MERGO

Mooc in Enology aimed at Reinforcing competences applying Game-based approach and Olfactive learning for the wine tasting

IO3

MERGO Odour Game Kit

MERGO

Project number

2020-1-IT02-KA203-080040

Mooc in Enology aimed at Reinforcing competences

applying Game-based approach and Olfactive learning

for the wine tasting

Co-funded by the European Union

Partnership:

University of Foggia (UNIFG) - Italy
Smarted (SM) - Italy
Universidade De Tras-On-Montes E Alto Douro (UTAD) - Portugal
University Of Cukurova (CU) - Turkey
Vignerons Bio De Nouvelle-Aquitaine (VBNA) - France
Universtiy of Zagreb (UNIZG) - Croatia
Organizzazione Nazionale degli Assaggiatori di Vino (ONAV) - Italy

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Introduction

MERGO APP is designed for the same targets of the MERGO MOOC (IO2) because its direct integration in the MOOC. However, the MERGO Odour Game Home Kit could run also independently and be used by each professional in the wine sector in order to train or maintain ability to recognize different olfactive stimuli. The Odour kit is designed with an easy interface, for a plug-and-play procedure, that will allow everyone to have a virtual teacher (based on artificial intelligence) for the recognition of basic olfactory learning.

Each Partner created a dedicated space for the public use of this MERGO Odour Game in their venue.

The application of MERGO Odour Kit benefits from the Tangible User Interfaces paradigms. The Tangible User Interfaces (TUIs) allows the user to interact with tangible and multisensorial object, then objects that contain aromas, and consequently they could be recognized by a digital component.

We can define the principle of Tangible User Interfaces (TUI), which are input tools for Augmented Reality systems created from physical and common objects. Users have the ability to dynamically interact with the virtual component through the use and manipulation of tangible objects.

A great definition of Tangible User Interfaces is provided by MIT's Tangible Media Group:

Tangible User Interfaces (TUI) are based on the physical embodiment of digital information that aims to go beyond the current dominant paradigm of Graphical User Interfaces (GUI). TUIs expand on our dexterity, integrating digital information into the physical space. They enhance the accessibility of physical objects, surfaces, and spaces, supporting direct engagement with the digital world.

The term "Tangible User Interface" was introduced in 1997 by Hiroshi Ishii and Brygg Ullmer, following the work of George Fitzmaurice (Fitzmaurice, Ishii, Buxton, 1995) on the Bricks prototype. Bricks are brick-like objects, similar to Lego, that when placed on an Active Desk, can be recognized by the system and used as input mechanisms to interact with graphical representations. By moving the bricks, it was possible to, for example, move, rotate, or even transform (if two bricks were moved simultaneously) a virtual object displayed on the device.

In 1997, Ishii and Ullmer introduced the concept of TUI in their article "Tangible Bits: Towards Seamless Interfaces between People, Bits, and Atoms" to move beyond the concept of Graphical User Interfaces (GUI). TUIs, as introduced earlier, allow us to transform the world around us into an interface that enables communication with the artificial world by "coupling" digital information with physical objects (Ishii, Ullmer, 1997).

As previously described the integration with the MOOC is a relevant novelty of MERGO project, as an innovative pedagogical approach for distance learning. It elicits the possibility to learn with a MOOC that provides normal lessons (slides, videos, questionnaires) in a typical declarative learning and with a practical tool that supports the procedural learning and the practical experience, also at home. In enology and wine-tasting sector, the procedural learning could directly involve the basic olfactory learning, applying in practice what he/she is studying in the MOOC.

Attention for the reviewers: if you want to try the IO3 you must have the MERGO kit and a smartphone able to recognize NFC tags (thin adhesive sensor that you could buy in any online store) to be pasted on the smelling jars.

For receive one of these please write to:

sandra.pati@unifg.it ;
smartedsrl@gmail.com
mergoproject.eu@gmail.com

MERGO platform

MERGO is an app for olfactory training in the viticultural sector. By using a Tangible User Interface (TUI) kit consisting of 88 aromas (for more information, contact admin@smarted.it), you can refine your olfactory abilities and test the knowledge gained during the MERGO project MOOCs (www.mergoproject.eu).

The central objective of the MERGO project is to develop a new way to promote innovative and advanced solutions based on the latest technologies to innovate and promote excellence in teaching in the viticultural sector. In particular, the MERGO project aims to create a highly innovative MOOC (Massive Open Online Course) designed to better meet the learning needs of students and, at the same time, increase attractiveness by including ICT-enriched learning.

