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"Human" Technology in the Digital Era: Freehand Images and Analysis of Cultural Heritage – The Know-how and Its Applications

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WELCOME TO OUR COMMON HERITAGE

The Presentation Structure

The Presentation Structure

1 **Introduction**: Structure of the Problem

2 **WHAT**: Freehand Image as an Engine of Conservation Analysis

3 **HOW**: Focusing the Eye (FtE) –– CCH-Focused Visual Analysis in Sketching

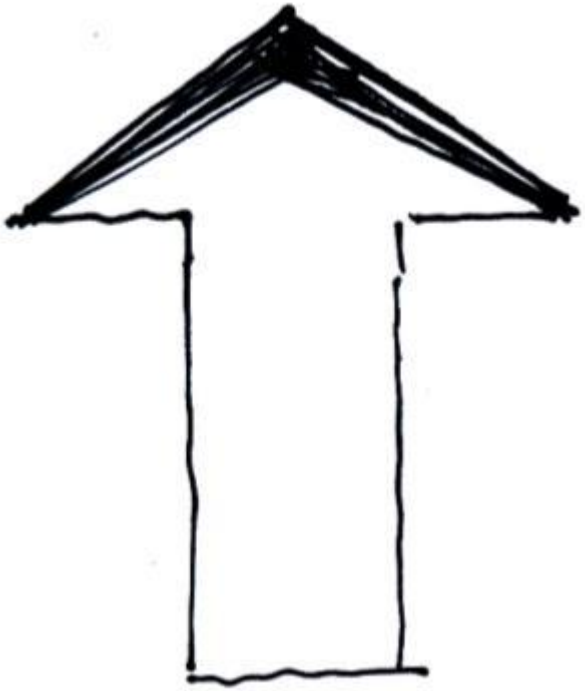
4 **WHO**: Accessibility of the Method, Its Uses and Application Examples

5 **Conclusions**

Abstract

Rapidly developing advanced methods and techniques often displace the traditional ones. But might such ***"traditional" perception of the "old"*** as hopelessly outdated cause us to overlook its intrinsic qualities?
Could a relevance for actual disadvantages be suggested, ***could a traditionally time-consuming technology be transformed into an effective one, with its original values preserved?***

Abstract (continued)

Advanced **methods and techniques**	***Traditional*** **methods and techniques**
	**Outdated**
Rapid development	
	?

Abstract (continued)

This paper:

- **reconsiders the role of *freehand sketching* in modern conservation of cultural heritage by *shifting the main focus from the result to the process***
- presents a ***method***, combined with the rapid learning methodology for achieving this traditional artistic ability, and
- ***examines its focused application to the visual analysis of cultural heritage by non-artist users***.

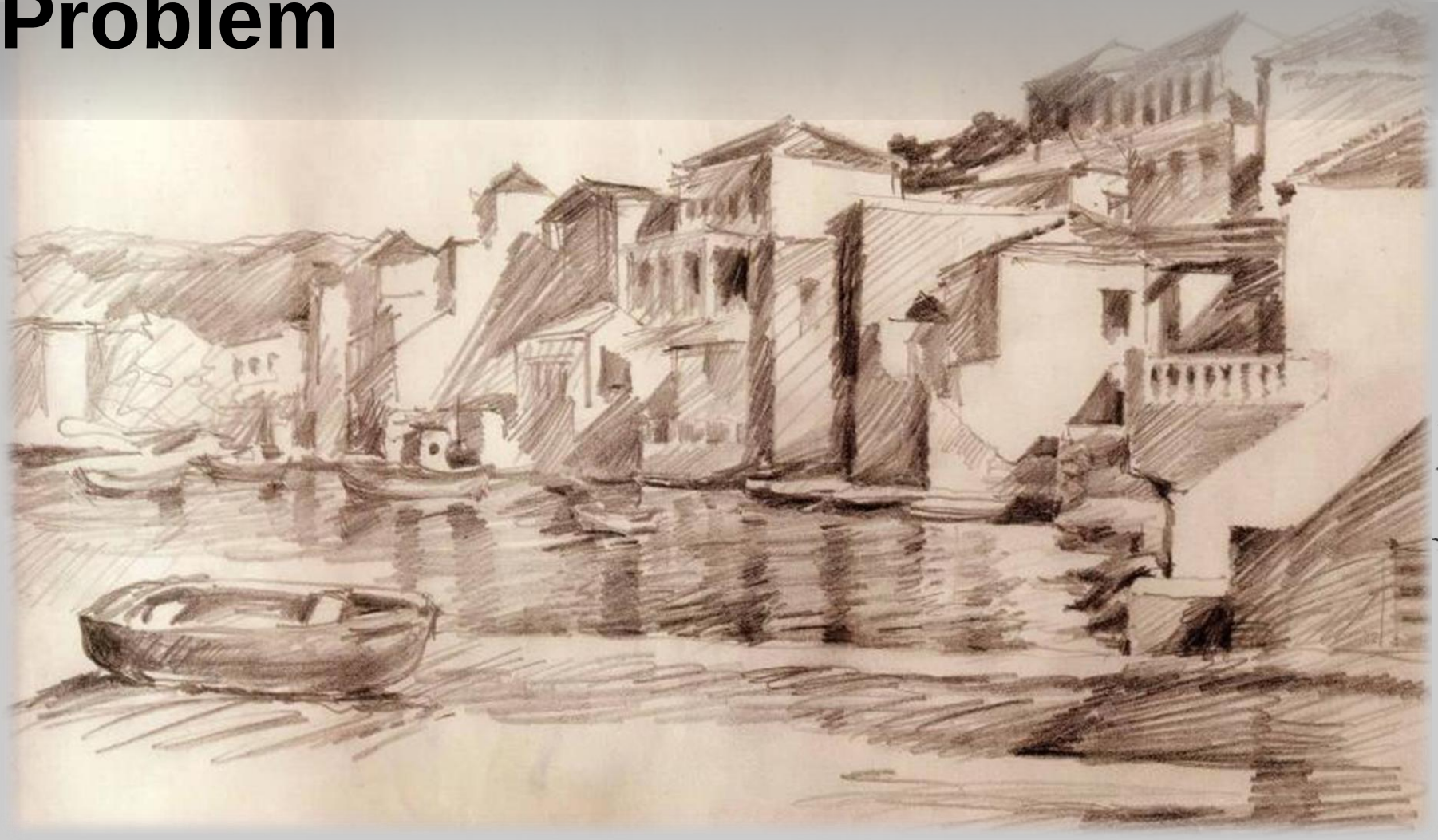
Abstract (continued)

