiCAD drawing programs. Oral interviews were recorded either by writing the transcript using Word or by filming it on video. Old inscriptions and documents were scanned and saved in .jpeg format. Following that, the data was entered into the areas designed in the software of the developed web application.

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The application process of DCHMM

Afterward, within four months, the application would be made available on the internet with each user's responses to questions on what the new roles of the structures should be today being recorded in the database of the last section.

Evaluation of the data obtained in DCHMM

The application process concludes with a game-based evaluation section that assesses how successful each user's urban memory knowledge is transferred. It is also desirable that the user responds from multiple-choice functions as a participant to the structure's future function after the passive experience of each memory structure.

The outputs obtained from this application, which was written for DCHMM and made available on the internet for urban memory transfer, were evaluated. These outputs are:

- How many people have visited the application (profiles: age, education)
- Re-functionalizing the memory space in which the user is informed by providing data for conservation planning by responding to multiple-choice questions
- At the end, correct answers to multiple-choice questions in a game format are provided for achievement performances in memory transfer over time
- The in-game section's proportional success rate.

Application Sections of DCHMM

The web application was implemented on the internet for six months. The data on the admin-controlled panel was frequently backed up for the evaluation process, and any interruptions was addressed. The user's position of the model within the application; passive information, the participant (presenting ideas), and active questions after the general assessment were provided with the sections in the game format. Each section featured a flow chart with data that corresponded to the data that was to be transferred in and between them (Figure 2).

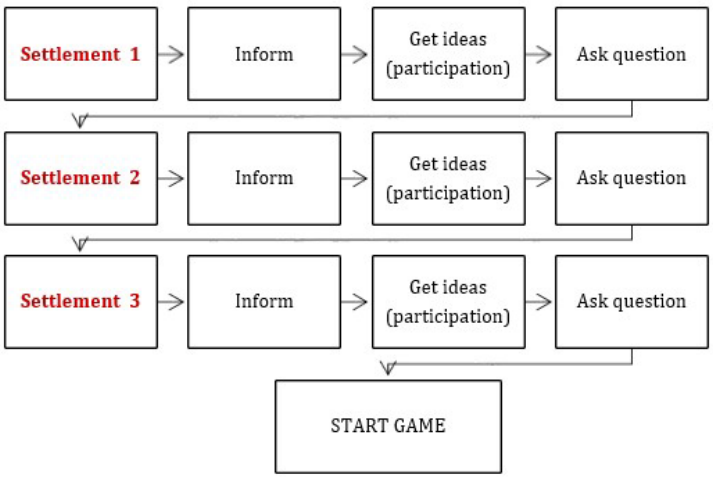

Figure 2. Flow chart of the application process of the DCHMM

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Information processing and memory transfer are treated as parallel cases in the model's construction. Questions regarding urban memory elements, which consist of verbal, written, architectural memory elements related to a settlement, are asked in the Ask Questions section, with the goal of reinforcing the given knowledge with the questions and storing it in long-term memory. The game section coincides with the efficiency stage in the information processing process in digital memory transfer (Figure 3).

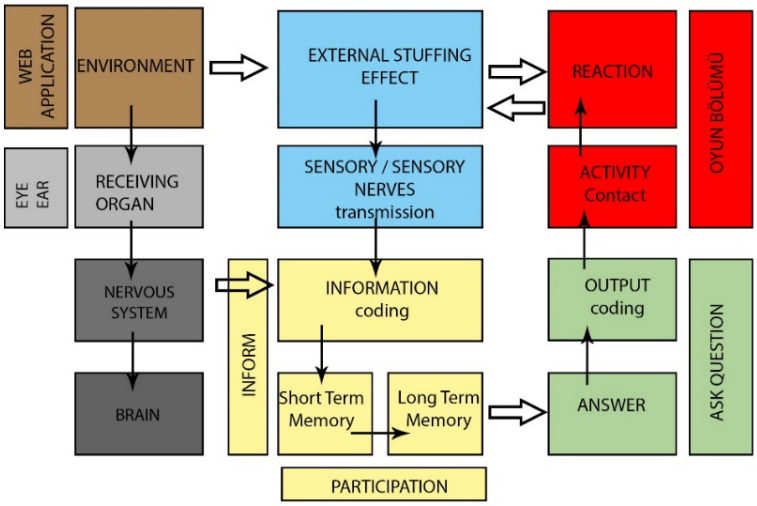

Figure 3. Flow practice of the DCHMM in the Information Processing Process (The stages of the information processing process are adapted from Aydınlı (1986)

The urban memory elements were transferred to the user in three stages (informing-engaging-questioning-asking), (Table 3). How much information the user retains at this point will be determined by the success rate in the answers. In fact, the game section is the enticing final phase, allowing users to evaluate the designed digital memory model while also allowing them to use the application repeatedly.

