



# NARRATE

Needs for Digital Recording and Documentation of Ecclesiastical Cultural Treasures in Monasteries and Temples

## Project Information

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The purpose of NARRATE project is to codify the actual recording and documentation needs for the ecclesiastical cultural treasures, through a systematic study of the users' needs.

### Consortium partners



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Contract no: 2022-1-EL01-KA220-HED-000089867



### Main Authors

Name	Organization
Ivaylo Naydenov Svetoslav Ribolov Ventzyslav Karavalchev Tatyana Ivanova	SOFIA UNIVERSITY ST KLIMENT OHRIDSKI
Argyris Constantinides, Mario Belk	COGNITIVE UX GMBH
Stella Sylaiou Konstantinos Evangelidis	INTERNATIONAL HELLENIC UNIVERSITY
Aikaterini Stamou	ARISTOTLE UNIVERSITY OF THESSALONIKI GREECE

### Contributing Partners

Organization
ASSOCIATION FOR THE PROTECTION OF CULTURAL HERITAGE (KMKD)

## Abbreviations

<b>API</b>	Application Programming Interface
<b>CH</b>	Cultural Heritage
<b>CRM</b>	Conceptual Reference Model
<b>WP</b>	Work Package
<b>3D</b>	Three-Dimensional
<b>GIS</b>	Geographic Information Systems

## Executive Summary

The EU Erasmus+ “NARRATE: Needs for Digital Recording and Documentation of Ecclesiastical Cultural Treasures in Monasteries and Temples” (2022-1-EL01-KA220-HED-000089867) aims at identifying and promoting the needs and priorities concerning ecclesiastical Cultural Heritage (CH) documentation.

The current study is being performed to codify the actual recording and documentation needs for the ecclesiastical cultural treasures, through a systematic study of the users’ needs. NARRATE reflects an emphasis on documenting ecclesiastic CH treasures in ways that will enable stakeholders to narrate their intertwined histories, functions, and spiritual importance throughout time.

This document summarizes and reports the activities and outcomes of *Work Package (WP) n°2 - Needs Analysis, Best Practice Collection and Conceptual Design of the NARRATE Framework*. WP n°2 is co-lead by Aristotle University of Thessaloniki (AUTH) and International Hellenic University (IHU), with involvement of the following partners: Sofia University St Kliment Ohridski (SU), Kulturel Mirasi Koruma Dernegi (KMKD), and Cognitive UX GmbH (CUX).

The main objectives of this WP are as follows: *i)* generate state-of-the-art tools, methods, and solutions that will not be imposed on their main users and managers but conversely will be developed in an inclusive way, incorporating their input and specialist knowledge and their sensibilities on the intricate matter of faith-related Cultural Heritage (CH) representation through digital technologies; *ii)* a thorough review of best practices in the field of CH documentation through digital means will be conducted with an emphasis on needs analysis and the development of training material for the users of such platforms and repositories. This will inform the design of our project and will lead to the production of best practices guides for training purposes; and *iii)* the conceptual design of the NARRATE framework that will incorporate the insights gained from the earlier objectives' fulfillment, will lead to the production of specific guidelines, structural and factual characteristics of the applications that will be developed in response to identified needs.

## Table of contents

1. Introduction.....	10
1.1 Role of the Document .....	10
1.2 Structure of the Document.....	10
2. Best practices in documenting ecclesiastic Cultural Heritage through new technologies.....	11
2.1 Introduction to Documentation of ecclesiastic Cultural Heritage .....	11
2.2 Methods of Documentation of Movable and Immovable Ecclesiastical Heritage for 3D digitization .....	13
2.3 Best Practices in the documentation of movable Ecclesiastic Treasures according to the NARRATE survey results in Greece, Bulgaria and Turkey.....	14
2.3.1 Preferred digital form of ecclesiastical treasures: .....	16
2.3.2 Preferred form of presentation of ecclesiastical treasures: .....	16
2.3.3 Preferred option for exhibiting the digitized ecclesiastical-historical heritage	16
2.3.4 Preferred use of NARRATE project site:.....	16
2.3.5 Preferred information for a digital description of the ecclesiastical treasures that need to be included in the digital documentation of Ecclesiastical Cultural Heritage repository .....	17
2.3.6 Proposed tools for better promotion, display, preservation and conservation of the ecclesiastical treasures. ....	17
3. Design of NARRATE Framework .....	22
3.1 Data Models and Reference Ontologies .....	22
3.2 Conceptual Architectural Design .....	23
4. Planning and Designing the Evaluation Methodology of NARRATE framework ...	26
4.1 Overview of Evaluation Methodology .....	26
4.1.1 Formative and Summative Evaluation Study of NARRATE .....	27



4.2	Formative Evaluation .....	28
4.2.1	Evaluation criteria overview .....	28
4.2.2	User Needs and Goals .....	29
4.2.3	Usability and User Experience .....	30
4.2.4	Content Relevance and Coverage .....	30
4.2.5	Accessibility .....	31
4.3	Summative Evaluation .....	31
4.3.1	Summative Evaluation criteria overview .....	31
4.4	Prospective Participants .....	33
4.5	Ethics and Consent forms.....	34
4.5.1	Information Sheet .....	34
4.5.2	Concent Forms .....	38
5.	Conclusions.....	41
	References .....	42



## List of figures

Figure 1: Summary results on type of information to be included in the repository for Greece, Bulgaria and Turkey .....	17
Figure 2: High-level conceptual architecture of NARRATE framework.....	24
Figure 3: NARRATE server architecture .....	25
Figure 4: Schematic representation of the Formative and Summative Evaluation Study of NARRATE project.....	26
Figure 5: Implementation of the Formative and Summative Evaluation through the life circle of the NARRATE project.....	27
Figure 6: Quality, effectiveness and usefulness evaluation criteria of FE.....	29
Figure 7: Quality, effectiveness and usefulness evaluation criteria of SE .....	32



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## List of tables

Table 1. Matching of needs analysis with the entities of CIDOC CRM .....22



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# 1. Introduction

## 1.1 Role of the Document

The role of this document is to report the best practices in documenting church heritage through new technologies, as well as the design considerations of the initial version of the NARRATE framework. More specifically, it provides an introduction to documentation of ecclesiastic Cultural Heritage, describes the new technologies in ecclesiastical treasure documentation and presents the methods of documentation of movable ecclesiastical heritage for three-dimensional (3D) digitization of immovable ecclesiastic Cultural Heritage. Additionally, this document reports on the best practices in the documentation of movable ecclesiastic treasures in the three participating Countries of NARRATE Project, Greece, Bulgaria and Turkey, according to the user-centered surveys that were conducted under the Activity: Needs Verification with Key Stakeholders from the Ecclesiastical Domain of WP2.

Furthermore, it outlines the design of data models and reference ontologies describing ecclesiastical cultural treasures based on a semantic metadata description, alongside with the conceptual architectural design of the NARRATE framework, which will include the server-side Web Application Programming Interface (API) for exposing the data to third-party services.

Finally the report introduces the methodology for the Formative and Summative Evaluation Study that will be implemented in the following stages of the project.

