



RTI (Reflectance Transformation Imaging)
Training and Community Education
for Heritage Conservation in Turkey

Evaluation Report

INTRODUCTION

Reflectance Transformation Imaging (RTI) is an open source software package that produces interactive 'digital surrogates' of artefacts. Originally designed for use with small museum artefacts, using it to record large relief monuments and inscriptions outdoors in a Mediterranean environment presents a difficult set of challenges and requires special training (but no special equipment).

This project worked with local partners across Turkey to deliver a programme of training led by Liverpool University to raise awareness of the technology within the Turkish heritage community and then train up representatives from universities, museums, research institutes and commercial heritage consultancies in using RTI in the field. Trainees were then offered follow-up support for a year after the training to help them apply the technique to their own research and conservation projects.

The project's second aim was to reduce the risk of damage to ancient monuments via community education that aims to reduce looting and vandalism of rock-carved inscriptions and monuments. To do this we worked with a Turkish NGO to develop, test, refine, and disseminate a series of educational resources embed the pedagogic principle of Active Learning into a series of education games that would teach children about heritage cultural conservation.

The project was funded by Cultural Protection Fund with additional funding from FETAV and the University of Liverpool.

Lead Institution:



Project Partners:



Sponsors:



EXECUTIVE SUMMARY

The Challenge

How can we support local communities in Turkey to protect vulnerable rock carvings at risk from destruction?

Ancient rock carvings can be found in nearly every village in Turkey but natural erosion and human actions, such as vandalism, quarrying and building development, mean that they are at risk. Looting of these and other sites also funds terrorist groups such as ISIS but they cannot be removed to museums for safe-keeping. Their remote, inaccessible locations hamper recording with 3D Laser (3DL) scanning. Reflectance Transformation Imaging (RTI) is a more lightweight recording method than 3DL, requires no expensive equipment, and works by using digital photos to compile an interactive digital image of an artefact. RTI highlights fine surface details, making eroded or damaged inscriptions easier to see, but it can be difficult to learn and tricky to use under field conditions.

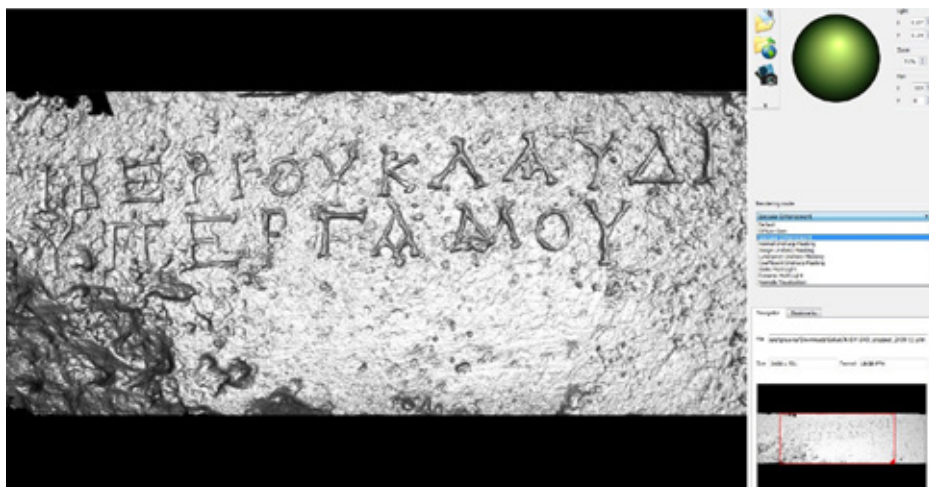


Image: A screenshot from a V-RTI of a tomb inscription from Fethiye.

Activity

Building on existing partnerships in Turkey, we developed a two-strand approach that combines training local heritage professionals in using RTI with educational resources for schools and community groups to raise awareness of looting and empower local communities with knowledge of their local archaeological heritage.

First, a series of awareness-raising workshops at universities and museums across Turkey introduced the heritage community to the potential of RTI as a powerful tool for archaeological research and conservation. Next, heritage professionals from universities, museums, research institutes, and commercial heritage consultancies were trained to use Highlight RTI (H-RTI), in which high powered flash guns are used to compensate for the intense Mediterranean sunlight and make fine surface details visible. Finally, partners were offered support with using RTI for a year after the training as they started to record at-risk rock-cut monuments across Turkey, including sites along the Turkey/Syria border.

At the same time, a series of educational games were developed using the principle of Active Learning to embed awareness of heritage conservation. Active Learning encourages children to construct their own meanings from the activities, resulting in deeper learning. The games were piloted with teachers, parents and school kids across the Fethiye region of SW Turkey. Feedback from the pilot was positive and the games are now freely available online for use by schools, museums, and tourists.