Table 2. Descriptions of the implementation stages for a settlement

INFORM		GET IDEAS	ASK QUESTION
General information about settlements	Population Exchange date of settlement	Selecting reuse recommendations for memory spaces	Multiple choice questions about urban memory data given during the information phase are asked. If 3/5 (three-fifths) is provided according to the number of correct answers given by the user, it is requested to visit the settlement again if it is not provided to move to the new settlement.
	Important memory spaces		
	Elements of oral memory (Oral interviews, traditions)		
Information about memory spaces	History of the building		
	Architectural Features (Plan, Facade, Construction Technique)		
	Past functions		
	Current usage status (Interiors, special accessories)		

Information section

The information section is designed to transfer the urban memory elements that were originally intended to be transferred to short-term memory in a way that appeals to sensory memory through visual and auditory means. "Coding" refers to a set of control operations in which information to be remembered is placed in the context of additional, easily retrievable information, such as a reminder sentence (R. C. Atkinson & Shiffrin, 1971). The first stage of memory is defined by R. Atkinson, Atkinson, Smith, and Bem (1990) as the parts of written, structured, and vocal urban memory that are unique to each settlement.

While preparing the presentation of the content in the information section, the statutes, declarations and legislation of many studies (The Nara Document On Authenticity (ICOMOS, 1994), ICOMOS International Cultural Tourism Charter Managing Tourism at Places of Heritage (1999) ICOMOS Convention for the Protection of the Intangible Cultural Heritage (2003), ICOMOS Charter on the Interpretation and Presentation of Cultural Heritage Sites (2008), and ICOMOS Turkey Architectural Heritage Conservation Charter (2013)aimed at protection and survival were accounted for.

The memory cards of each village selected as a sample are available in the web application's "traveler" tab. A generic snapshot of the settlement and the logo of the village's key memory space (building) are on the front of each card. Behind these cards are the names of important architectural memory spaces at settlement (Figure 4). Villages are presented as a card abstraction, allowing the user to select and acquire information in a specific order.

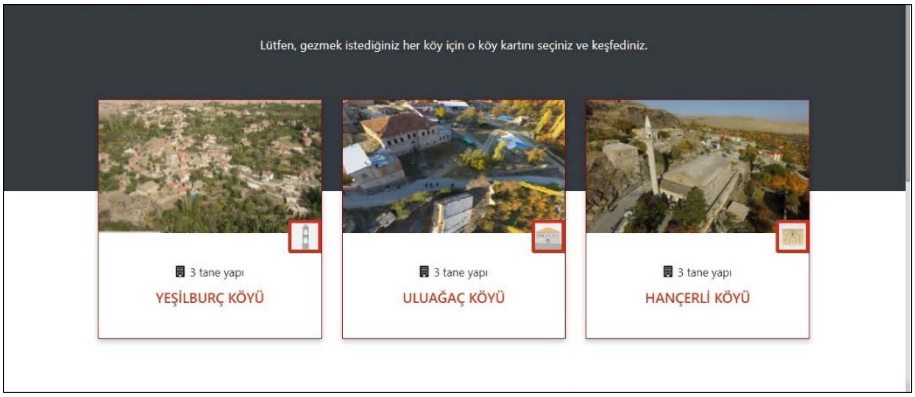

Figure 4. Traveler part implementation of DCHMM -memory (information) cards

The general information about the village, verbal memory of settlement interview video and the information map of the memory structures placed on the aerial photo of the village appear when you click on the settlement card (Figure 5-6-7). Aerial photography containing the village's main architectural structures was preferred in the interface design for those with a strong visual memory, and a plain simple design was preferred in the interface design for users of all ages (Figure 5).