## 1.2 Structure of the Document

The rest of the document is structured as follows: *Section 0* presents the best practices in documenting ecclesiastic Cultural Heritage through new technologies. *Section 0* presents the general architecture of the initial NARRATE framework and its underlying data models and reference ontologies. *Section 4* introduces the methodology of the Formative and Summative Evaluation of NARATE framework and *Section 5* concludes the report.

## 2. Best practices in documenting ecclesiastic Cultural Heritage through new technologies

This section describes the best practices in documenting ecclesiastic Cultural Heritage through new technologies. It addresses the following questions:

- i) Which are the newest methods of documenting ecclesiastic Cultural Heritage?
- ii) What kind of ecclesiastic Cultural Heritage are they suitable for?
- iii) Which of these methods are applicable to movable ecclesiastical heritage?
- iv) Which are applicable according to the objectives of the project *NARRATE - the creation of a digital archive*, as a method of preservation of ecclesiastic Cultural Heritage and creation of a digital archive as a tool for religious education, remote access for disadvantaged people?

The input to this section is based on the user-centered surveys conducted in Greece, Bulgaria and Turkey.

### 2.1 Introduction to Documentation of ecclesiastic Cultural Heritage

To begin with, we describe what CH documentation is and why it holds such importance. Regarding the question: *“Is there a need to digitize the ecclesiastical-historical heritage?”* 49% in Bulgaria, 64% in Greece and 86% in Turkey of the Clergy and 75% in Bulgaria, 89% in Greece and 72% in Turkey of non-Clergy respondents answered: *“Yes, and it cannot be postponed”*<sup>1</sup>.

“Today the world is losing its architectural and archaeological cultural heritage faster than it can be documented. Human-caused disasters, such as war and uncontrolled development, are major culprits. Natural disasters, neglect, and inappropriate conservation are also among the reasons that our heritage is vanishing.”<sup>2</sup> This is how François LeBlanc and Rand Eppich express their concerns about the rapid loss of architectural and archaeological heritage in their publication – “Documenting Our Past for the Future”. Their publication emphasizes the urgency of documenting cultural

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<sup>1</sup> Results according to the questionnaires for Clergy and non-Clergy survey participants. See on this topic Report on R.6, WP2 of the NARRATE project.

<sup>2</sup> [https://www.getty.edu/conservation/publications\\_resources/newsletters/20\\_3/feature.html](https://www.getty.edu/conservation/publications_resources/newsletters/20_3/feature.html)

heritage to preserve it for future generations. In conclusion, we must document our CH to preserve it for the future.

Many churches today are being threatened due to fast urbanisation, urban sprawl and natural disasters that occur nowadays. It is our obligation to preserve the cultural sites and all the information they hold using the knowledge and tools that the latest technology offers.

While we owe to the future generations to preserve as much as possible of our CH, it is not possible to save everything. For this reason CH documentation is of great importance as it helps transmitting the knowledge to future generations. François LeBlanc and Rand Eppich<sup>3</sup> in their newsletter of The Getty Conservation Institute «Documenting Our Past for the Future» note that: “Indeed, documentation can help keep heritage from being destroyed or forgotten, and it serves to communicate, not only to conservation professionals but to the public at large, the character, value, and significance of the heritage“. In the same document François LeBlanc and Rand Eppich mention: “Documentation of cultural heritage, broadly defined, includes two main activities: *i*) the capture of information regarding monuments, buildings, and sites, including their physical characteristics, history, and problems; and *ii*) the process of organizing, interpreting, and managing that information. Reasons for engaging in documentation include assessing the values and significance of the heritage in question, guiding the process of conservation, providing a tool for monitoring and managing heritage while creating an essential record, and communicating the character and importance of heritage“. This approach of CH documentation applies to our project focus: documenting ecclesiastical treasures of Orthodox Monasteries and Temples. As François LeBlanc and Rand Eppich state: “Documentation is the medium through which this knowledge is recorded, collected, and stored. Without guidelines only international cooperation between public and private endeavors can provide effective solutions to safeguard and preserve cultural heritage for future generations“.

A review of the development of ecclesiastical heritage documentation contains an extensive bibliography of publications and projects to date. Their identification and analysis has already been carried out in several reports in the WP2 of the NARRATE

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<sup>3</sup> [https://www.getty.edu/conservation/publications\\_resources/newsletters/20\\_3/feature.html](https://www.getty.edu/conservation/publications_resources/newsletters/20_3/feature.html)

project: *R1. Literature review of interdisciplinary approaches on religious cultural heritage documentation and preservation through new technologies; R2. Identification of pertinent projects and research; R3. Identification and analysis of best practices with regard to needs analysis through user-centered surveys; R4: Identification and analysis of best tools and practices.*

## 2.2 Methods of Documentation of Movable and Immovable Ecclesiastical Heritage for 3D digitization

As we have already analysed in report R1: *Literature review of interdisciplinary approaches on religious cultural heritage documentation and preservation through new technologies*, digital documentation techniques, such as 3D scanning, photogrammetry, and laser scanning, are used to create accurate and detailed digital representations of religious artifacts, buildings, and sites. These techniques capture precise measurements, textures, and colors, allowing for virtual preservation and reconstruction of damaged or destroyed heritage.

- **Photography:** High-resolution photography is employed to capture detailed images of religious artifacts, architectural elements, and sacred texts. Multiple angles and close-up shots help in capturing intricate details, textures, and colors [1].
- **3D Scanning:** 3D scanning technologies, such as laser scanning or structured light scanning, are used to create three-dimensional digital models of religious artifacts, sculptures, or architectural features. Laser scanning uses laser beams to measure the distance between the scanner and the object, creating a point cloud that represents the object's surface. This technique is particularly useful for capturing intricate details of sculptures, reliefs, or delicate artifacts. These scanners capture millions of data points to generate accurate and realistic 3D representations [2]-[6].
- **Photogrammetry:** Photogrammetry involves capturing a series of overlapping photographs from different angles and processing them with specialized software to create 3D models. This technique is useful for capturing complex architectural structures, such as temples or churches [7], [8]. Digital documentation can be used to create virtual reconstructions of religious sites or structures that may have been damaged or lost. By combining the digital data with historical research, architectural knowledge, and artistic interpretations, virtual reconstructions offer immersive experiences of religious heritage.

- **Digital Archiving - Metadata and Annotation:** Once the digital documentation is complete, the data is organized and stored in digital archives. These archives can include high-resolution images, 3D models, metadata, and contextual information. Digital archiving ensures long-term preservation and accessibility of the documented religious heritage. Metadata, such as descriptions, classifications, and historical information, is attached to the digital documentation to provide context and facilitate searchability. Annotation tools enable scholars and experts to add additional information, interpretations, or notes to the digital records.

- **Online Platforms and Virtual Exhibitions:** Digital documentation allows for the creation of online platforms and virtual exhibitions, where users can explore and learn about religious artifacts, sites, and practices. These platforms provide interactive experiences, educational resources, and opportunities for global access and engagement.

- **GIS technology:** Geographic Information Systems are employed to map and analyze religious sites, pilgrimage routes, and cultural landscapes. By combining spatial data with other information, such as historical records, archaeological findings, and cultural practices, GIS aids in understanding the context and significance of religious heritage. It enables effective planning, management, and conservation strategies.