The Tangible User Interfaces (TUI) paradigm leverages real-world objects, enhancing them with low-cost technologies (RFID/NFC) that then become Smart Objects, allowing for procedural activities. Practical activities are essential to put theoretical knowledge into practice and, at the same time, reduce MOOC dropout rates, a common issue in distance education. In the field of oenology and wine tasting, procedural learning can directly involve basic olfactory learning by applying what is being studied in the MOOC. To this end, MERGO will redefine a methodological framework based on a student-centered learning approach aimed at acquiring transferable skills for the job market, using highly innovative ICT tools with the goal of applying a co-creation approach. The use of TUIs will enable the creation of a practical home laboratory for distance wine tasting education.

The project aims to offer skills acquisition by providing tools for professionals in the viticultural sector that meet the needs of the labor market. The MOOC, enhanced by practical activities with tangible user interfaces for olfactory recognition of wine aromas (wine defects recognition, discrimination of individual olfactory matrices, specific aromas in local wines, etc.), meets the demands of the labor market for various roles in oenology and viticulture (quality, supply chain, industrial food sector, restaurant services). Furthermore, the MOOC could increase the attractiveness for a broader audience of enthusiasts, who have the opportunity to learn independently, benefiting from a scientific approach.

MERGO platform is made by two parts:

1) **MERGO Hardware**
2) **MERGO APP**

Which are the minimum requirements of the MERGO app?
The user that intends to use MERGO application must have:

1. An Android phone with a Android OS minimum version 10.

2. A smartphone equipped with an NFC antenna.

3. The box of aromas of Aromaster (https://aromaster.com/product/master-wine-aroma-kit)

4. A set of NFC tags, the tags could be bought in any online store (i.e. Amazon or similar). Tags must be adhesive to be pasted on the phone.

5. Follow the instructions for tagging the objects in the video

The user could skip the point 3,4 and 5 writing to the Partnership to the mail mergoproject.eu@gmail.com, smartedsrl@gmail.com or on the website www.mergoproject.eu asking for a complete kit, with the tags included and pasted on the MERGO box. The cost of the MERGO box is 450€ (VAT included) and the seller is Smarted srl (the company involved in the project).

MERGO Hardware

The MERGO kit seamlessly marries tradition with cutting-edge technology. At its core, it harnesses an extensive array of scent jars that have garnered favor among sommelier experts, wine enthusiasts, and oenology university courses worldwide. These jars, sourced from Aromaster[1], house a rich collection of 88 distinctive scents, serving as indispensable tools in the realm of wine tasting assessments. They play a pivotal role in sharpening the olfactory skills of newcomers embarking

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[1] https://aromaster.com/product/master-wine-aroma-kit

on the journey of wine evaluation. While these jars may appear uniform at first glance, they are thoughtfully organized into olfactory categories, encompassing fruity (white wines), fruity (red wines), vegetal, floral, mineral, oak barrel maturation, wine faults, and more.

Figure 1: Mergo KIT adpted from the Aromaster kit. Each smelling jar is recognized by an Android smartphone using the MERGO app.

Figure 2: the MERGO toolkit

To enrich this sensory experience, the kit adopts the Tangible User Interfaces paradigm. It incorporates discreet antennas on the jars, harnessing the capabilities of Near Field Communication (NFC) technology. Thanks to these NFC antennas, smartphones can effortlessly identify these scent jars. Given that most commercial smartphones are equipped with NFC antennas, they have the inherent ability to detect objects embedded with passive NFC tags. Each antenna is thoughtfully tagged with a unique code, instantly recognizable by the MERGO application.