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Figure 5. Traveler section-information part on the place's history, language, population and verbal memory (sample settlements-Hançerli

Interviews with the living for oral memory transfer are presented in the explanatory texts alongside the interview video and are intended to provide interaction with the community without visiting the village (Figure 6).

Figure 6. Traveler section- verbal memory of settlement interview video- an interview with one of the oldest living in the selected settlement about the history of the village, its historical structures left from the Greeks, the village's history of population exchange (sample settlements-Hançerli Village)

Figure 7. Traveler section- map of 3 historical buildings selected for memory transfer in the village, interactively over the aerial photograph, marked with pins that the user can select (sample settlements-Hançerli Village)

The user has the option of choosing with the freedom to start from whatever historical building they want by hovering over it with the marked pins (Figure 7). When the settlement's memory structure is selected, an information screen about the building (history, plan, construction technique, facade, old function, current function) is displayed step by step (Figure 8-9-10).

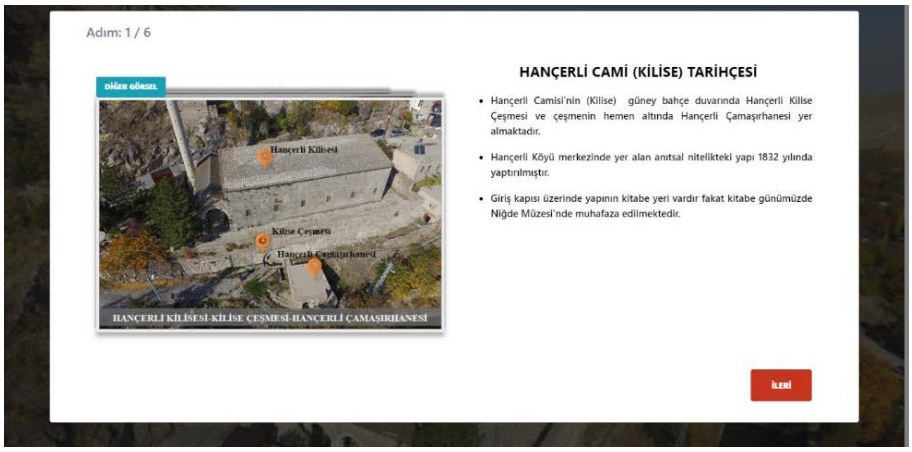

Figure 8. Traveler section - memory space information about the architectural building's history (Hançerli Mosque (Church)): construction date, by whom it was built, its importance in the settlement's history

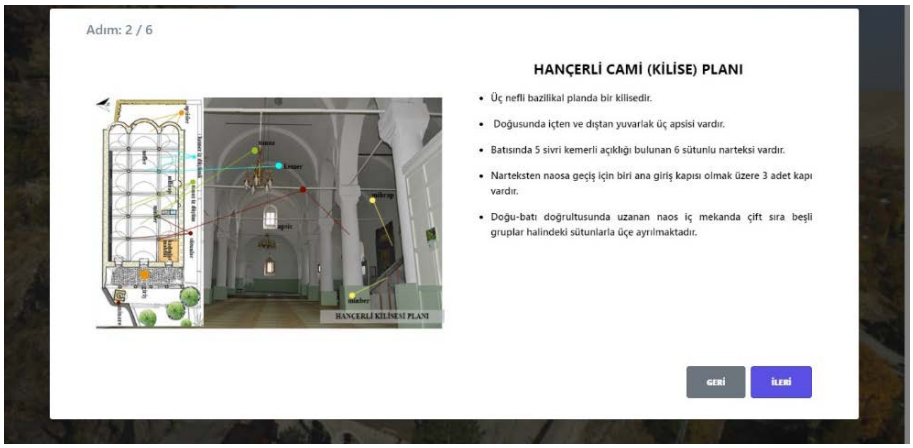

Figure 9. Traveler section - memory space information about architectural features: plan, facade, ornament, important equipment, construction technique (Hançerli Mosque (Church))

In the design of each stage detailing the architectural features of the historical building, plans, sections and views are schematized in a way that all users can understand. The ones that are intended to be conveyed on the image are marked and coloured on the right, and the information given on the left is retransmitted as text (See: Figure 8-9).

Following the presentation of important memory values of the historical building, the user is given information about the current state of the building and its historical worth (Figure 10). Additionally, when the user hovers over the images on the right, the user reinforces this situation by selecting multiple images (blue button), strengthening the building's current information about the use case (Figure 10).