GIS can be used to create detailed maps of religious sites, including temples, churches, mosques, synagogues, and sacred natural sites [9]. These maps can include information about their location, architectural features, historical significance, and associated rituals or practices. GIS enables the analysis of religious heritage within broader cultural landscapes. It helps identify the spatial relationships between religious sites, natural features, settlements, and other cultural elements [9].

## 2.3 Best Practices in the documentation of movable Ecclesiastic Treasures according to the NARRATE survey results in Greece, Bulgaria and Turkey

Cultural heritage is categorized into tangible and intangible, and the tangible into movable and immovable. The focus of the NARRATE project falls on the movable ecclesiastical treasures, which are located in the immovable (temples). Therefore, for the documentation of movable ecclesiastical treasures, appropriate methods of movable



cultural heritage will be used, but they will be placed in a specific context by methods of documentation of immovable cultural heritage.

According to the questionnaires conducted among the stakeholders of the NARRATE project, the two most appropriate forms of visual documentation for the NARRATE platform are: *i) detailed photo documentation*, and *ii) 3D visualization-digitization*.

**3D digitization:** Complete recording of CH is a multidimensional process. Pavlidis et al. [10] note: “It does not only address the problem of 3D digitization of objects and monuments but involves all the aspects of this new digital content management, representation and reproduction. It addresses issues affecting the whole life cycle of the digital cultural content.”

At the same study [10] nine criteria were identified which summarize the possible parameters for choosing a 3D digitization system for cultural heritage applications:

1. Cost
2. Material of digitization subject
3. Size of digitization subject
4. Portability of equipment
5. Accuracy of the system
6. Texture acquisition
7. Productivity of the technique
8. Skill requirements
9. Compliance of produced data with standards

Pavlidis et al. [10] note that: “3D digitization is a complex process that consists mainly of three phases: 1. *Preparation*, during which certain preliminary activities take place that involve the decision about the technique and methodology to be adopted as well as the place of digitization, security planning issues, etc; 2. *Digital recording*, which is the main digitization process; 3. *Data processing*, which involves the modelling of the digitized object through the unification of partial scans, geometric data processing, texture data processing, texture mapping, etc. “.

The first important task for creating the working framework of the NARRATE platform is collecting information through the surveys conducted among Clergy and non-Clergy focus groups. The following paragraphs summarise the results based on the answers of the survey participants of Clergy and non-Clergy in Greece, Bulgaria and Turkey.

### 2.3.1 *Preferred digital form of ecclesiastical treasures:*

On question “*What kind of digital form of presentation of ecclesiastic treasures you prefer?*”, survey participants both of Clergy and non-Clergy group in Greece preferred detailed photo documentation (64% of Clergy and 73% of non-Clergy accordingly) while in Bulgaria and in Turkey they favor the option of 3D visualisation (50% of Clergy and 52% of non-Clergy in Bulgaria, and 50% of Clergy and 53% of non-Clergy in Turkey). This means that based on our surveys the most appropriate method for the visual documentation of ecclesiastical treasures will be the preparation of a **3D visualization** of the object under study.

### 2.3.2 *Preferred form of presentation of ecclesiastical treasures:*

Another notable result pertains to the form of presentation. In Greece, the most favored answers were, first, the Album (52% of Clergy and 51% of non-Clergy), and second, the Catalogue (38% of Clergy and 46% of non-Clergy). In Bulgaria first, the most preferred answer for both Clergy and non-Clergy was the Catalogue (44% of Clergy and 55% of non-Clergy), followed by the Album (46% of Clergy and 40% of non-Clergy). In Turkey, the most frequent response was the Catalogue (50% of Clergy and 55% of non-Clergy), with the Album being the second choice (44% of Clergy and 27% of non-Clergy).

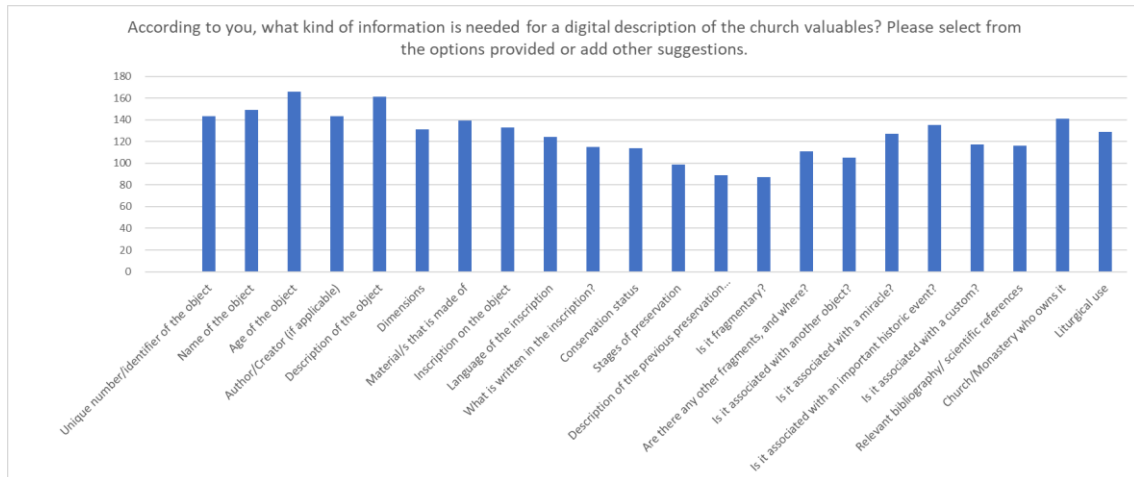
### 2.3.3 *Preferred option for exhibiting the digitized ecclesiastical-historical heritage*

In Greece 70% of both the Clergy and the non-Clergy group preferred the electronic environment, either on the website of cultural institutions or with open access. In Bulgaria, these preferences were reflected in 50% of the Clergy and 70% of the non-Clergy. Meanwhile, in Turkey, the percentages for choosing the electronic environment, either on the website of cultural institutions or with open access, were 85% for the Clergy and 58% for the non-Clergy group.

### 2.3.4 *Preferred use of NARRATE project site:*

On question “*For what purposes would you use the future NARRATE project site?*”, the most frequent answer in Greece is “Presentation of our own church heritage” (31% of the Clergy and 21% of the non-Clergy participants) and in Bulgaria (30% of the Clergy and 32% of the non-Clergy), while in Turkey the most popular answer for Clergy is the Archive (36%) and for non-Clergy, both the ‘Archive of Information’ and the ‘Digital information for researchers’ scored equally with a 20% percentage each.

### 2.3.5 Preferred information for a digital description of the ecclesiastical treasures that need to be included in the digital documentation of Ecclesiastical Cultural Heritage repository



**Figure 1:** Summary results on type of information to be included in the repository for Greece, Bulgaria and Turkey

### 2.3.6 Proposed tools for better promotion, display, preservation and conservation of the ecclesiastical treasures.

On question “What do you think would be good to do for better promotion, display, preservation and conservation of the ecclesiastical treasures?”