MERGO APP

The application is published on the Google Play store and its free and available for any kind of user.
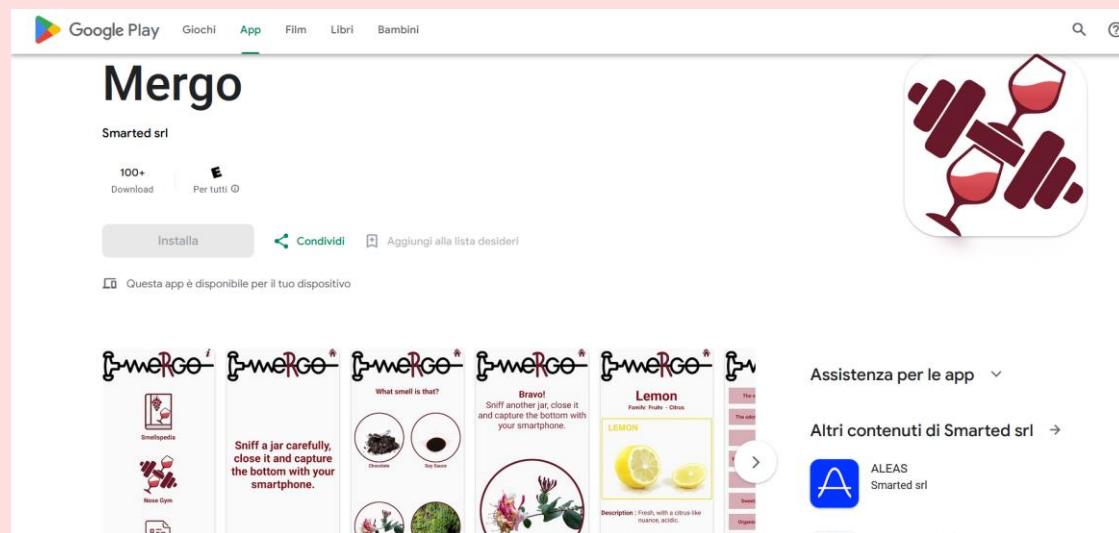

Figure 3: Google Play page that hosts the MERGO app

The MERGO learning environment is actualized through its software, designed as an Android application tailored to smartphones equipped with NFC capabilities. This application is readily available for free on the Google Play Store[2].

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[2] https://play.google.com/store/apps/details?id=it.smarted.mergo&hl=it&gl=US
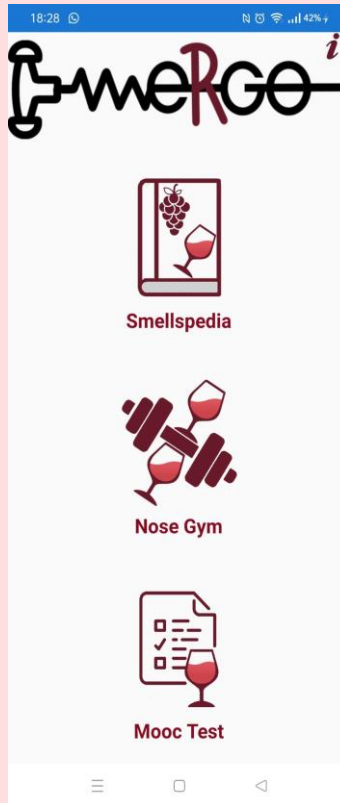
Figure 4: Main menu of the MERGO application with three sections: Smellspedia, Nose Gym and Mooc Test.

The application unveils three distinctive areas:

1. Smellspedia:

This segment is a treasure trove for aspiring sommelier students looking to explore the 88 scents featured in the Aromaster kit. Users select a jar, savor its scent, and bring it into proximity with their smartphone's NFC antennas. At this juncture, the system seamlessly deciphers the scent jar's unique code. The application then unveils the scent's name and imparts insightful information about its relevance within the wine industry. These descriptions are thoughtfully curated by wine experts actively engaged in the MERGO project.

Figure 5: Display of Smellspedia for the Lemon's scent, with the description and the possible wine where this aroma could be present.