The paper

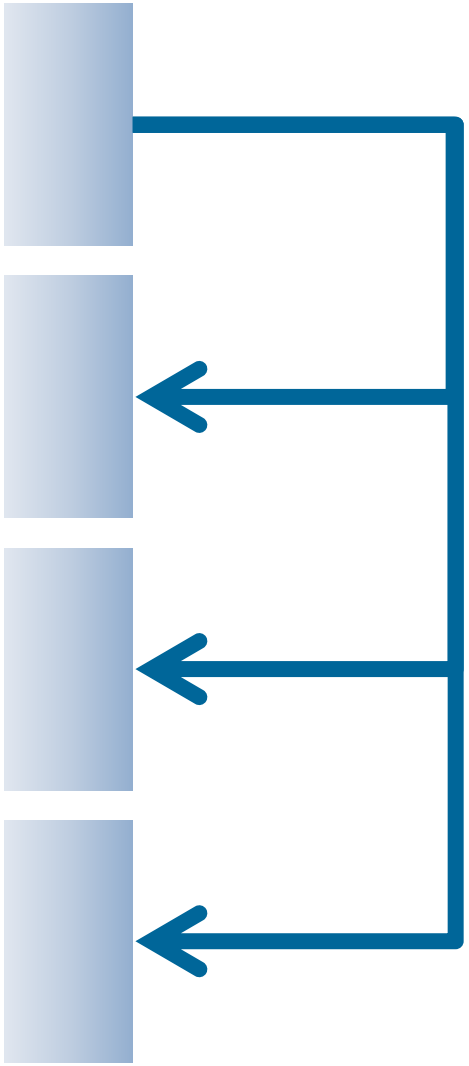
- ***demonstrates wide accessibility of the*** proposed ***method*** to the general public ***and*** conservation experts

- examines its uses in modern multi-and interdisciplinary conservation of built heritage through ***recent results of its application*** of the method in national and international projects.

1 Introduction: Structure of the Problem



- Reconsider the **role of *freehand sketching* in modern conservation of cultural heritage (CCH)**
- **Shift** the main **focus** from the ***result*** to the ***process***
- **FtE Method** (combined with the rapid learning methodology for achieving this traditional artistic ability)
- Focused application of the FtE Method to the **visual analysis of cultural heritage by non-artist users**.



Freehand images are traditionally associated with arts and art-related areas.

Sometimes, historic images are used as an auxiliary source of information about historic monuments.

However, active use of conservation-focused modern freehand image *is not part of the methods* presently applied to the contemporary conservation of cultural heritage.

Common assumptions which cause the exclusion of freehand images from conservation of CH :

A) The use of freehand methods **cannot produce precise and detailed results**, compared to images produced by the use of high-technology techniques;

B) Producing a freehand image is ***traditionally*** thought to be **time consuming**;

C) **Acquiring an acceptable skill in freehand sketching requires much time, effort and aptitude**, which reduces its application to a very limited number of experts.

Are these A-B-C assumptions real?

Let us cast a fresh analyzing glance at **the role of freehand sketching in the modern conservation of cultural heritage (CCH)**, and **focus on the following questions:**

What uses of freehand sketching and freehand images are relevant in the contemporary highly-technological field of conservation of CH;

How can they be applied;

Who can benefit from CCH sketches and sketching?

A-B-C assumptions focus on the outcome qualities, while they miss its ***purposes***.

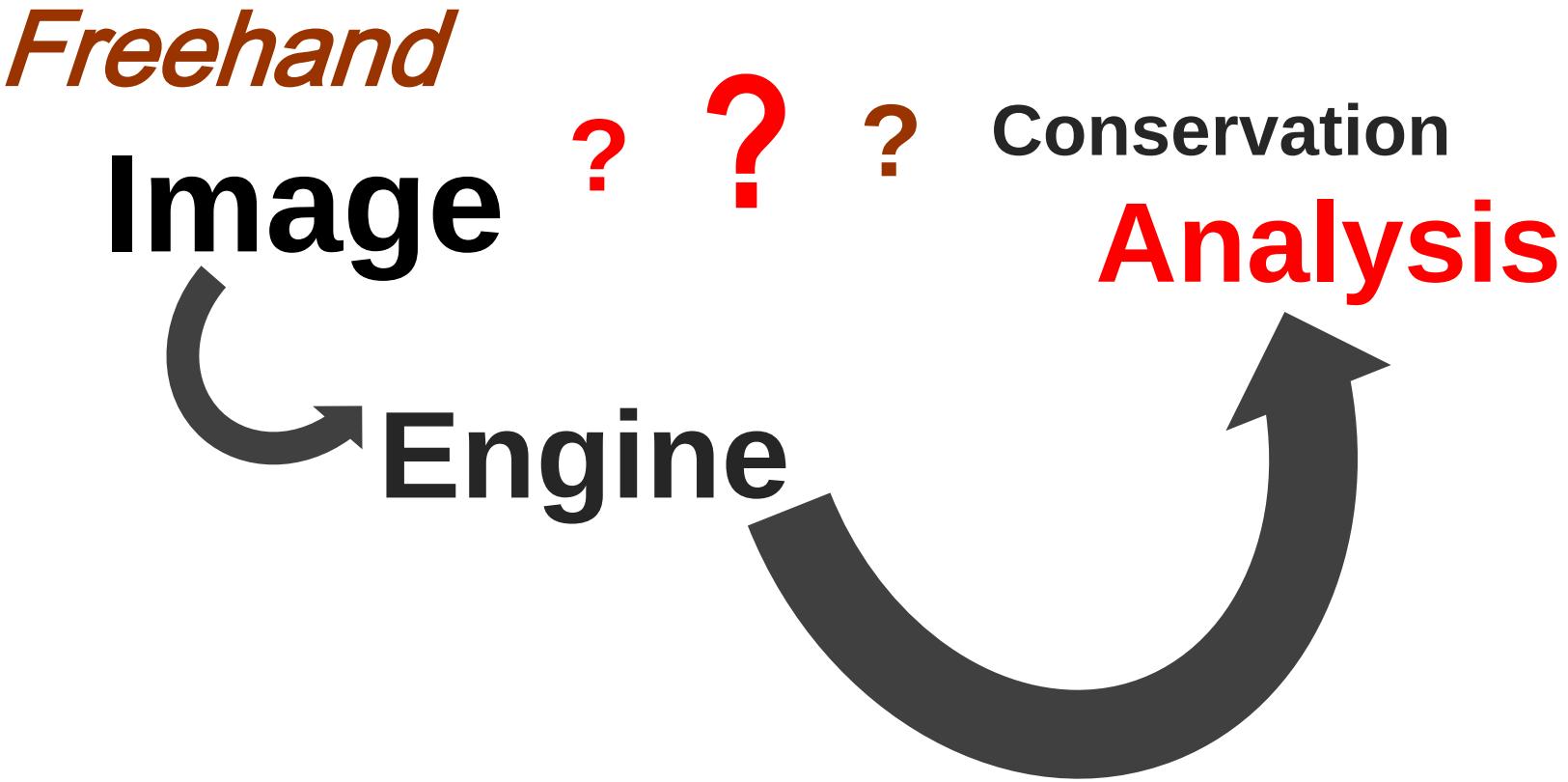
In this paper, the ***sketch*** (image) is approached as ***part of the sketching process***.