#### In Greece:

Clergy participants in Greece listed the following ideas:

- Publication of (e-)books/albums
- Conservation of icons and other treasures
- Systematic documentation in the parish directory
- Exhibitions
- Ecclesiastical museums
- Protective measures against theft (e.g. Placing replicas in place of the originals, which should be preserved in Ecclesiastical museums)
- Digital archive
- Research and other funding programs
- photographic archive
- Educational initiatives for church staff
- Digital museums

- Film-documentary
- On-line material (e.g. PowerPoint presentations).
- Digitization-3D imaging
- Scientific research by specialists or conservators

Non-Clergy participants in Greece listed the following ideas:

- Various forms of documentation (e.g., audio-visual, historical records, photographs, interactive maps)
- Publication of (e-)books/albums
- Awareness of digital illiteracy of the local populace
- Online repository
- Outreach via mass media.

In Bulgaria:

Non-Clergy participants in Bulgaria listed the following ideas:

- An interactive presentation about the history of the ecclesiastical treasures and maps;  
Classification of the ecclesiastical treasures;
- Cataloguing and description of the current state of the ecclesiastical treasures to protect them
- Extract from the chronicle books of the temples in the Plovdiv Metropolis;
- Digitization of old printed books, manuscripts, archives, utensils and icons;
- Online access from anywhere and free photos available on the Internet;
- Good presentation of church artifacts by categories, temples, dioceses, tools with visualization, history, technical characteristics, liturgical function for each artifact;
- information on dating, author, technique, previous restoration interventions;
- When clicking on the icon of each temple, a list of movable church values with photo documentation and information about them;
- 3D visualization with high resolution;
- Complete information for each object;
- Improved access from Google;
- The platform can help tourism and store an archive and being used for academic research/studies.

Clergy in in Bulgaria answered:

- Complete digitization,
- Digital storage of the documented ecclesiastical treasures;
- Remote access;
- Information about the local population, popularization among the natives and international public of the church treasures.

### In Turkey

Summary of Clergy and non-Clergy participants proposals in Turkey:

- UV Photography, IR Photography, X-Ray photography, 3D documentation, Laser photography.
- Digitization: The NARRATE platform could provide tools for digitizing ecclesiastical-historical objects such as books, images, archives, and other significant items. This would allow for their preservation and easy access in digital format, ensuring the historical records are safeguarded and enabling easier study and research.
- Virtual Exploration: The platform can offer virtual tours of the ecclesiastical sites and present 3D models of churches, monasteries, and other historical locations, artworks, artifacts etc. Users would be able to explore the environment and architecture of these historical monuments from a distance
- Educational Material: The platform can provide educational resources related to the ecclesiastical-historical heritage of the region and the artworks. This could include educational videos, articles, presentations, and other informative materials to increase public awareness and knowledge about the cultural heritage of the area.
- Collaboration and Networking: The platform can facilitate collaboration among researchers, academics, professionals, and the local community interested in the ecclesiastical-historical heritage. This would create a network for collaboration and knowledge exchange to protect, preserve, and promote the heritage.
- Touristic cultural heritage tours to enhance the overall experience and appreciation of the ecclesiastical treasures for tourists, utilizing various digital or social platforms.
- Theft Prevention Measures: Ensuring the safety and security of ecclesiastical treasures is of paramount importance. The NARRATE platform can play a crucial role in implementing theft prevention measures. It can incorporate advanced

security features such as access control, authentication protocols, and encrypted data storage to safeguard the digital assets. Furthermore, it can provide guidelines and best practices for physical security measures at ecclesiastical sites, including the installation of surveillance systems, alarms, and secure storage facilities, to deter theft and unauthorized access. By implementing these tools and information within the NARRATE platform, the preservation and promotion of the ecclesiastical-historical heritage of the region can be greatly enhanced while ensuring safety against theft and unauthorized access.

- Social media, Phone applications etc.
- Studies can be conducted on religious historical heritage structures in rural areas that are not widely known.
- The project should be planned with a model of a field survey.
- The environments in which the objects are located should be monitored
- Determine preventive protection methods based on parameters such as humidity and light intensity. Prioritize Preventive Protection work, as creating and implementing preventive protection and periodic maintenance plans will reduce the need for larger conservations
- Introducing the works, determining and documenting their functions. Determining why the works are important and their significance and place in future common heritage value.
- Upgrade equipment and available resources.
- Establishing contact and acquaintance with the priests of each church in Constantinople and elsewhere, where Orthodox churches are located in Europe, Asia, and America.
- The preservation of ecclesiastical treasures within the church itself.
- Establishment of a Scientific and Relevant Clerical Committee to oversee and monitor all necessary actions.
- Emphasize respect to the heritage and its history.
- Design website for access by interested people and researchers. Create a catalogue and a data bank. Develop applications.
- Create a cultural heritage scientific committee and establish an institution for ecclesiastical treasures with dedicated departments for conservation/restoration and education.



#### WP2-R2.5. Production of a framework for best practices

- Raise awareness through seminars, conferences, and workshops to promote the significance of cultural heritage and its preservation.
- To protect the works, exhibit them and raise awareness among people, information can be shared on platforms such as YouTube.



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### 3. Design of NARRATE Framework

#### 3.1 Data Models and Reference Ontologies

The data models and reference ontologies of the NARRATE framework will be based on the CIDOC<sup>4</sup> Conceptual Reference Model (CRM), a widely used tool for information integration in the domain of cultural heritage. Based on the needs analysis concerning the documentation of ecclesiastical treasures, we performed a matching of the needs analysis with the entities available in the CIDOC CRM, as summarized in Table 1.

*Table 1. Matching of needs analysis with the entities of CIDOC CRM*

<b>Needs Analysis (Item description)</b>	<b>Related Category</b>	<b>CIDOC CRM Entity</b>
The name of the ecclesiastical treasure	Name of ecclesiastical treasure	E35 Title
Instructions for creating a new code for each object	Name of ecclesiastical treasure	-
The name of the ecclesiastical treasure translated in Greek, Bulgarian, Turkish	Name of ecclesiastical treasure	E56 Language
Have more than one name for the ecclesiastical treasure	Name of ecclesiastical treasure	E41 Appellation
Include the existing code for the ecclesiastical treasure (if any)	Name of ecclesiastical treasure	E42 Identifier
Will not have a word limit	Description of ecclesiastical treasure	-
A short and an extended version	Description of ecclesiastical treasure	-
Different descriptions according to the different profiles of users	Description of ecclesiastical treasure	-
Will include photos and specifications for the image creation, e.g., image resolution	Description of ecclesiastical treasure	-
Information about the time span	Description of ecclesiastical treasure	E52 Time-Span
Information about its kind	Description of ecclesiastical treasure	E55 Type
Information about its creator	Description of ecclesiastical treasure	E71 Human-Made Thing
Information about its beginning of existence	Description of ecclesiastical treasure	E63 Beginning of Existence