2. Nose Gym:

In this domain, learners embark on a journey to refine their olfactory senses using the scent jars. The system presents a quiz-game format designed to deepen one's understanding of wine-related olfactory learning. This section is thoughtfully subdivided into specific sub-sections, comprising:
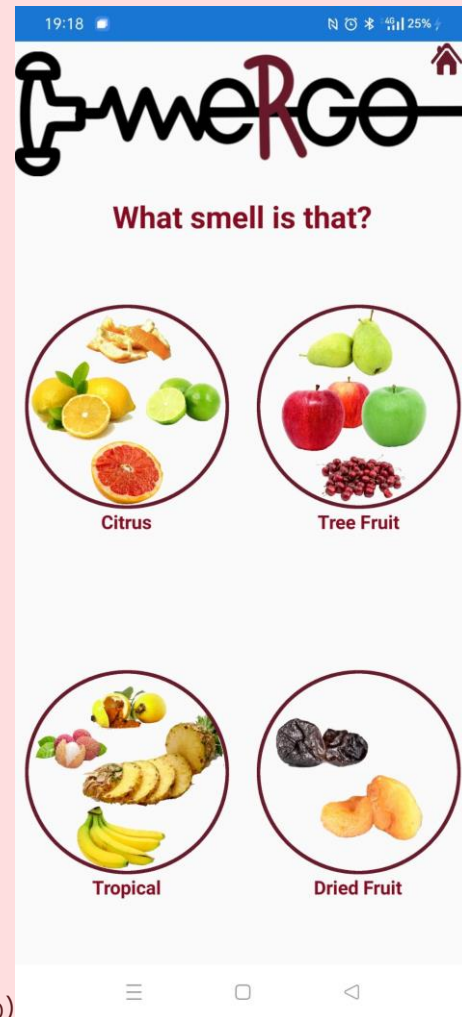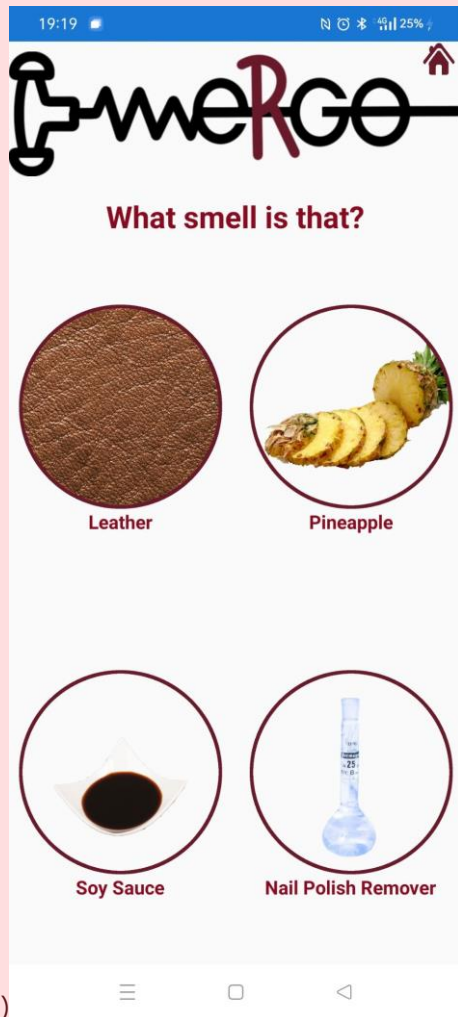
Figure 6: Screenshot of two different exercises: a) on the left "Recognize the smell", b) on the right "Recognize the Smell Family".

1. **Recognize the Smell:** Users encounter a jar, inhale its fragrance, and subsequently identify the specific scent from among four available options.