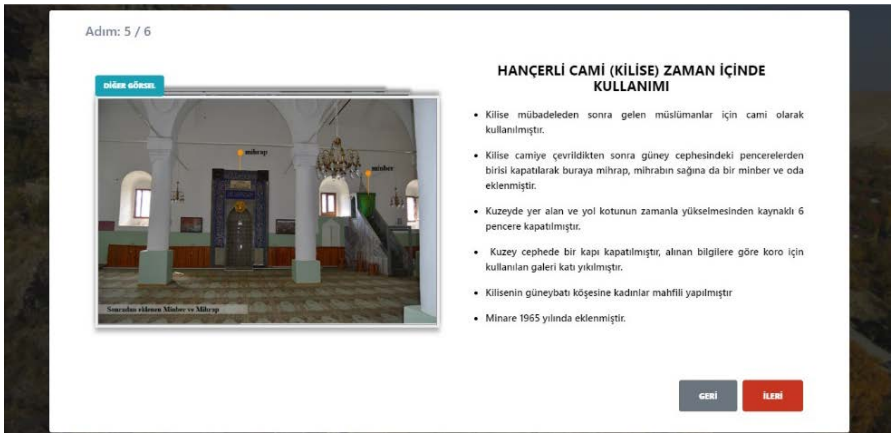

Figure 10 Traveler section - memory space information functional change of the structure over time (Hançerli Mosque (Church))

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Participation (getting ideas) section

Purely legislative limits and propositions will not be sufficient to ensure the preservation of architectural heritage. Success in this issue is directly related to the adoption of the notion of protection and making it an integral part of one's identity (ICOMOS Turkey Architectural Heritage Conservation Charter / 2013). The adoption and promotion of this notion by all segments of society can help to ensure the preservation of architectural heritage. Therefore, non-formal education should be aimed to promote public awareness (ICOMOS Turkey Architectural Heritage Conservation Charter / 2013) . According to the Charter on the Built Vernacular Heritage /1999, interventions can be made within the framework of a society-accepted code of ethics if traditional architectural forms are still maintained in the implementation principles incorporated in the adaptation to the new use. The use-value incorporated in the conservation values is defined as the value-added to the building by the original use of the building or the new use foreseen by the society (ICOMOS, 2013) This is closely linked to user opinions, i.e. public opinion. After giving information about the history, culture and oral memory values of the settlement to the user in the selected settlements, the architectural information (plan, facade, building material and technique, ornamental features, architectural reinforcements), the preservation status of the building, and its use in the past and present value information is transferred in the application step by step. Then, the user is presented with three different new function options to transfer the past memory values of the historical structure over their reuse potential. With these three different options, it is desired to show the user that the memory values are sustainable over the future use potentials of the structures, and this situation provides clear data in terms of evaluation in terms of results. The user must choose a new function between three options that they deem appropriate for the structure in the participation section.

Each building identified in Niğde with a history of population exchange must to be re-functionalized to meet the social, architectural, cultural and economic needs of today's environment. Many of them have disappeared because they are not used, while others are in danger of extinction. The process of structure conservation should include not only a documentation and registration process, but should also participate in society's existence with common elements of memory, each of which reflects the Turkish-Greek population exchange. To this end, the user's awareness of the assets of these structures obtained in the information section will be reinforced by considering the functions of their status in the future. Three new functions will be proposed for the memory spaces in each selected settlement (Figure 11).