The paper presents the **method of "Focusing the Eye"(FtE)** on conservation-related data of each specific CH object. Combined with "Rapid Learning Methodology in Freehand Sketching" (RaLeMeFS), it can serve as a powerful **tool for the analysis of CH objects for conservation purposes**. The approach is based on methods initially developed, applied and introduced by the author in 2002, 2003, 2009 [1], [2], [3].

[FtE] + [RaLeMeFS] = [Visual Analysis Tool for CCH through Sketching]

2 WHAT: Freehand Image as an Engine of Conservation Analysis

2 **WHAT**: Freehand Image as an Engine of Conservation Analysis



Freehand Sketching and Conservation of Cultural Heritage

Past

- Freehand sketching and drawing were an integral part of architectural education,
- they were traditionally applied in conservation of built heritage].
- Architectural curricula produced the main heritage conservation expert force - conservation/ restoration architects, - and included a significant number of courses in drawing, painting and sculpture, with many sources available

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Freehand Sketching and Conservation of Cultural Heritage

Present

The important **development of advanced methods and techniques** for collection, processing and production of visual and multi-dimensional data has led to a wide **replacement of freehand techniques** in both architectural and engineering education, and in the field of recording and survey of historic buildings.

Freehand Sketching and Conservation of Cultural Heritage

However…

…the understanding of specific and unique values of freehand applications for architects, engineers and scientists is gaining more attention, and sometimes originates from the ICT community [9].

Moreover, recent developments in sketch-based modeling are opening new opportunities of integration of freehand sketches as free input in computer-aided design [14], [15], [16].

Freehand Sketching in CCH – Assumptions A-B-C

***Assumption A**: the use of freehand methods cannot produce accurate and detailed results*

Q ⇨ A

- accuracy can be achieved when a sufficient level of proficiency in sketching is achieved through the learning process [19].

Freehand Sketching in CCH – Assumptions A-B-C

***Assumption B**: producing a freehand image is time consuming*

Q ⇨ A indeed, it takes far more time to produce a free hand image than e.g. to take a photograph.

But what are the aims of each action?

Freehand drawing and precise imaging, produced with the aid of advanced technologies, differ by their driving forces.

Freehand Sketching in CCH – Assumptions A-B-C

***Assumption B**: producing a freehand image is time consuming*

Q ⇨ A

Advanced technologies provide a wide range of methods and equipment for data collection and multi-layer analysis, usually by means of pre-developed processes.

A freehand image has a first-hand connection with the brain of its human producer.

Freehand image is flexible and is produced through
the immediate contact,
reflection and reaction to the
experience,
perception,
knowledge and
understanding
of its maker in real time.