2. **Recognize the Smell Family:** Participants position a jar in close proximity to the NFC antenna, striving to accurately discern the familial category associated with the scent, choosing from four available options.
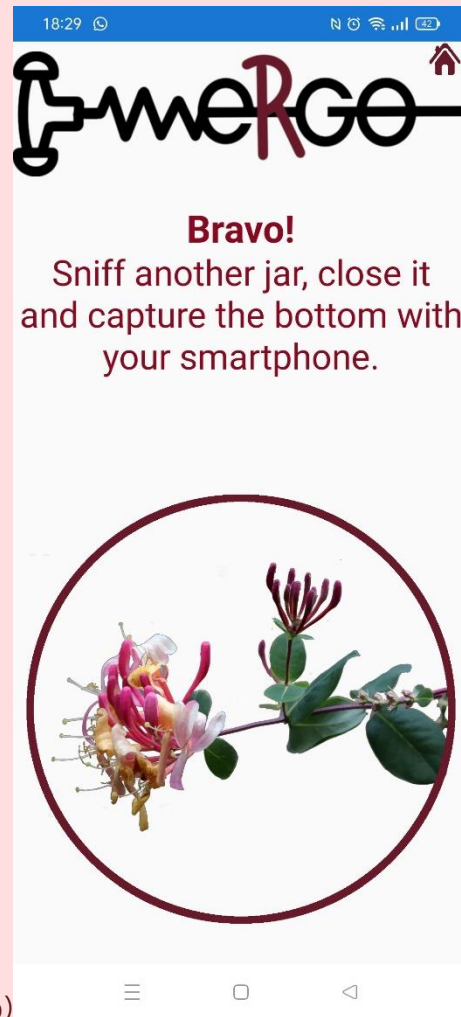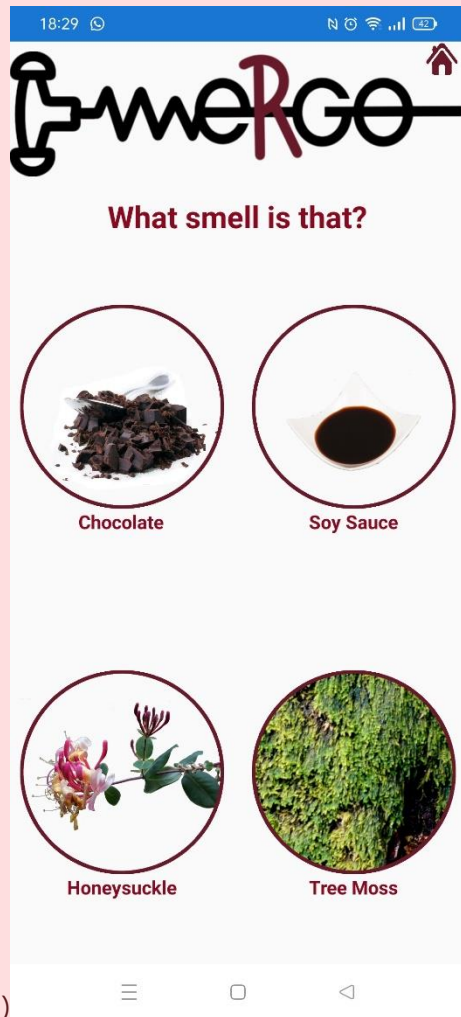
Figure 7: Screenshot of "Recognize the smell", in two different moments: a) the question b) positive feedback once the student founds the right aroma.

3. **Look for the Smell:** The system guides students in a quest to locate four distinct scent jars, challenging them to identify the particular scent indicated by the app, such as the aroma of cherries, from a selection of four possibilities.

4. **Look for the Smell Family:** In this exercise, students are tasked with selecting four scent jars from the collection and identifying the family classification specified by the application, such as "wine faults."
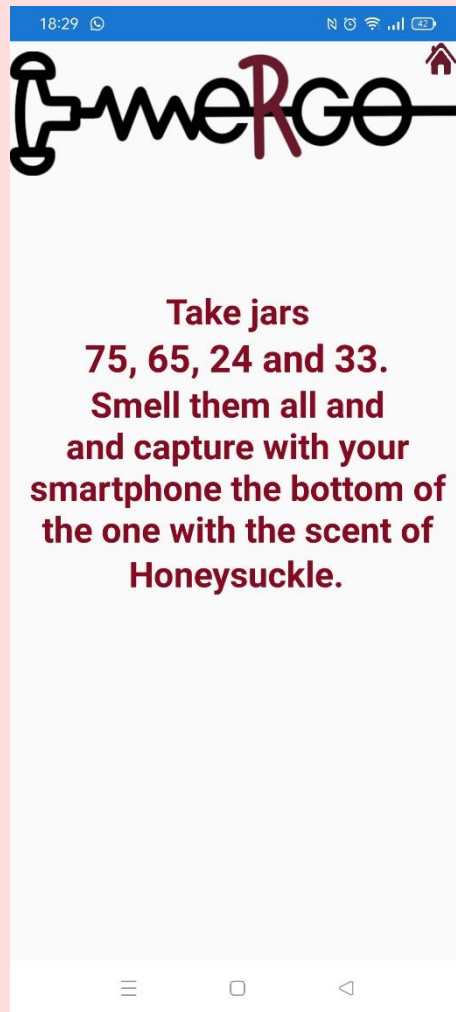
Figure 8: Screenshot of "Look for the smell" section. The user has to pick the smelling jars labelled with the numbers 75, 65, 24 and 33 and find the aroma of Honeysuckle.

The application fosters a conducive learning environment, permitting students to revisit these exercises at their leisure. Notably, the application refrains from implementing a scoring or leveling system, instead providing auditory feedback, including gentle sounds for incorrect answers and positive reinforcement for successful task completion.