Image: Poster for the Phaselis training workshop & on-site RTI training for heritage professionals

Impact

Our RTI awareness-raising events were attended by 350 heritage professionals in eight different localities across Turkey. We then trained 51 archaeologists and conservators in H-RTI, working with real artefacts as our training examples, and using specially prepared bilingual training handbooks and sets of training data. These are now freely available online and are already being used in Turkey to train students in H-RTI. During the project 40 at-risk monuments were recorded across Turkey, including the Halep Yazit inscription which is carved into the bedrock on the Turkish/Syrian border in Gaziantep province.

Games, training manuals, sample data sets, evaluation data and other resources are available on-line here:

<https://doi.org/10.17638/datacat.liverpool.ac.uk/1133>

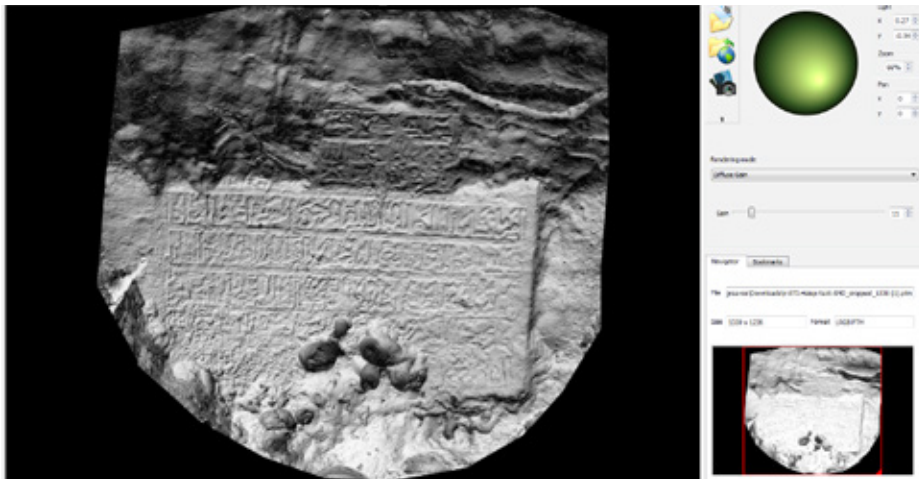


Image: A screenshot of a V-RTI of the Halep Yazit inscription on the Turkish/Syrian border.
(Courtesy of Gaziantep University and Scott Redford)

Limiting Factors/ Learning/ Success

Whilst supporting our colleagues in Turkey, we realised that they were encountering challenges with using H-RTI in the field because of the size of the monuments they wanted to record, their inaccessible locations, or extreme ambient sunlight. We therefore worked to develop an alternative method of capturing the digital images needed to make an RTI, using 3D models and Virtual Reality, an approach that we refer to as Virtual RTI (V-RTI). We then piloted this new recording method in field trials in the city of Fethiye (ancient Telmessos), where tombs of the ancient Lycian culture are a threat from vandalism and rapid urban development. A preliminary report on the Fethiye survey was published in the journal *ANMED* and a final report will be published in the *Journal of Field Archaeology*.

Our education programme provided heritage education training for 200 teachers and community volunteers who then engaged with an estimated 3,000 school kids within the first year of the project. The games that we developed are now available to freely download and use and have been designed to be easily reproducible using standard black-and-white photocopyers, to minimise costs for schools. A research article about heritage education for community cohesion has been prepared for publication.



PROJECT OUTLINE

Project Aims:

This project had two strands: intensive, practice-based RTI training for heritage professionals and community-based heritage education aimed at raising awareness of archaeology.

RTI TRAINING FOR HERITAGE PROFESSIONALS:

- 1.1 Develop a user-friendly bi-lingual RTI training manuals and other materials.
- 1.2 Deliver intensive RTI training for c.20 heritage professionals.
- 1.3 Support participants to apply RTI in 20 field trials that test the uses of RTI in a range of challenging scenarios.
- 1.4 Refine the RTI manual in light of the field trials and publish it freely on-line.
- 1.5 Deposit sample of RTI data sets online.
- 1.6 Publish case studies in English and Turkish.
- 1.7 Deliver RTI awareness raising events for 100 heritage professionals in Ankara and Istanbul.
- 1.8 Conduct pre- and post-training evaluation via participant questionnaires.