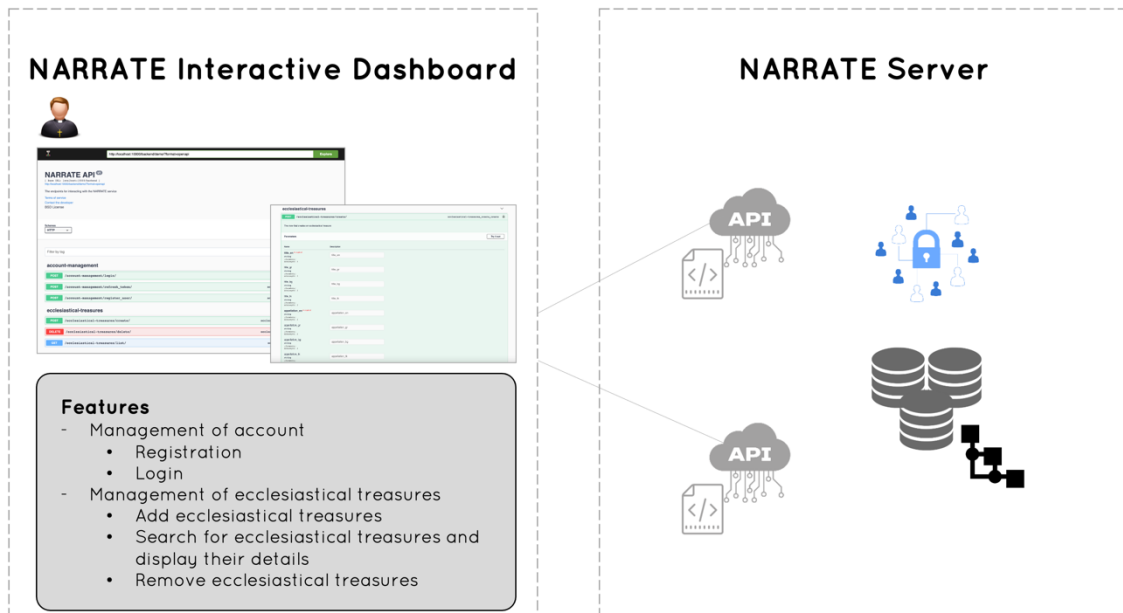
<sup>4</sup> CIDOC Conceptual Reference Model - <https://www.cidoc-crm.org/>



Information about its biography (e.g., if it was initially in a church, in another country, if it was lost and found, etc.)	Description of ecclesiastical treasure	-
Information about its dimensions	Description of ecclesiastical treasure	E54 Dimension
Information about the materials it was created	Description of ecclesiastical treasure	E57 Material
Information about its inscriptions	Description of ecclesiastical treasure	E34 Inscription
Information about its content, e.g., the text of a manuscript	Description of ecclesiastical treasure	E73 Information Object
information about pertinent religious events or rituals, e.g., litanies	Description of ecclesiastical treasure	E5 Event
Information about its previous documentation/s	Previous documentation	-
Information about its relevant bibliography	Previous documentation	-
Information about its state of preservation	Preservation – conservation status	E14 Condition Assessment
Information about its conservation. We will include photos before and after its conservation.	Preservation – conservation status	E11 Modification
Information about the group of objects it belongs	Group of objects	E74 Group
Information about the collection it belongs	Group of objects	E78 Curated Holding
Information about more than one piece of the ecclesiastical treasure	Group of objects	-
Information about its place in the church or a museum	Position	E53 Place
Information about the people that help with the object's documentation	Data administration	-

### 3.2 Conceptual Architectural Design

The NARRATE framework is illustrated in Figure 2. At a high-level, the framework consists of two main components: *i)* the NARRATE interactive dashboard, and *ii)* the NARRATE server. The interactive dashboard is the main source of user interaction and is responsible for facilitating the management of ecclesiastical treasures in terms of cataloguing and discovery. The server is a Web application that exposes the implemented endpoints through which users can interact with and exchange data.



*Figure 2: High-level conceptual architecture of NARRATE framework*

The architecture of the NARRATE server-side Web API is illustrated in Figure 3. The server-side Web API is implemented in Python 3.10.8, using the Django REST Framework, which is an open-source Python and Django library used for building Web APIs. Furthermore, NGINX is used for the deployment of the server-side Web API. NGINX serves as a versatile Web server, which could also be used as a reverse proxy and load balancer. Additionally, we use the Gunicorn application server, which translates the HTTP requests into something Python can understand. Gunicorn implements the Web Server Gateway Interface, which is a standard interface between Web server software and Web applications.

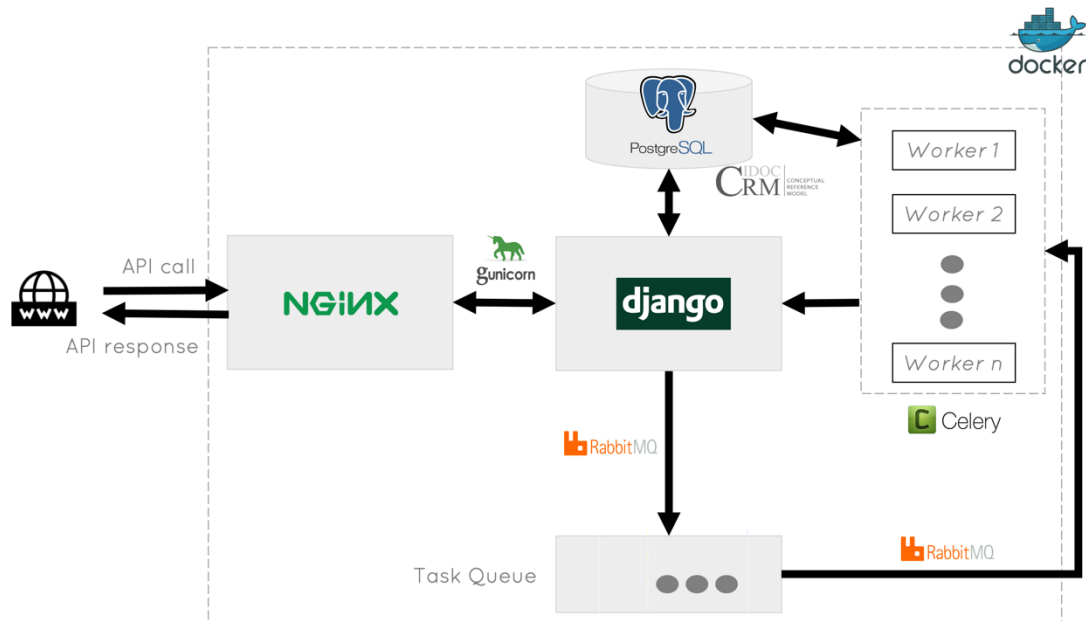


Figure 3: NARRATE server architecture

For certain time-consuming or blocking tasks (e.g., sending emails with account verification during user registration), ideally we would like the request and response cycle to be fast. To address such time-consuming or blocking situations, we employ the Celery asynchronous task queue, which is based on distributed message passing. Celery requires an external solution to send and receive messages. For this purpose, we also use RabbitMQ, which is an open-source message-broker software that implements the Advanced Message Queuing Protocol.

For the storage of the data, PostgreSQL is used, which is an open-source relational database management system. The database tables are implemented by considering the CIDOC conceptual reference model, which is widely used for information integration in the area of cultural heritage. Last, we use Docker platform for easily packing, shipping, and running our Web API as a lightweight, portable, and self-sufficient container.