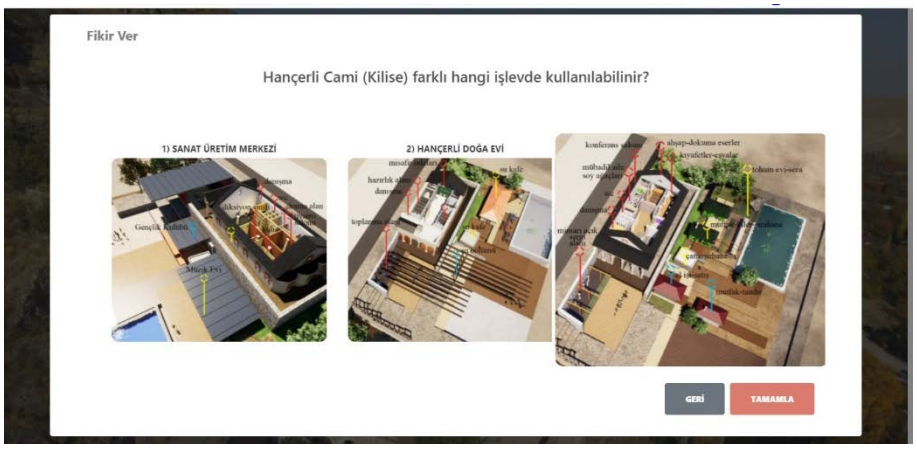

Figure 11. "Traveler" section part of the model-participation (suggestions of reusing value of Hançerli Mosque (Church)

These functions will help to promote the existence of other memory spaces in light of the settlement's socio-cultural, economic characteristics and history. The user must respond to the function that they deem appropriate for the structure in the participation section. Thus, they will be actively involved in conservation decisions.

Asking question section

After completing the information and participation stages of each settlement in the DCHMM web application, users move to the question section to collect data on how successful they are to be transferred. Users who want to move on to another settlement are required to answer at least three of the five questions correctly (60% success) . Users who fail to do so will return to the information section in another placement, concentrating on answering the questions. It is hoped that users who view the question would be aware of elements of urban memory that they did not consider in their first investigation.

Five fixed questions concerning the urban memory elements that are to be transferred after each settlement were asked in the asking questions section. The goal is to have a minimum of a 60% success rate for users of the urban memory elements to be transferred. First time users who fail to accomplish so will be requested to visit the settlement and their success rates would increase. The analysis of the urban memory element in which settlement is achieved will be assessed based on each user's answers in the first try. Success graphs were created for each placement in the first attempt. The results obtained in this way would be demonstrate their ability to be transferred to the user between placements.

Game section

The games are defined as an immersive, voluntary and entertaining activity in which a challenging goal is pursued according to the rules (Kinzie & Joseph, 2008; Zyda, 2005). Learning and memory transfer various sorts of learning and instructional relationship. Many studies have examined the effects of computer games on learning and it has been claimed that playing is a more effective new and modern method of

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learning than traditional methods and applications (Cassidy, 2003; Hwang, Sung, Hung, Huang, & Tsai, 2012; Vogel et al., 2006) have been developed for this (Ebner & Holzinger, 2007; Sung & Hwang, 2013; Zin & Yue, 2009).

The game section of DCHMM aims to enable the user to re-encounter urban memory elements in an interactive setting by having fun and motivation for high scores after information, questioning and participation sections. Based on this, 15 of the urban memory elements listed in the information section will be presented in the DCHMM game.

The information provided in each image about the location and name of the structure will refresh the user's memory. The user will then be asked to find the correct response from each of the three answer options based on each question visually within the time limit that will start the game (Figure 12). The user will be able to use 3 tips if they wish.

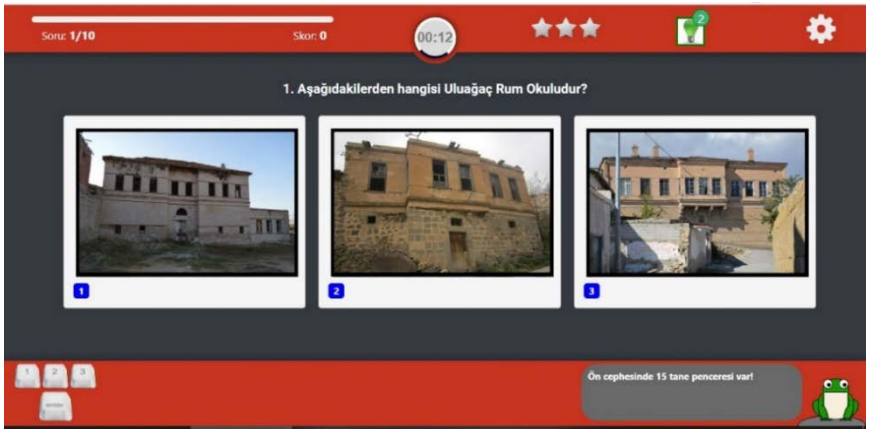


Figure 12. Game section interface

The user will be able to see the percentage of success proportional to the number of correct answers and outcomes at the end of the game (Figure 13).

