MERGO

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

IO1 - Pedagogical Strategy for implementation of multisensory approach in MOOCs

MERGO

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Index

Introduction

The educational field has been greatly influenced by emerging technologies, which constantly evolve with the introduction of new tools. These advancements proved invaluable during the COVID-19 crisis as they enabled millions of students to continue their learning through distance education. From kindergarten to university, innovative methods of remote teaching gained widespread popularity during school and university shutdowns [1].

However, it is crucial to systematically study these new educational opportunities in the realm of technology-enhanced learning. This research should adopt a human-computer interaction (HCI) perspective [2] and consider interactive learning environments [3]. Evaluating the effectiveness and learning outcomes of these tools in naturalistic settings is essential. With the continuous emergence of new tools, it is important to determine their ease of use for students and identify any limitations that could lead to further improvements in technology-based learning tools.

This paper focuses on the field of oenology and viticulture, which has seen limited and outdated studies on the application of distance learning in oenology [4,5]. A brief review of e-learning systems, particularly MOOCs, in the oenology sector is also provided [6]. Oenology heavily relies on in-person presence due to its olfactory-based learning that involves stimuli that cannot be simulated in distance learning. While theoretical teaching forms the basis of academic lessons in this field, practical laboratory activities play a significant role in developing multisensory skills for wine recognition (olfactory, gustatory, and visual). Consequently, declarative learning, supported by linguistic approaches, must be harmonized with procedural learning through hands-on experience and laboratory work [7].

In contrast to other fields where theoretical aspects take precedence, the ability to "recognize" is central to oenology and wine tasting. As a result, specific methodologies and didactic tools have been developed to facilitate the acquisition of basic sensory recognition, often with the guidance of experts in the field. These tools cater to different levels of procedural learning. At the basic level, they aim to improve sensory abilities, primarily olfactory, through experiential learning, allowing

experts to assist students in distinguishing and categorizing odors and flavors. This serves as an introductory step toward creating a perceptual, synesthetic, holistic, and multisensory framework for identifying individual flavors and assessing wines.

In this context, solutions that enable individual learning using cyber-physical systems and expert tutoring supported by software are crucial. In recent years, new tools like Tangible User Interfaces (TUIs) [14], powered by artificial tutoring systems [15,16], have emerged. Tangible User Interfaces, introduced by Ishii and Ullmer as "tangible bits" [17], fall within the realm of Mixed Reality systems [18] and leverage Internet of Things technology [19]. TUIs bridge the gap between physical and digital worlds by using physical objects as drivers in hybrid environments, creating a continuum between cyberspace and the physical realm. Graphical User Interfaces (GUIs) are then controlled by the objects, allowing users to interact with tangible artifacts and manipulate the digital interface. Tangibles have found extensive use in education, drawing on pedagogical approaches such as Montessori education, which leverages tangible objects for enhanced learning. TUIs take this a step further by incorporating the digital element, serving as vehicles for digital information. Consequently, TUIs are strong contenders for improving academic learning methodologies in basic sensory training, providing students with new tools to autonomously engage in learning activities. If physical objects can carry digital information, even smelling jars, like the ones mentioned previously [8], could be recognized within the digital learning environment. Thus, the presence of an expert would be limited to specific activities requiring the transmission of experience, sensitivity, and professional culture that cannot be replaced by artificial systems.

Tangible User Interfaces (TUIs) enable users to interact with tangible and multisensory objects, including objects containing odors, which can be recognized by their digital counterparts. This opens up possibilities for developing e-learning systems on the topic of "wine tasting" while allowing the application of procedural learning based on olfactory recognition through the integration of new technologies. Autonomous game-based learning, which is not feasible with traditional analog tools on the market, can be supported by these advancements. Several prototypes [20] have already been developed to enhance olfactory learning related to simple

odor stimuli, incorporating digital tools with artificial tutors to guide the learning process.