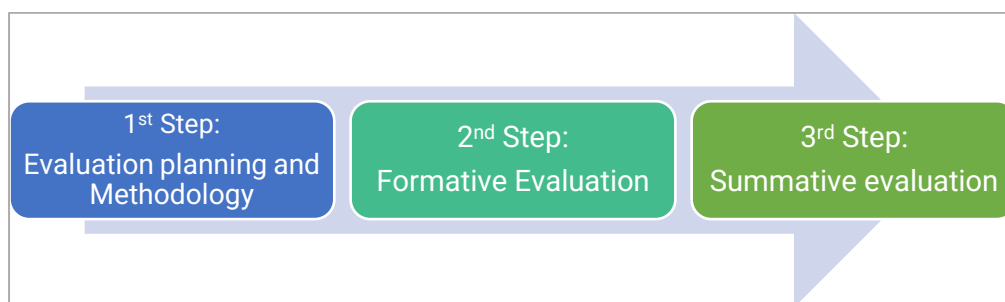
## 4. Planning and Designing the Evaluation Methodology of NARRATE framework

### 4.1 Overview of Evaluation Methodology

Formative evaluation is essential to ensure that the NARRATE framework effectively captures and preserves cultural ecclesiastical information while meeting the needs of its users. It is a crucial step that occurs in the development process, helping to identify issues and make improvements before this framework is finalized.

The Summative Evaluation (to be conducted by the end of the project) is a comprehensive assessment determining the NARRATE project's overall effectiveness, success, and impact. Its results are expected to help the involved stakeholders understand whether the project achieved its goals and objectives.

Schematically, the 1<sup>st</sup> step of our Formative and Summative Evaluation is to create and establish the proper evaluation methodology. The 2<sup>nd</sup> step includes the Formative Evaluation (FE) that will take place in the upcoming months and the 3<sup>rd</sup> step that concludes the evaluation assessment is the Summative Evaluation (SE).



*Figure 4: Schematic representation of the Formative and Summative Evaluation Study of NARRATE project*

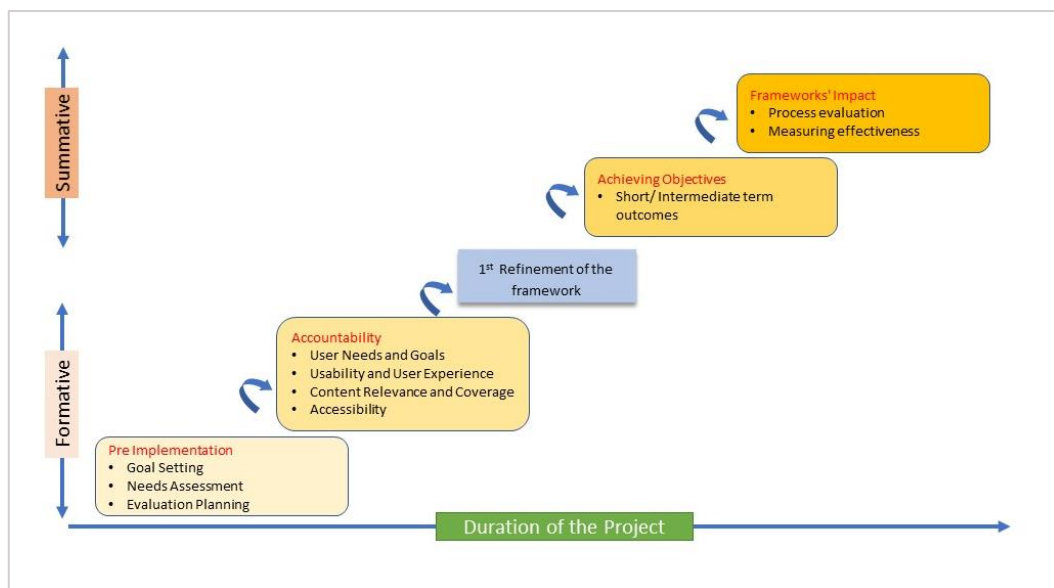
In the following paragraphs, the methodological framework for Formative evaluation is analysed. The assessment findings of this evaluation are expected to identify possible shortcomings and therefore will help on making improvements regarding the framework developed by NARRATE. Summative evaluation that will be performed by the end of the project will document the effectiveness of the project.

#### 4.1.1 Formative and Summative Evaluation Study of NARRATE

The major difference between Formative and Summative Evaluation is that FE focuses on the improvement of the process (in our case the creation of the NARRATE framework) while SE focuses on the results and impact of the produced framework. Thereupon, formative assessment for NARRATE will be conducted during the creation and the development process as it will provide useful information that we can use in order to make the appropriate changes in the operation and implementation of the NARRATE framework. Typically FE is conducted early in the life cycle of a process, hence data collection should occur before and during the process of creating the framework.

Summative Evaluation on the other hand, focuses on the framework's impact and its results. In consequence, it should be conducted later in the life cycle of the project, when possible shortcomings have been resolved, thus it can provide evidence about the effectiveness of the NARRATE framework.

Figure 5, shows the proposed implementation of Formative and Summative Evaluation through the life cycle of the NARRATE project.



**Figure 5:** Implementation of the Formative and Summative Evaluation through the life cycle of the NARRATE project

## 4.2 Formative Evaluation

The first crucial step of the NARRATE FE is to define properly the project's objectives and the criteria against which its success will be measured. These criteria should be specific, measurable, and relevant to the project's goals. Hence, before deciding what types of data are needed (qualitative or quantitative) as an input for the FE, and from whom they are going to be collected (stakeholders, end-users etc), we need to clarify what specific problem the NARRATE project addresses.

The NARRATE project's goal is to codify the actual recording and documentation needs for the ecclesiastical cultural treasures, through a systematic study of the users' needs. NARRATE framework will be a comprehensive and unified tool for extracting information, gaining access and actively involving in the process of exposing the ecclesiastical treasures to their owners themselves – clerics of the church, other church officials and museum workers. All of them in one way or another are responsible and have at their disposal various types of ecclesiastical treasures.

As the emphasis is on documenting ecclesiastic CH treasures in ways that will enable stakeholders to 'narrate' their intertwined histories, functions, and spiritual importance throughout time, the focus group of NARRATE project is the stakeholders themselves, not the end-users that will find information for ecclesiastical CH through the NARRATE framework. With the proposed project, we will empower people who manage, or possess ecclesiastical cultural treasures, to communicate their needs. Therefore, the Formative Evaluation should be addressed to them.