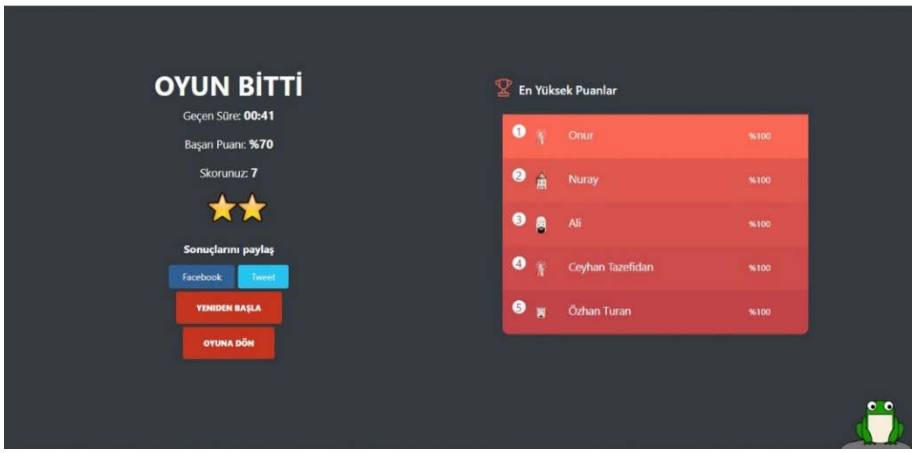


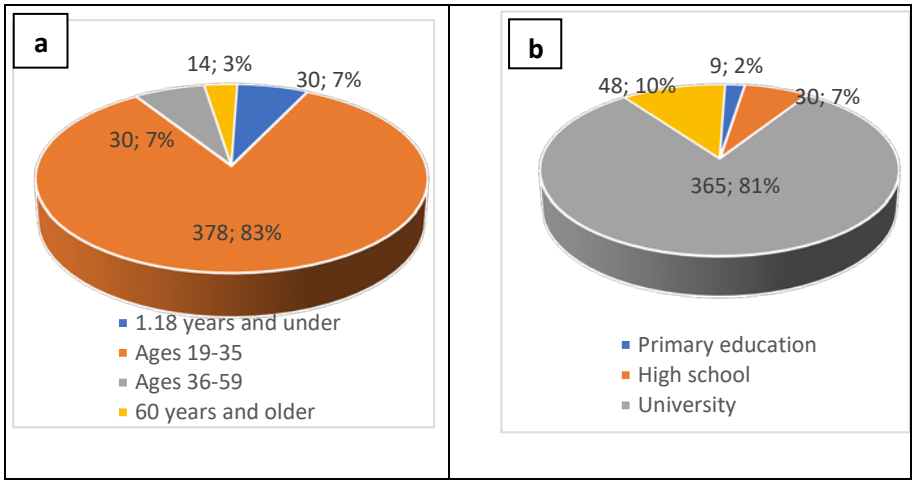
Figure 13. Game section results

Results of after Application of DCHMM

The application of the model was carried out by 452 people over the course of six months. The answers given by users registered in the system

in the participation and asking questions section of the traveler's part, where the cultural heritage memory structures are processed, are saved in the database for each user, as well as a general evaluation according to age and education level (Table 3). The data acquired from the user was digitized and interpreted in line with the ones that were to be evaluated alongside the graphics during this process.

Table 3. Percentage distribution and numbers of users registered in the system



The circumstances in which the user visits the memory cards (Yeşilburç Village, Uluağaç Village and Hançerli Village) and gets an overview of the memory structures on these cards:

•Yeşilburç Village Mosque (Church): 342 people gave ideas: 342 people provided ideas (58.8% of the users who made the participation part of Yeşilburç Mosque (Church) wanted it to be given the function of Niğde Population Exchange Museum.)

•Yesilburc Stone Mansion: 349 people provided ideas: Mansion, the most preferred one was Yesilburc Guest House with a rate of 46.7%)

•Yeşilburç Hamam: 343 people provided ideas: their opinion (46.36% of the users chose the Turkish Bath, 33.5% as the Walking Way Stop and 18.8% as Yeşilburç Winery)

•Uluağaç Greek School: 320 people provided ideas: Uluağaç Village Association-Craft School was the most preferred among the functions offered to Uluağaç Greek School with a rate of 53.7%.