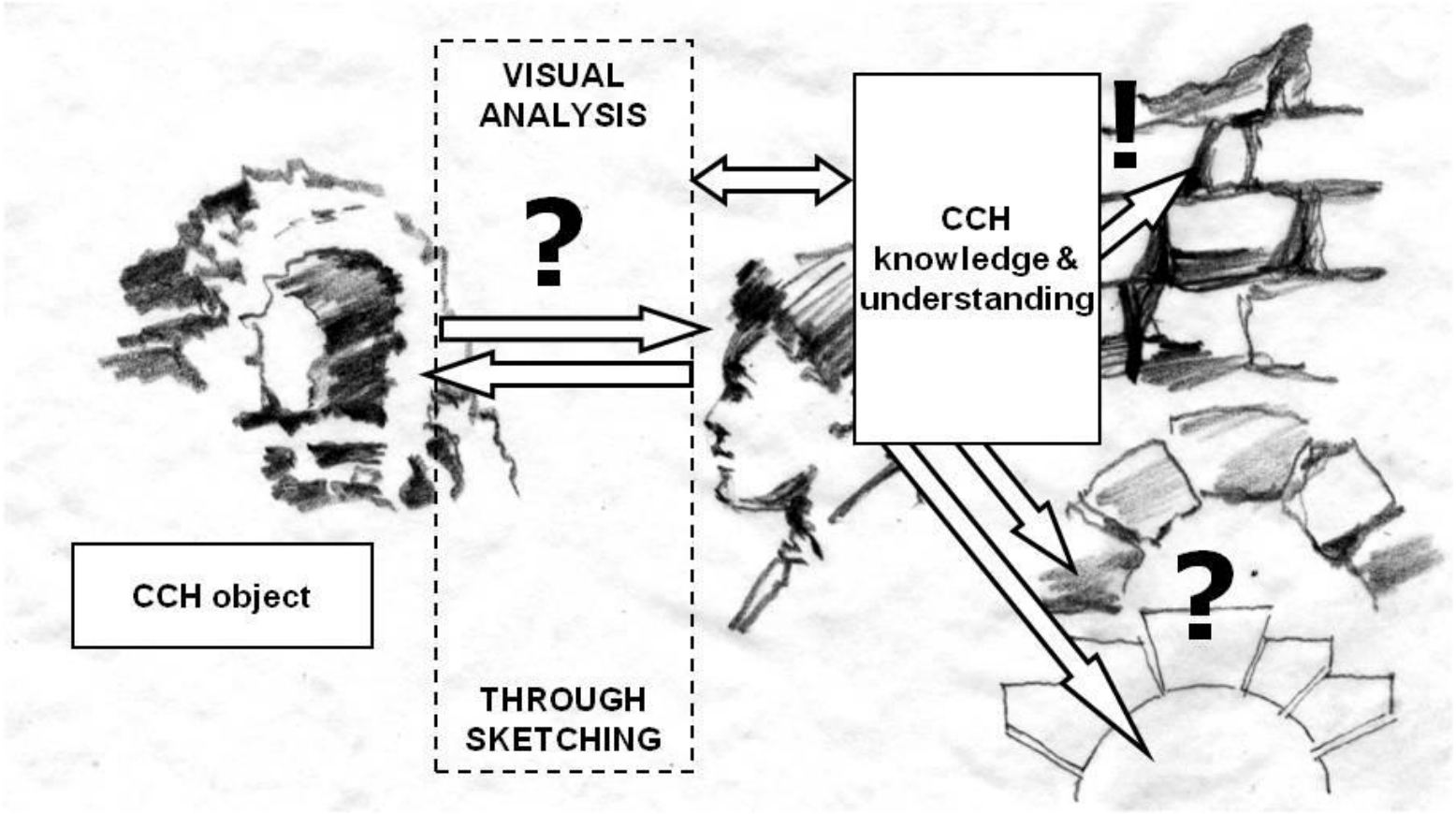

Fig. 1. CCH - targeted sketching process - visual analysis

In conservation of CH, **a freehand image is more useful for analysis and decision making** than for the accumulation of precise data. In many cases it is simply unnecessary to produce a detailed image which can be obtained by the use of advanced technologies. **A sketch serves as a self-focusing instrument for its producer**. Such a sketch should not be significantly time-consuming. In this context, the terms "**image**" and "**produce**" lose their original role, because the **main focus here is shifted *from the result to the process of understanding and analyzing.***

This is the major contribution of freehand sketching to CCH.

Major contribution of freehand sketching to CCH:

-------for analysis and decision making;

-------sketch as a self-focusing instrument for its producer

The main focus here **is shifted *from the result to the process of understanding and analyzing*.**

Freehand Sketching in CCH – Assumptions A-B-C

***Assumption C**: acquiring an acceptable skill in freehand sketching requires much time, effort and aptitude, which reduces its application to a very limited number of experts*.

Q ⇨ A

Solved: "Rapid Learning Methodology in Freehand Sketching" allows practically everybody to quickly acquire a sketching ability, and open up sketch-powered visual analysis to wide range of users within and beyond the heritage conservation community.

Different types of conservation-focused sketchers :

------- **Conservation experts**

------- **Sketchers not trained in conservation,** but who produce a sketch with a specific focus on its contribution to conservation of cultural heritage object

Different uses of freehand sketching by conservation-focused sketchers :

------Conservation experts
are capable of immediately understanding the conservation implications of their discoveries made through sketching.
------Major outcome: operational **conclusions**, enabled through sketching process, rather than the sketch itself.

Different uses of freehand sketching by conservation-focused sketchers :

------Sketchers not trained in conservation, who produce a sketch *with a specific focus on its contribution to CCH*
(cannot achieve full-scale conclusions resulting from their sketching process)

------ Major outcome: the sketch, produced through the process of understanding during sketching. Sketch should contain information useful for its subsequent analysis by a conservation expert.

The sketch presents a visual result of a preliminary analysis purposefully focused on conservation by a sketcher who is not a conservation expert