### 4.2.1 *Evaluation criteria overview*

Four major areas that define the quality, effectiveness and usefulness of an on-line framework that can record and codify ecclesiastical cultural treasures based on users' needs can be summed up as follows:

1. User Needs and Goals
2. Usability and User Experience
3. Content Relevance and Coverage
4. Accessibility

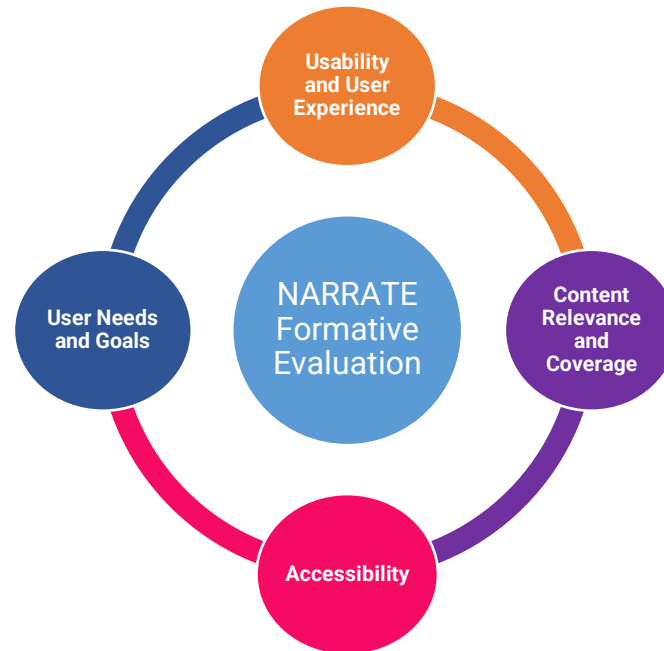


Figure 6: Quality, effectiveness and usefulness evaluation criteria of FE

Methodologically, FE of the NARRATE project will be conducted by evaluation questions. The evaluation questions are expected to collect data in order to understand the project's intention and focus on the aforementioned assessment criteria.

#### 4.2.2 User Needs and Goals

The set of questions regarding the User Needs and Goals criteria are widely covered by the user-centered surveys conducted under the Activity 2.2: *Needs Verification with Key Stakeholders from the Ecclesiastical Domain* of WP2 of the NARRATE project. The user-centered surveys that were performed in the three participating countries (Greece, Bulgaria, Turkey) include all the necessary information for the FE with a series of evaluation questions such as:

- What are the primary goals, the specific needs and expectations of users when documenting ecclesiastic cultural treasures?
- What kind of information is needed for a digital description of the church valuables?
- Which are the movable church valuables that should be digitized?
- How would you prefer the form of representation of ecclesiastical-historical valuables to be?
- For what purposes would you use the future NARRATE project site?

### 4.2.3 Usability and User Experience

The set of questions to be asked in order to assess whether the usability characteristics of the NARRATE framework are appropriate and satisfactory, should provide an overall assessment of the users' experience. These questions should offer an insight into the practicalities in relation to a system's user-friendly characteristics such as clarity, simplicity, responsiveness, and unobstructed use. Moreover, evaluation questions of user experience should offer insight into the efficiency, the lack of (system) errors, and learnability (if applicable). These aspects, though, fall into the Summative Evaluation process, so the related questions should be adjusted accordingly for the Formative Evaluation. Some sample questions to be used for this evaluation criteria:

- Are users able to easily navigate and understand the documentation process?
- How easy was it to create an account?
- How easy was it to identify where to put your information related to the object being documented?
- Did you encounter problems (system errors, slow response, unfinished uploading) when registering your object?
- Is the tool's interface intuitive and user-friendly for individuals with varying levels of technical expertise?
- How easy is it for users to complete specific tasks or achieve their goals within the framework?
- Are there any obstacles or frustrations users encounter during their interaction?
- What improvements can be made to enhance the overall user experience?
- Do you think you learned/acquired some general knowledge after visiting the NARRATE website?
- Did your visit in the NARRATE website help you to learn how to look for information of other ecclesiastical treasures?

### 4.2.4 Content Relevance and Coverage

The relevance&coverage criteria ensure that the NARRATE's content stays relevant with reference to yield meaningful and useful results. Some sample questions to be used for this evaluation criteria:

- Does the tool cover a broad range of cultural documentation needs, including language, history, traditions, and artifacts?



- Are there any gaps in the types of ecclesiastical cultural information the tool can capture?

#### 4.2.5 Accessibility

The final criterion should refer to a specific accessibility issues that would ultimately improve the overall accessibility level of the NARRATE framework and will make the user's experience even easier from start to finish.

- Is the tool accessible to users with disabilities, ensuring that everyone can contribute to ecclesiastical cultural documentation?
- Does it support multiple languages and cultural contexts?
- Is the tool user-friendly for individuals with varying levels of technical expertise?

### 4.3 Summative Evaluation

The Summative Evaluation of the NARRATE project will be designed to assess the project's overall effectiveness, success, and impact in achieving its goals and objectives. It will focus on collecting insights into the long-term impacts, sustainability, and success of the framework, particularly in relation to how well the NARRATE repository addressed the documentation and engagement needs for ecclesiastical cultural treasures. The methodology for the SE will be developed with careful attention to the project's focus on the stakeholders and the broader goals of the NARRATE initiative.

#### 4.3.1 Summative Evaluation criteria overview

In order to properly measure the success of the NARRATE framework, five measurable evaluation criteria were defined based on the project's goals. These criteria focused on:

- **Usability:** The ease with which stakeholders could use the NARRATE framework to document ecclesiastical cultural treasures.
- **Accessibility:** Whether the framework was accessible to all relevant stakeholders, including church officials, clerics, and museum workers.
- **Functionality:** How well the NARRATE framework performed its intended functions of extracting and accessing information about ecclesiastical treasures.
- **User Satisfaction:** The satisfaction of the stakeholders in using the NARRATE repository, particularly in terms of meeting their documentation and engagement needs.

- Engagement: The extent to which stakeholders actively participated in the process of documenting and sharing information about ecclesiastical treasures.



Figure 7: Quality, effectiveness and usefulness evaluation criteria of SE

In contrast to the FE, which primarily focuses on usability, accessibility, functionality, and user satisfaction, the SE introduces a fifth key element: user engagement with the NARRATE repository. This addition will be critical in understanding not only how stakeholders interact with the platform but also the extent to which they actively participate in documenting and sharing ecclesiastical cultural treasures.

The FE mainly assesses whether the NARRATE repository was functional, accessible, and met user needs. However, for the SE, it is important to go beyond these technical and usability aspects and measure the actual level of engagement from stakeholders, particularly how they interact with the platform and whether they find value in contributing content. This shift in focus is necessary because the NARRATE project's primary audience consists of clergy and non-clergy community that are expected to take an active role in documenting and sharing their ecclesiastical treasures. Therefore, measuring engagement is key to determining whether the project succeeded in fostering participation among its target audience.

## 4.4 Prospective Participants

A number of 50 (formative evaluation) and 100 (summative evaluation phase) stakeholders from the participating countries of NARRATE project are envisaged to contribute in total. In particular, through the formative evaluation phase we aim to address 20 stakeholders from clergy and non-clergy groups in Greece, 20 in Bulgaria and 10 in Turkey.

## 4.5 Ethics and Consent forms

Consent forms and Information sheets will be used following a template similar to the ones that were created for the survey participants.

### 4.5.1 Information Sheet



## INFORMATION SHEET

**Project title:** Needs for Digital Recording and Documentation of Ecclesiastical Cultural Treasures in Monasteries and Temples – NARRATE. (2022-1-EL01-KA220-HED-000089867)

**Project Coordinator:** Aristotle University of Thessaloniki (AUTH)

**Funding Organisation:** European Commission Erasmus+ programme

### Names of the coordinators of the research from AUTH:

Efstratios Stylianidis

email : [sstyl@auth.gr](mailto:ssstyl@auth.gr)

Tel: 2310-995973

Address: Aristotle University of Thessaloniki

Faculty of Engineering

School of Spatial Planning and Development

Laboratory of Geoinformatics

University Campus

54124 Thessaloniki

Greece

**Data Protection Officer (DPO):** [data.ptotection@auth.gr](mailto:data.ptotection@auth.gr)

## Important Information

You will be given information on the research to be conducted within NARRATE and you will be invited to take part in the study. Your participation is voluntary.