•Uluağaç Church: 322 people provided ideas: Users' preference rates for the functions suggested to Uluağaç Church were 43.5% Art History Campus-Main Building, 29.8% Uluağaç Village Association-Guesthouse, and 26.7% Primary School Students Education Building-Tale Workshop.

•Çatal Çeşme: 319 people provided ideas: Of the functions proposed for Çatal Çeşme and its surroundings, Uluağaç Village Association-Exhibition and Sales Area was preferred with a rate of 30.1%, Art History Campus-Semi-Open Cafe with a rate of 40.8%, and Primary School Students Education Building-Playground with a rate of 29.2%.

•Hançerli Mosque (Church): 311 people provided ideas: 311 people gave ideas. (59.8% of users chose Niğde Ethnography Museum, which is

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recommended for the Hançerli Mosque (Church), 23.2% chose the Hançerli Nature House, and 17% chose the Art Production Center-Main Building.)

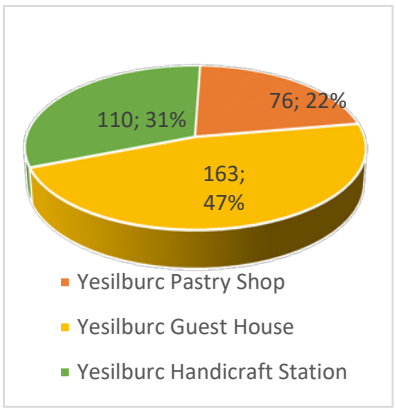
•Hançerli Church Fountain: 310 people provided ideas: 53.9% of users opted for Niğde Ethnography Museum-Retroactive animation

•Hançerli Laundry: 308 people provided ideas: Of the three functions suggested Hançerli Laundry, the users preferred the most with 55% as Niğde Ethnography Museum-Laundry Animation

The settlement that attracted the most attention, according to the digitized results, is Yeşilburç Village. The village that digitizes the data in the information section is the most densely populated village in terms of text and visual richness in the presentation of the data to be transferred. In addition, being the first card lined up from the left in the interface is observed to be beneficial in the selections. Some of the users did not visit all of the memory structures in the settlements, hence did not provide an idea. Users who register to the system during the process have a tendency to build villages in the traveller section at regular intervals.

To preserve the continuity of memory in society, users' the choices among the three new functions proposed for each historical structure were digitized according to age and education level for each building; thus, digitized data was obtained by ensuring the user's participation in conservation planning. (For an example, see Table 4: Yeşilburç Taş Konak participation section results).

Table 4. Age grouping numbers and percentages of the answers of the choices made to the user age and education groups to the functions proposed to Yeşilburç Stone Mansion



Suggested new functions	Age Groups							
	18 years and under		Ages 19-35		Ages 36-59		60 years and elder	
Yeşilburç Pastry Shop	7	%9.21	6	%86.84	3	%3.95	-	-
Yeşilburç Guest House	8	%4.91	45	%88.96	5	%3.07	5	%3.07
Yeşilburç Handicraft Station	8	%7.27	5	%86.36	5	%4.55	2	%1.82
	Education status							

Suggested new functions	Primary Education		High School		University		Postgraduate	
Yeşilburç Pastry Shop	3	%3.95	10	%13.16	59	%77.63	4	%5.26
Yeşilburç Guest House	-	-	3	%1.84	147	%90.18	3	%7.98
Yeşilburç Handicraft Station	2	%1.82	7	%6.36	90	%81.82	1	%10