2 WHAT: Freehand Image as an Engine of Conservation Analysis

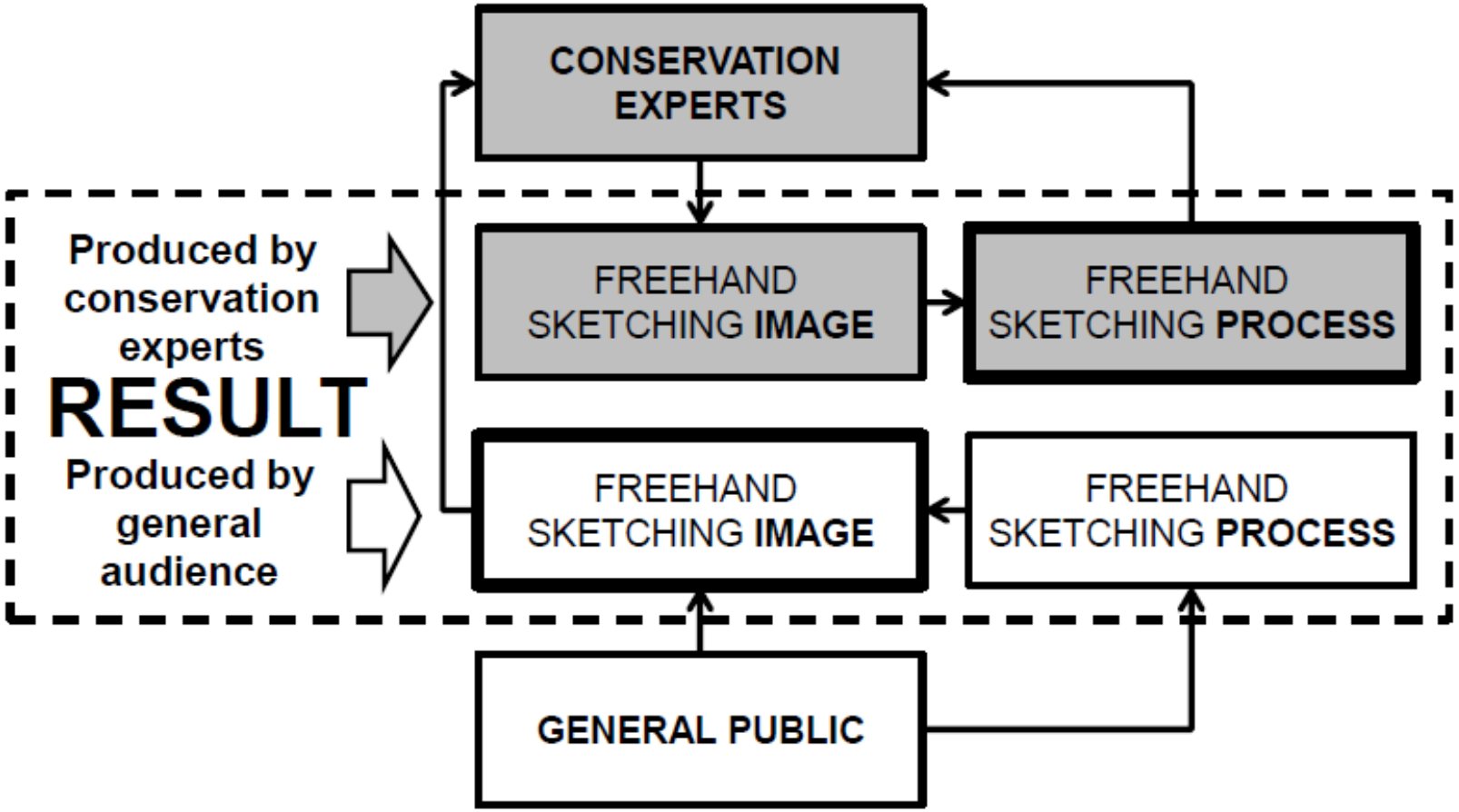

Fig. 2. Duality of sketching result: the image and the process. Direct and indirect use of sketching in CCH by conservation experts

3 HOW: Focusing the Eye (FtE) CCH-Focused Visual Analysis in Sketching

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"Focusing the eyes" of CCH sketchers should be undertaken before the start of their actual on-site sketching/analyzing of historic buildings.

2 skills, required from a sketcher for a successful representation for CCH:

- to perform an educated visual analysis of CCH objects
- to produce an image of a CCH object.

In order to produce a sketch of conservational analytical value

the sketcher's eyes and mind should be trained to capture the multilayered data on site

For a "non-conservation" sketcher (general public):

-------CCH focus should be formulated as simply as possible;

-------Focus definition should not overlook the essence of CCH,

Incl. the efforts to understand and preserve a unique complex of values of each heritage object; the efforts on its recovering (to possible limits) from deterioration and preventing further decay, through respect to authenticity, taking into consideration methodologies, principles and the development of criteria.

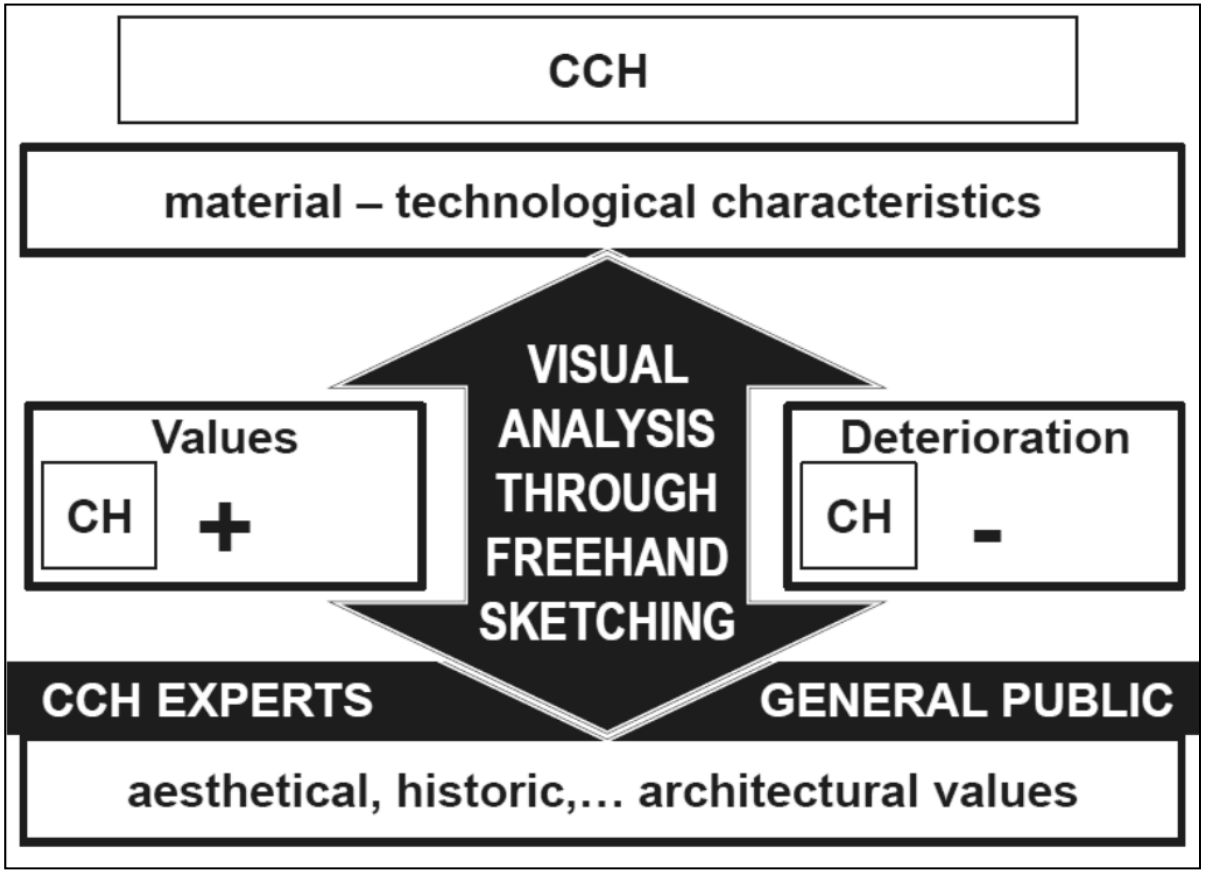

Fig. 3. Focusing the Eye: capturing the characteristics of both the values and the deterioration of CH

Both geometry and materials play an active role in solving contradictions frequently encountered on historic monuments, such as between the urge to preserve an architectural value of a building or a detail, versus its poor physical state. The difficulty of conservation decisions and interventions may be rooted in the fine geometry of an authentic detail and the inability to preserve it due to lost geometry of its present state, while geometry is lost through the loss of material, and possibly - the loss of structural stability.