NARRATE is an EU Erasmus+ project which aims to codify the actual recording and documentation needs for the ecclesiastical cultural treasures, through a systematic study of the users' needs. With the proposed project, we will empower people who manage, or possess ecclesiastical cultural treasures, to communicate their needs. In the framework of the project, a questionnaire survey will be implemented to identify and provide stakeholders' opinions on the needs and priorities concerning ecclesiastical CH documentation.

You can talk about this study and the consent form with other people such as family/friends/or whoever you feel comfortable with. You do not have to decide right away. You can decide whether you want to take part in the study after you have thought/discussed this.

There may be words you do not understand or some things you would like for me to explain to you in detail. You can stop anytime and ask questions.

### Why are we conducting this study?

The EU Erasmus+ "NARRATE: Needs for Digital Recording and Documentation of Ecclesiastical Cultural Treasures in Monasteries and Temples" (2022-1-EL01-KA220-HED-000089867) aims at identifying and promoting the needs and priorities concerning ecclesiastical CH documentation.

The current study is being performed to codify the actual recording and documentation needs for the ecclesiastical cultural treasures, through a systematic study of the users' needs. NARRATE reflects an emphasis on documenting ecclesiastic CH treasures in ways that will enable stakeholders to narrate their intertwined histories, functions, and spiritual importance throughout time. The objective of this survey is to collect insights on your opinion on ecclesiastical treasures, your current experience with ecclesiastical CH documentation and what do you expect from a digital platform that could help to preserve and promote the ecclesiastical-historical heritage of your region.

The information collected during the survey that will be implemented will be used to develop a digital ecclesiastical platform customized to end users' needs, avoiding unnecessary design and increasing its acceptance.

### Why are we requesting your participation?

You have been invited to take part in this survey because you are a person who manages, or possesses ecclesiastical cultural treasures. Your participation in this survey will help the consortium understand how a digital ecclesiastical platform can be designed and developed in order to successfully meet the needs of its users.

### **Do I have to do this?**

You do not have to take part in the study if you don't want to. Even if you say "yes" now, you can change your mind later and pull out of the study at any time.

### **What will this cost me?**

Your participation in the survey does not involve any cost.

### **What will happen if you take part in the study?**

If you accept the invitation, you will be asked to fill in a 10-minute questionnaire about your current experience with ecclesiastical CH documentation and what do you expect from a digital platform that could help to preserve and promote the ecclesiastical-historical heritage of your region. You may choose to not answer to any question that you do not feel comfortable with.

### **What kind of data will be collected?**

The questionnaire collects information through hard copy and/or electronic submission in a properly formatted form using the "limesurvey" software. Apart from your views on ecclesiastical CH documentation we will collect some personal data namely:

- Your position/work
- Your technological literacy

### **Is this bad or dangerous for me?**

There are no risks involved in this study.

### **Will this be beneficial for me?**

By participating in this survey, you will be contributing towards the development of a digital ecclesiastical platform which will meet your needs and you may benefit by using it as a person who owns or manages ecclesiastical treasures.

### **Will you inform me on the conclusions?**

When the research is finished, the results will feed in the development of the NARRATE platform. If you wish you may be invited to the following project activities where you may participate in the forthcoming Workshops and Webinars.

### **Can I choose not to be part of this study? Can I change my mind?**

Your participation is not forced. You can stop the research at any time if you wish.

During the survey, if you change your mind, you may not submit your answers. In this case your answers will not be saved.

Consent is provided for 24 months.

## Data managing

After submitting your answers, for the purposes of the research, the verification of your identity is not required by those responsible for the processing of your personal data. As a result, the latter are not obliged to obtain, or retain or process additional information to verify your identity. Consequently, you may not exercise the following rights: a) the right of access to your personal data, b) the right of correction, c) the right of deletion, d) the right of restriction of processing, and e) the right of data portability in accordance with the General Data Protection Regulation.

If you have any questions about your rights, you may contact the Scientific Coordinator by sending an email to [ssyl@auth.gr](mailto:ssyl@auth.gr) or phone at 2310-995973.

**If you finally decide that you would like to take part in the study, you may save a copy of this document.**

4.5.2 *Consent Forms*



**CONSENT**

**NARRATE:** Needs for Digital Recording and Documentation of Ecclesiastical Cultural Treasures in Monasteries and Temples – NARRATE. (2022-1-EL01-KA220-HED-000089867)

I the undersigned .....

I declare that:

- I have been adequately and comprehensively informed by .....  
(*Name and position/area of responsibility of the researcher*) for the purposes of the research in which I will participate and which is part of the research project **NARRATE:** related to 74068 code attributed by ELKE.
- I have been adequately and comprehensively informed about the method and sources of the research financing.
- I have been adequately and comprehensively informed about what my participation in this research entails. In particular, I have been informed of all the rights and obligations I will have as a participant in the research comprising the obligation of confidentiality (if the latter is required).
- I have been adequately and comprehensively informed about any positive or directly negative, short-term or long-term consequence my participation in this research is expected to have concerning me or in relation with third parties.
- I have been adequately and comprehensively informed about how my personal data related to this research is processed and protected.
- I have been adequately and comprehensively informed about the provision and proper use of the devices (If applicable) that I will use during my participation in this research.
- I am aware of the fact that my participation is voluntary and that I can withdraw my participation from the research at any time for any reason and without any impact on me (as well as of the fact that the same applies to the person I represent).



- I know the Head of the research to whom I can address to withdraw my participation from this research or to notify any potential problem that might arise during my participation or after the completion of this research.
- No pressure was exerted to me and I was given enough time to think and decide.

**I consent to participate in the above research.**

**I consent that the Participant [Full Name] for whom I constitute the Legal Guardian takes part in the above research.**

**Participant's Signature: \_\_\_\_\_**

**Legal Guardian's signature:**

**Date: \_\_\_\_\_**

**day/month/year**



## WITHDRAWAL OF CONSENT OF THE PARTICIPANT

**NARRATE:** Needs for Digital Recording and Documentation of Ecclesiastical Cultural Treasures in Monasteries and Temples – NARRATE. (2022-1-EL01-KA220-HED-000089867)

I the undersigned .....

hereby withdraw my consent concerning my participation/the participation of my child/the participation of the person for whom I constitute the legal guardian in the research study **NARRATE**, which I had given on \_\_\_\_/\_\_\_\_/\_\_\_\_

\_\_\_\_\_  
*Signature of the participant*

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_  
*day/month/year*

\_\_\_\_\_  
*Full name*

## 5. Conclusions

The purpose of this report is to delineate the best practices for documenting church heritage using new technologies. Additionally, it aims to expound on the methodology employed in the design and development of the initial version of the NARRATE framework.

This includes the formulation of data models and reference ontologies that describe ecclesiastical cultural treasures based on a semantic metadata description, as well as the architectural design of the NARRATE framework, which will include the server-side Web Application Programming Interface. Finally, this report presents the methodology for the formative evaluation user study of the NARRATE framework.

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