COMMUNITY EDUCATION:

- 2.1 Develop a teacher's pack and c.30 educational games for children aged 5-15.
- 2.2 Organise six teacher training events at the Fethiye Cultural Centre to pilot the pack.
- 2.3 Train c.30 volunteers to use the education resources with children and families.
- 2.4 Train c.100 teachers to use the resources with school groups.
- 2.5 Post educational resources created by the project freely online.
- 2.6 Conduct pre- and post-project evaluation of local communities and project participants via questionnaires.

PARTICIPANTS & ACTIVITY

Academic Trainees



Akdeniz (Antalya)
Ankara University
Bilkent (Ankara)
Istanbul University
Kırşehir University
Koç University (Istanbul)
Marmara University (Istanbul)
METU (Ankara)
Mimar Sinan University (Istanbul)
Nevşehir University
TED (Ankara)
Sivas University
Tunceli University

PARTICIPANTS & ACTIVITY

Other Trainees



Museum Staff

- Antalya
- Demre
- Elmalı
- Erimtan (Ankara)
- Fethiye
- Side

Research Institutes

- ANAMED (Istanbul)
- ARIT (Ankara)
- BIAA (Ankara)

Heritage Consultants

- Izmir

Provinces where monuments were recorded:



Antalya
Bilecik
Gaziantep
Kilis
Konya
Mersin
Muğla
Şanlıurfa

Project Management

The project was led by the University of Liverpool, with local partners taking responsibility for specific areas of activity and being allocated budget accordingly. Dr Alan Greaves gave a series of awareness-raising demonstrations and lectures in English and Turkish at universities and museums across Turkey, starting with our partner institution Hacettepe University. These events were used to demonstrate RTI technology and recruit trainees onto the intensive workshops.

The Liverpool team prepared the training manual, which was then translated into Turkish, and a series of pre-selected data sets for use in the training events in Turkey. The Mediterranean Civilisations Research Institute at Akdeniz University hosted the largest of these intensive training workshops at its Phaselis Research Centre. This proved to be so popular that we were invited by those who had been on it to run training sessions in their own universities, thereby increasing the number of trainees we could reach out to.

FETAV led the educational part of the project and developed and piloted the educational games. FETAV produced the educational games (in both Turkish and English), trained teachers and community volunteers in how to use them with school-age children and piloted them directly with a number of schools from across the wider Fethiye region. FETAV produced a separate evaluation report on the education programme.

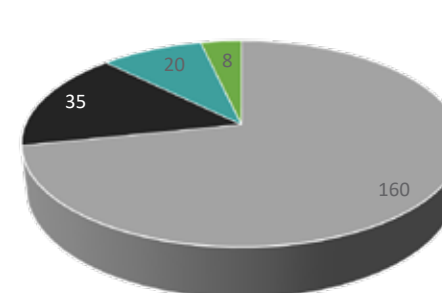
Materials from the project, including training manuals, training data sets, case study data sets (3D models, H-RTIs, V-RTIs) and educational games, are now hosted online via the University of Liverpool Research Data Management (RDM) system. This is openly accessible via a permanent DOI link.



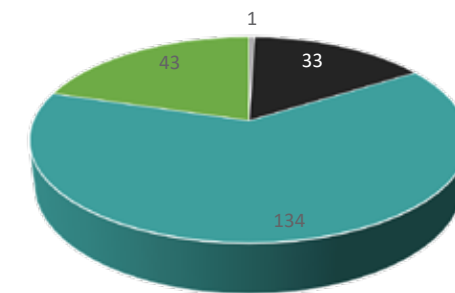
Evaluation Methodology

The primary aim was to show movement from knowing little or nothing about RTI/ cultural heritage towards knowing more about it in as many participants as possible. We gave out evaluation forms at all awareness-raising, RTI training and educational events.

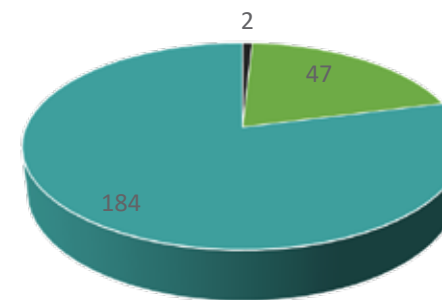
RTI Awareness Training Events:
BEFORE



RTI Awareness Training Events:
AFTER



RTI Awareness Training Events:
Enjoyment

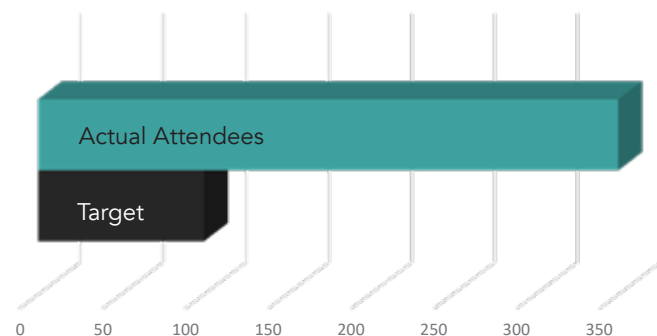


IMPACT

The project has involved thousands of participants, recorded dozens of sites and resulted in the development of a new, lightweight approach to digital recording of rock carvings in the field.