The data of the successful and unsuccessful percentages determined according to the 60% success score of the users who tested themselves were acquired in Yeşilburç Village's questioning section. In the questioning section, if a user's success rate in answering the questions is below 60%, he/she is asked to answer the second round of questions in order to answer the questions again. But in the system, some users may exit the system instead of responding in the second round. Here, 50 people out of 333 people for Yeşilburç Village were not successful in the first round, but 28 of these 50 people answered again in the second round. Of these 28 people, 64.3% were successful in the second round. This success achieved in Yeşilburç Village was greater than predicted, where the most data with cultural heritage value is provided from distinct building groups for the three settlements and the technical term is used. A total of 316 people attended the questioning section of Uluağaç Village. In the first round, 85.8% of these 316 people were successful and 14.2% were unsuccessful. Twenty-seven of the forty-five people who made it to the second round tested themselves in the second round. 66.7% of users who made the second round were successful. 89.8% of the 303 people who tested themselves in the questioning section of Hançerli village were successful in the first round and 10.2% were unsuccessful. Twenty-one of the thirty-one who failed in the first round tested themselves in the second round. 47.6% of the users in the second round were successful and 52.4% were unsuccessful. The data obtained from the user as a result of using DCHMM in the designed digital environment demonstrates that the targeted memory transfer was accomplished in all three villages in the questioning section. More than 80% of users also demonstrated the success of the model. The user wants the settlement's memory value to be reflected in the present, according to the preferences stated in the functions proposed for the selected sample architectural memory structures. Furthermore, user preferences have demonstrated that the common main function given to three key architectural structures in a settlement will provide a sustainable level of protection, and a public participation poll has been conducted to put it into practice.

CONCLUSION AND RECOMMENDATIONS

In the discipline of architectural and urban conservation, particularly in the discipline of architectural space and time on the sustainability of spatial memory, debates, theories, and trends have arisen over the ages.

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Riegl (2004) describes the characteristics of a structure that require protection; and grouping them as nominal values (old age value, memory value, designed nominal value) and actual values (usage value, art value) and stated the time and other qualitative values of the structure separately among the structure's protection criteria. These criteria demonstrate the significance of the structure's memory value within the discipline of conservation. DCHMM was created to raise awareness about the transfer of the naturally inherited (memory spaces) and elements of intangible cultural heritage (verbal traditions) to the next generation and ensuring their sustainability. In the information age, architects and planners should respect digital memory as a tool for storing, processing, interpreting and shaping the future, rather than storing the past.

The application process and evaluation of DCHMM, including questions asked at the end of the information to provide evaluation in the web application, the time response system in game format, and option to opt for multiple-choice functionalization options of the memory structure, will be presented to the users both with repetition of the information requested and the settlement and it is expected to be included in the decisions. DCHMM's results will be used to support the hypothesis proposed by the success of urban memory in the digital world. Simultaneously, the responses to the protection of historic structures in the city memory were analysed following the adoption of this model, which allowed the user to make an active and participatory choice. After this evaluation, the data provided vital input for future urban planners and architects. While transferring memory places to users in the settlements of Niğde Province, the decisions of users in the web environment were learned in the new functions that are suitable for today's conditions, and the suggestions will be developed by evaluating these settlements through their desire to visit in person.

The preservation of architectural heritage cannot be guaranteed solely by legal constraints and propositions, and success in this regard is directly related to the adoption of the conservation concept and making it an integral part of its identity (UNESCO, 2003).The increase of public awareness on the importance of the protection of architectural heritage can be achieved through formal and non-formal education for people of all ages and educational levels. By developing the same approach and flow chart, DCHMM and cultural heritage elements of architectural heritage have created a system that will be used for educational purposes in schools. Improvements can be made in this direction based on the data collected throughout the application process and evaluation of DCHMM. Interactive web application models like the DCHMM can be used by elementary school and high school curricula in Turkey and around the world.

The UNESCO World Memory Program strives to ensure that the documents and information that constitute mankind's historical, cultural and social memory, and which are in danger of disappearing due to various natural disasters or social reasons, especially wars, are shared as

common values of humanity and shared in the digital environment as one of the measures of this protection. To this end, the program's three main objectives are to facilitate the protection of the earth's documentary heritage using the most appropriate techniques, to assist in universal access to documentary heritage, and to raise worldwide awareness about the existence and importance of documentary heritage. DCHMM can be used to turn data obtained from many historical settlements in Turkey into a project with the wide-scale support of local institutions and every city authority on this subject.

Urban memory values continue to exist as elements providing economic input. Measurable studies can be conducted using tourism activities aimed at targeted and intangible heritage sites in the sample settlements whose data is used to test the DCHMM's widespread impact after implementation and application evaluation. With the support of universities, local governments and the Ministry of Culture and Tourism, these studies can be developed via platforms that will be developed by architects, engineers, educators, sociologists, economists, city planners and all segments of society.

In line with all these results, suggestions for the use of the model (DCHMM) in education, tourism and public institutions show that an improvable approach is presented for future studies to ensure sustainability in the protection of cultural heritage.

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Resume

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