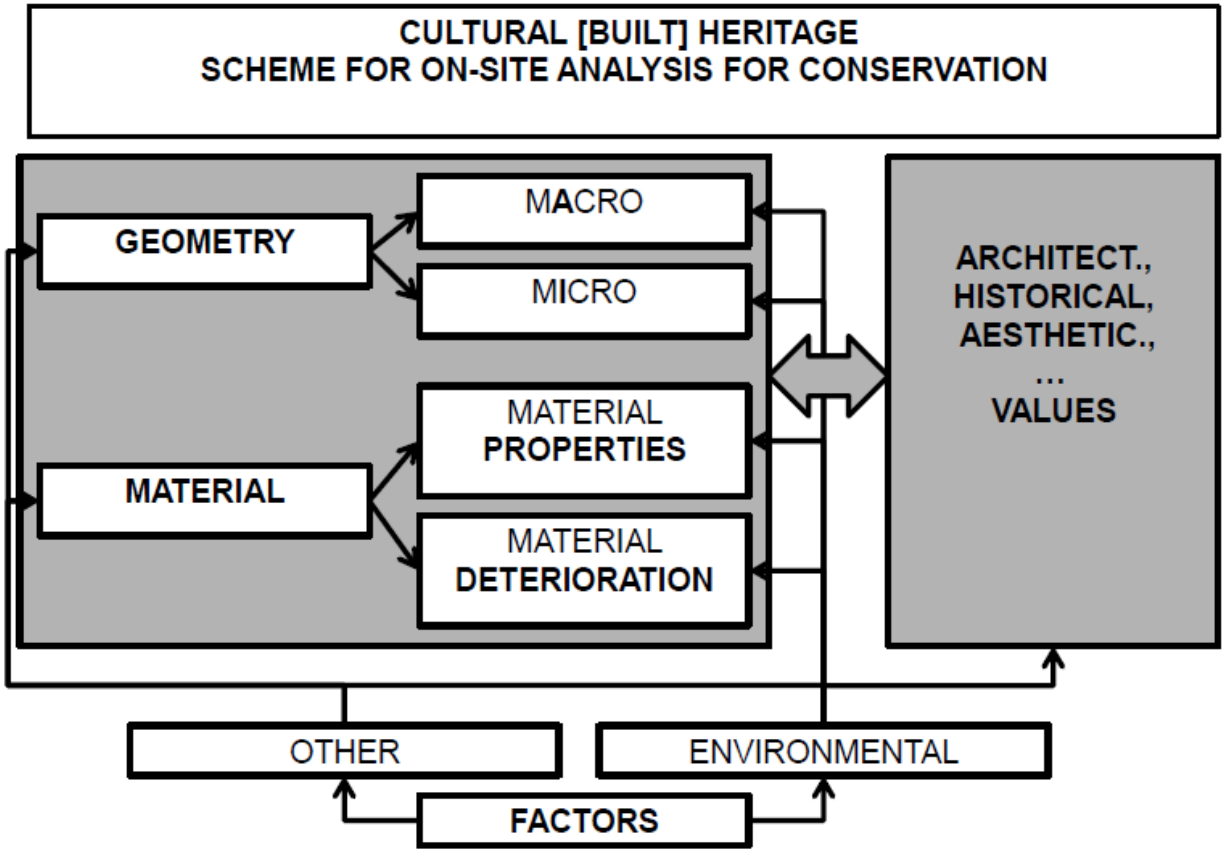

Fig. 4. Focusing the Eye: capturing the characteristics of both the values and the deterioration of CH - between geometry, material and environment

Simple scheme demonstrates the interconnection between environment, geometry and material, with regard to both the values and the deterioration, e.g. the original architectural choice of building material depends on its availability, and at the same time its original material properties predetermine its durability under specific environmental conditions (Fig. 4).

4 WHO:
Accessibility of the Method, Its Uses and Application Examples

“Human” Technology In the Digital Era: Freehand Images and Analysis of Cultural Heritage
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In order to sketch, a basic proficiency in freehand sketching is needed. The method is accessible to practically everybody, through the Rapid Learning Methodology in Freehand Sketching.

This section of the paper presents several examples of its application combined with FtE - “focusing the eye” on CCH, in three projects, with different types of participants:

Case study 1	**Conservation experts**
Case study 2	**High school students**
Case study 3	**Non-conservation architecture students**

4.1 **Case study 1:** the use of CCH freehand sketching by **conservation experts**

The use of CCH freehand sketching: a pilot learning experience at the sessions on "**Understanding cultural heritage through sketching – rapid learning methodology**" as part of the Training School, organized by COST i2MHB and the Fundación Santa María la Real del Patrimonio Histórico on its premises in Aguilar de Campoo in Spain, January 27-29 , 2016.

4.1 **Case study 1:** the use of CCH freehand sketching by **conservation experts**

Sketching sessions (2 hrs lecture and demonstration; home work; 2.5 hrs practical application on a historic site; 1 hr conclusion and analysis of results) were given by the author to a group of experts, MSc and PhD students from diverse areas of CH conservation.

Some participants came from a combined educational background in several areas, i.e. BSc., MSc., and PhD in different fields. Only a small number of participants were architects.