3. MOOC test

The third section is related to the MOOC and it is called MOOC test. The student could perform the exercises that are strongly related to the competences achieved during the learning made by the e-learning platform. Once the user has completed the lesson, he/she could access to the related section as shown in the picture below

Figure 9: Screenshot of the MERGO APP in the "MOOC test" section. The user could select the topic he/she prefers.

The section shown in the previous screen reflects the lesson that are taught in the MOOC, in the same order these are shown on the platform. These sections have all the questions that was collected during the multiplier events and in particular it brings the "Pick&Play" questions. To summarize this type of questions, the user must select a lesson, then randomly the system provides a question from all the questions that are collected for this topic. The question requires to proceed as "Look for Smell" or "look for the smell family". The students must pick up 4 option on the basis of the design made by the expert. Once the aromas are in front of the

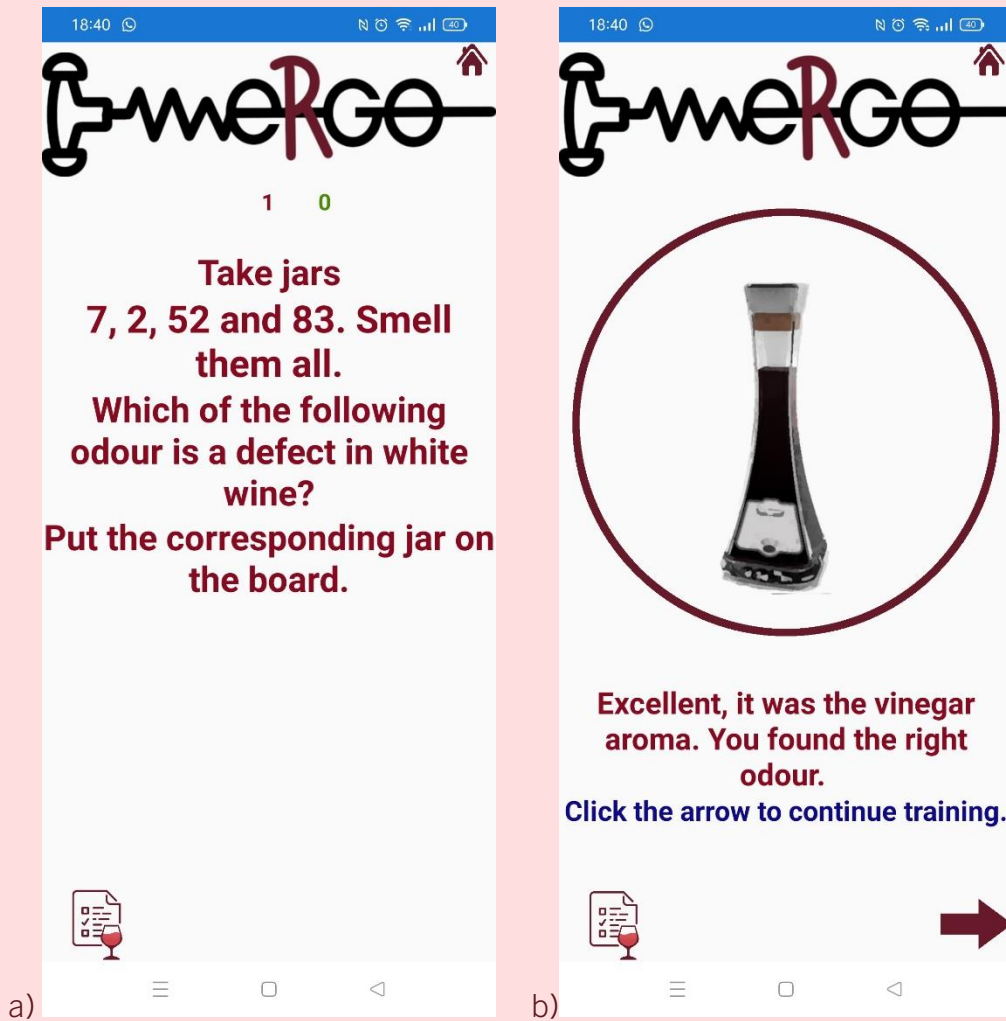student, he/she tries to identify the more appropriate answer on the abasis of the 88 aroma a disposa.

a)

b)

Figure 10: Screenshot of "MOOC test" section. The user must pick the smelling jars labelled with the numbers 7, 2, 52 and 83, as written in the OER by the expert and replies with the right aroma to the request made at the beginning. In this case the reply (b) is vinegar.