1. RTI Awareness Events

Key observations:



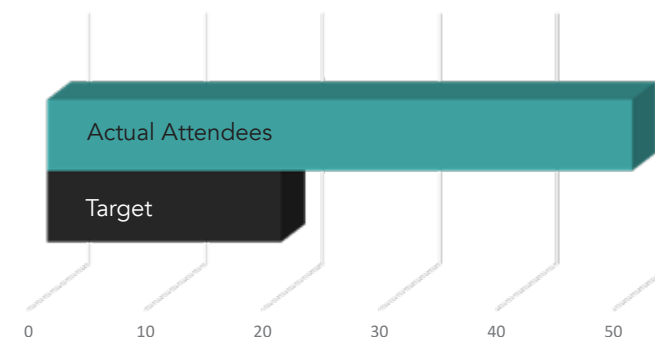
Critical success factors and/or critical limiting factors: These events were extremely popular, with a very high level of engagement. They were offered in Turkish or English, depending on the audience and/or host institution. The most popular element was the demonstration of the RTI technology itself.

Considerations and learning to take forward: None.



2. RTI Intensive Training Workshops

Key observations:



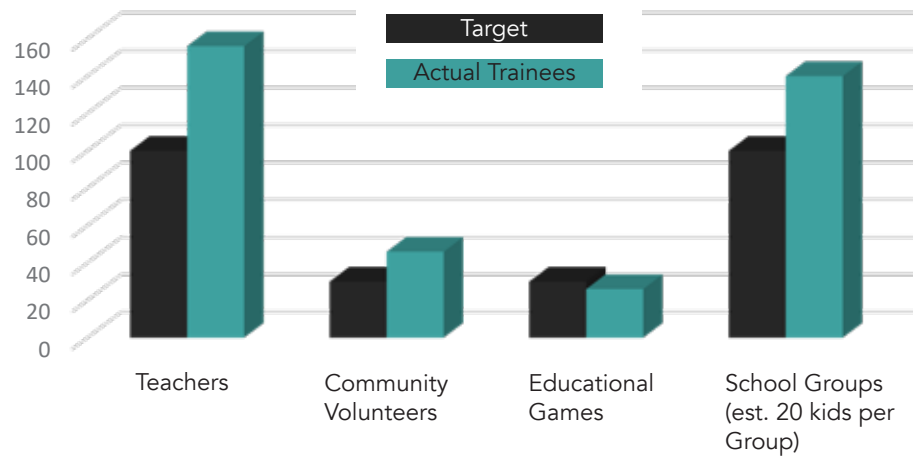
Critical success factors and/or critical limiting factors: These events were generally very successful. They were offered in Turkish or English, depending on the audience and/or host institution. Participants acquired the IT skills and field skills much more easily than the photography skills and this is what inspired us to develop the V-RTI method.

Considerations and learning to take forward: Two days is the absolute maximum period of time that these courses could last. The original plan for a five day plan was unpopular because the potential trainees all had other work commitments, so the length of the courses had to be cut down due to poor initial take-up.



3. Cultural Heritage Education Delivery

Key observations:



Critical success factors and/or critical limiting factors: FETAV excelled at engaging local schools to work with them on piloting the education programme. They reached out to a very wide range of schools, including for children with learning difficulties, demonstrating the broad appeal of the subject. The feedback from teachers and students alike was very positive.

Considerations and learning to take forward: A research article about this aspect of the project has been prepared for submission to a peer-review journal.



APPENDICES

Evaluation Survey Questions from Awareness-Raising Events:

About RTI

How much did you know about RTI before this event?

How much to do feel you know now?

Conservation (e.g. Condition Monitoring or erosion, vandalism, etc.) Research (e.g. new readings of reliefs and inscriptions)

Recording (e.g. creating 'digital surrogates' or models)

Education (e.g. videos, demonstrations, exhibitions)

Would you like to use RTI in future for a project you are working on? Would you like to learn how to use RTI yourself?

About Today

Did you enjoy today's event?

How much did you learn from it?