4.1 **Case study 1:** the use of CCH freehand sketching by **conservation experts**

Areas of expertise of the participants, within CH conservation:

history

economics

chemistry

sociology

art history

building pathology

electrical engineering

management

civil engineering

archaeology

architecture

4.1 **Case study 1:** the use of CCH freehand sketching by **conservation experts**

Questionnaires:

- **45%** of all participants had **"almost none" or "very little" experience** in freehand drawing, sketching or painting
- many **difficulties** were related to **capturing "perspective" and "proportions“**
- **50%** of the participants **with no or very little experience** in sketching wrote that **"everybody can learn to draw“**
- **72%** of all participants: sketching is useful for every expert in this field
- **86%** of all participants were **planning to use sketching in their main field of work (CCH)**

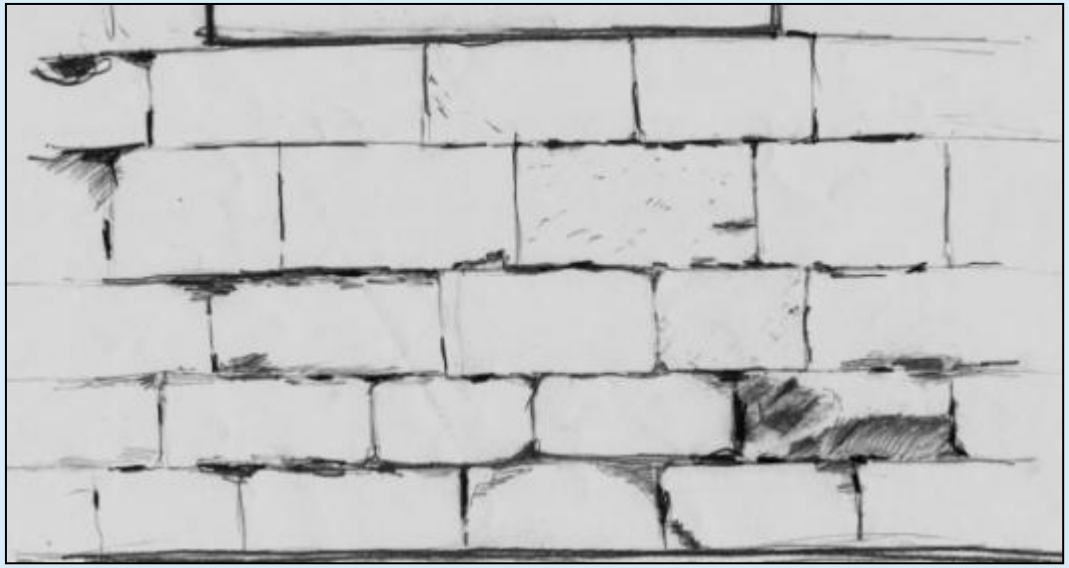
4.1 **Case study 1:** the use of CCH freehand sketching by **conservation experts**

Q:
"What can be the use of sketching in conservation of cultural heritage in general (if any?)“

A:
"To sketch what you do not see“

(the great value of **sketching as a tool for deepening the understanding and discovering the data which is often “invisible” to a non-sketching observer**)

4.1 **Case study 1:** the use of CCH freehand sketching by **conservation experts**



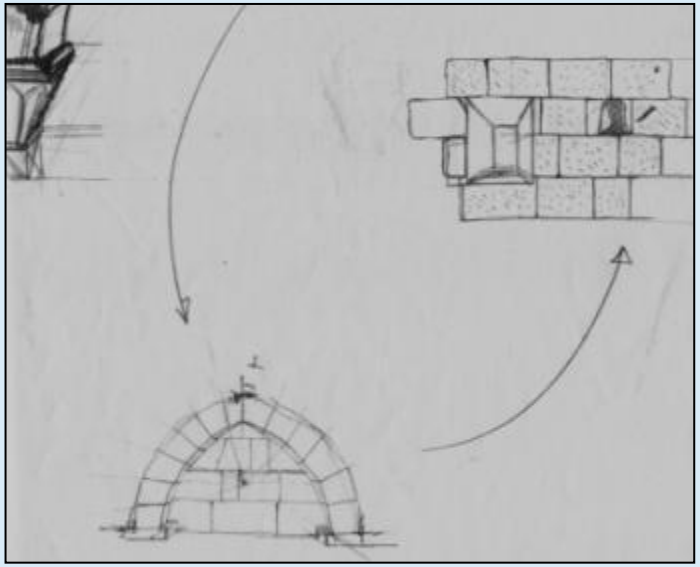


Fig. 5. Sketches, by two participants of practical session on "***Understanding cultural heritage through sketching***", COST i2MHB Training School, Fundación Santa María la Real, Spain, 2016: FtE and RaLeMeFS were applied. Both participants (D.Sc., construction economist (left) and MSc, building engineer; restorer (right)) had no previous experience in sketching, painting or freehand drawing before the session.

3 min. demonstration of actual freehand sketching with FtE

4.2 **Case study 2:** the use of CCH freehand sketching by **general public** - the case of **high school students**

A group of the Ben Zvi high school at Kiriat Ono, at the Society for Preservation of Israel Heritage Sites (SPIHS) at the Mikveh Israel School Visitor Centre in Tel Aviv, Israel, in May 2016
1.5 hours session: “Focusing the Eye”, review of different types or projections, introd. RaLeMeFS, 20 minutes of practical sketching of historic buildings or their elements

Fig. 6. Fast on-site sketch by a high-school student at a practical part of a lesson on understanding historic sites through sketching: material deterioration of a ground storey corner of a historic building, and pavement.

4.3 **Case study 3:** the use of CCH freehand sketching by **non-conservation architecture students**

Course in documentation and survey of historic buildings and sites at the World Heritage site in Acre (Akko)

Precise orientation of the course

Freehand sketching used voluntarily for its added value by students who had experience with courses in Architectural sketching.