About You

I am: male/female

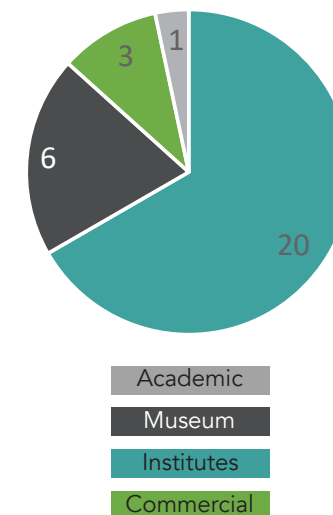
Circle all that describe what you do: Academic, museum, etc.

Circle that which best describes the organisation you work for: university, museum, etc.

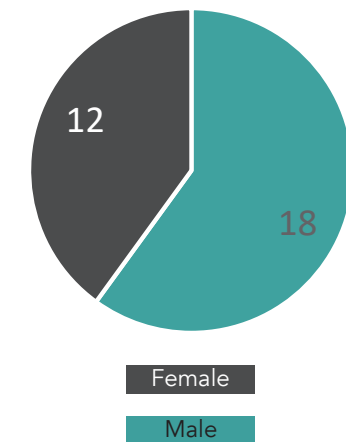
Fuller description of audience information

Monitoring data on trainees at intensive RTI workshops:

Sector



Gender



Participant Feedback

Quotes from heritage professionals who had completed the intensive RTI training workshops:

"Thank you very much for providing a good foundation for both the workshop and for future projects. I wish for the continuation of the exchange of information across different fields of archaeological work."
Elif Denel, ARIT, Ankara.

"The training not only provided information about how to use the technology but also provided information on ways in which I can personally use it in my own projects."
Aslıhan Sheridan-Aksoy, TED University, Ankara.

"Instructors paid special attention that everything and everyone was crystal clear. They were patient with the questions and were willing to go out of their way to help us."
Umit Dulun, Bilkent University, Ankara.

"It was a very good and beneficial in terms of helping our situation here in Turkey."
Ahmet Ari, Hacı Bektaş Veli University, Nevsehir.

"It was a very informative training workshop and helped me to realise RTI's many benefits. Support being provided for one year after today is very encouraging for like me to start using it as soon as possible."
Rida Arif, UNESCO, Pakistan.

"The training overall is very useful and opened a new avenue of research questions where RTI will be a useful tool to work with."
Gonca Dardeniz-Arikan, Istanbul University, Istanbul.

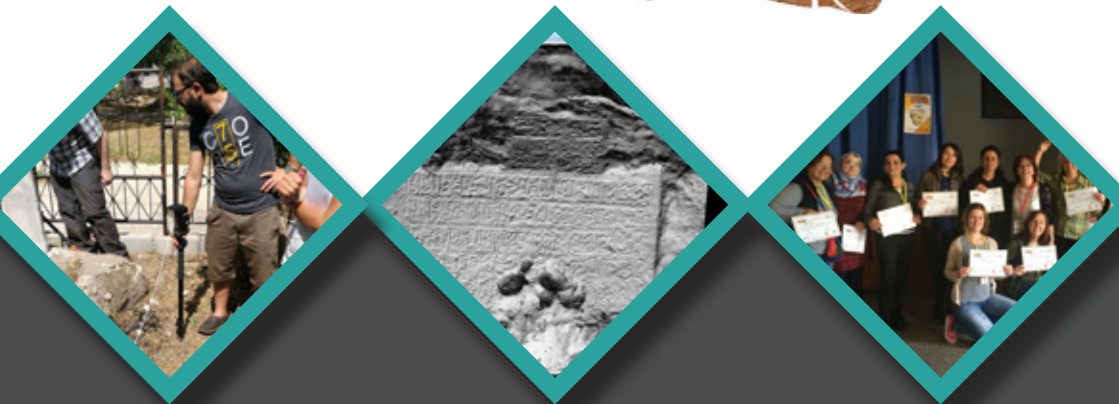
"I am very satisfied. It would be nice to invite museums again to learn about different innovations."
Fatma Şimşek, Elmalı Museum, Antalya.

"The theoretical and practical explanations were very clear. A perfectly structured training course."
Barış Altan, Koç University, Istanbul.



TRAINING TEACHERS AND COMMUNITY VOLUNTEERS: Cultural Heritage Education training at Fethiye Museum.

CARVED IN STONE

A brown, irregularly shaped stone fragment with a white line drawing of a classical face in profile on the right side. The text "CARVED IN STONE" is written in white, serif, all-caps font across the left side of the fragment.

Evaluation Report

Report compiled and written by Alan M. Greaves
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Designed by Vinay Lakshmikanth