4.3 **Case study 3:** the use of CCH freehand sketching by **non-conservation architecture students**

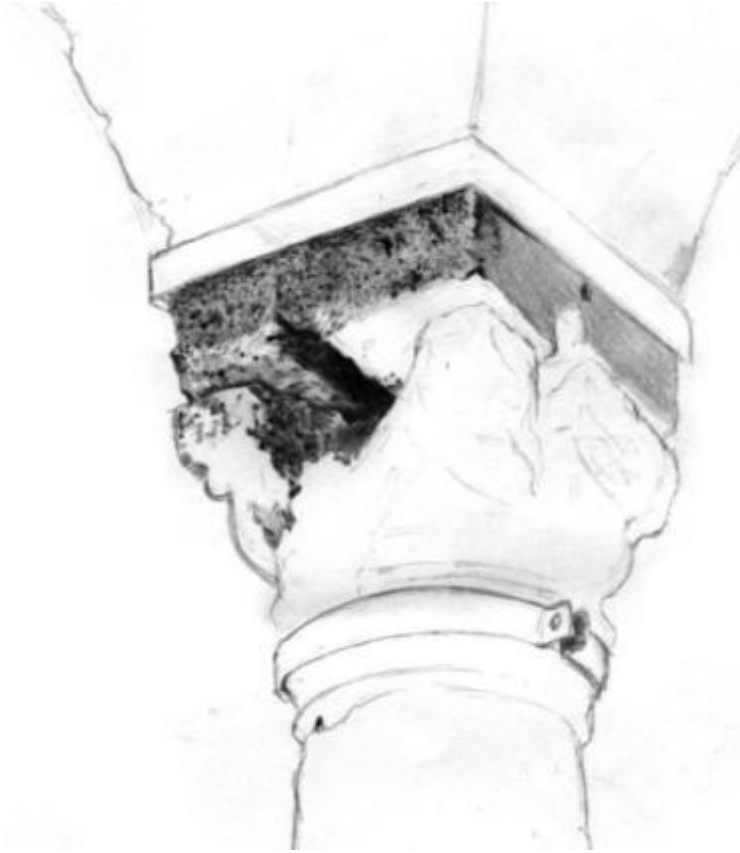
Fig. 7. Sketch from a field book, part of the teamwork in **students' documentation and mapping project**, in the course "Documentation of historic building and sites" Faculty of Architecture and Town Planning, Technion, (supervised by the author) 2011.

Sketch by Ori Roll.

4.3 **Case study 3:** the use of CCH freehand sketching by **non-conservation architecture students**

This freehand sketch focuses on **severe deterioration of the column's capital**. It also points out the initial visible stage of **detachment** of a stabilizing metal brace beneath it; and hints at **material deterioration of an arch** above the capital, on the left.

4.3 **Case study 3:** the use of CCH freehand sketching by **non-conservation architecture students**



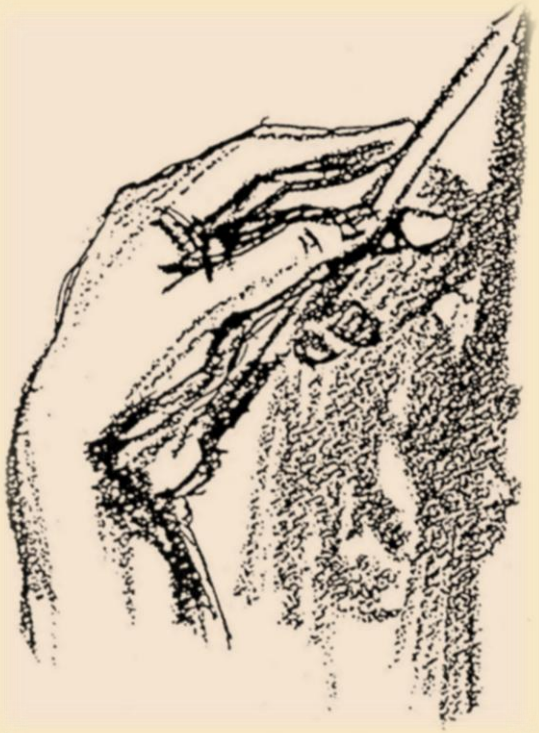
Contribution to learning: the sketch helped students to discover and analyze the main natural deterioration cause on this part of the monument.

Contribution to CCH:
Basing on this sketch, a conservation expert might recommend urgent engineering investigation of such details of the courtyard in order to examine their material deterioration and structural stability altogether.

Summarizing 3 case studies:

- on-site sketching brings the sketching person to deeper levels of understanding than by merely looking at the monument,
- this is true for both high school students and conservation experts,
- though their use of sketching differs.

5 Conclusions
Freehand sketching in CCH



5 Conclusions – Freehand Sketching in CCH

Combining

- **Natural ability** of human visual system to process complex data, including information on both geometry and materials of complex objects.
- **Focus** on conservation data and problems
- **FtE** (Focusing the Eye) **Method** supported by RaLeMeFS
- Activating the process of **visual analysis through sketching**

Allows for the inclusion of traditional freehand sketching into modern interdisciplinary and multidisciplinary conservation research and practice

5 Conclusions – Freehand Sketching in CCH

USERS	USES
Conservation experts	Direct - through “visual analysis through sketching” by conservation experts
	Indirect - through “visual analysis through sketching” by general public
General public (non-conservation)	Direct - through “visual analysis through sketching” by general public
Others	According to profile of the user

5 Conclusions – Freehand Sketching in CCH

Due to its simplicity, the method can be used by the general public and therefore enable large numbers of historic monuments to be studied and monitored regularly on a basic level.

The results of such wide active visual observation can be used by conservation experts.

This method can be also applied by other heritage-related communities, who have become more involved in conservation in recent decades, e.g. archaeologists.

5 Conclusions – Freehand Sketching in CCH

Activating visual analysis by FtE and RaLeMeFS, successful results of involving e-learning in the education of the general public for CCH and the rise of interest and achievements of the digital community in the development of sketch-based modeling in the recent decade add new dimensions to an old traditional, two-dimensional technique of freehand sketching.

Acknowledgements.

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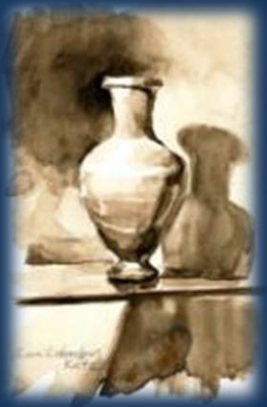
THANK YOU FOR ATTENTION

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