The rationale of the project

While humans may not possess the most powerful sense of smell compared to other animals, recent behavioral studies suggest that primates, including humans, have relatively good olfactory abilities (Sheperd, 2004). The human brain, which has evolved over time, plays a crucial role in perceiving and discriminating odors, although humans often struggle to fully describe odors using words. Our ability to describe smells begins with different olfactory patterns, which serve as virtual "odor images" (Xu et al., 2003).

Olfactory cells, which are uniquely connected to the external environment, allow us to recognize odors. Numerous studies have demonstrated the strong connection between odors and deep memories (Herz & Engen, 1996; Lerhner et al., 1999; Rochefort et al., 2002). Additionally, odors play a role in quickly assessing food (Eisner & Grant, 1981; Wysocki & Pelchat, 1993). In this article, we will focus on wine, which uniquely stimulates our olfactory senses due to its richness and complexity resulting from various molecules present (Thorngate, 1997).

Furthermore, the wine industry has significant economic implications, as it represents a substantial market globally, especially in Europe where production and commercial value are particularly high. European countries account for over 70% of the world's total wine production, making it a sector of great relevance to the environment, society, and economy across the continent. European vineyards cover approximately 52.7% of the total vine cultivation areas worldwide (Cardell et al., 2019).

According to Eurostat statistics, wine production in Europe is significant, with the EU leading in this field. In 2018, EU Member States exported €22.7 billion (bn) worth of wine and imported a total of €13.4 bn. The total wine production (including sparkling wine, port, and grape must) in the EU was approximately 15 billion liters. The EU's vine cultivation area in 2015 encompassed 3.2 million hectares, representing around 45% of the global vine area and 1.8% of the total utilized

agricultural area. Spain, France, and Italy were the main wine-producing countries in the EU, accounting for nearly three-quarters of the total EU vine area (74.1%) and two-fifths of the holdings (39.2%).

The culture of wine is not only related to food but also impacts civic society and the academic field due to its deep connection with specific territories and local culture. Higher educational institutions (HEIs) across Europe, particularly those with faculties of agriculture and enology, study wine with a scientific approach, training researchers and professionals. These institutions play central roles in the entire wine production chain, contributing to winemaking companies, viticulture management for high-quality wine production, maintenance of qualitative standards, and the preservation of indigenous vineyards.

Procedural learning vs. declarative learning

Academic lessons in the field of enology and viticulture predominantly rely on theoretical teaching, covering various aspects of enology, ranging from the chemistry of wine and grapes to the economic, social, and compositional perspectives. These lessons typically follow a traditional approach, utilizing books and face-to-face instruction, aiming to enhance students' theoretical and methodological knowledge.

However, in the field of enology, it is essential to complement theoretical lessons with practical activities. Higher educational institutions incorporate intensive laboratory activities where students can acquire multisensory skills for wine recognition, including olfactory, gustatory, and visual senses. Consequently, declarative learning (based on theory) is supported by lessons and didactic materials with a linguistic approach, which should be harmonized with procedural learning based on experience and laboratory activities. Procedural learning refers to unintentional learning that occurs outside of awareness (Reber, 1967) and is in contrast to declarative learning. In normal learning processes, both procedural and declarative mechanisms work together, competing to optimize learning outcomes (Poldrack & Packard, 2003; Foerde, Poldrack, & Knowlton, 2007).

Unlike other fields where theoretical aspects take precedence, the ability to recognize wines using the olfactory sense is central to enology and wine tasting. As a result, methodologies and specific didactic tools have been implemented in enology education to enable the acquisition of a basic level of sensory recognition with the support and guidance of experts. Specific learning approaches include dedicated sensory analysis laboratories or kits for olfactory learning. These kits contain primary odors and scents typical of wines, allowing students to train their sensory abilities autonomously. However, they require a control sheet to ensure the consistency of students' improvements.

These tools primarily focus on improving sensory abilities, particularly olfactory senses, which can be enhanced through experience. Experts assist students in distinguishing and grouping odors and flavors, progressing through procedural

learning levels to create a perceptual synesthetic, holistic, and multisensory framework. The ultimate goal is the identification and assessment of wines. However, the significant cost associated with this entire process, such as the need for a high teacher-to-student ratio or online learning during events like the COVID-19 pandemic, poses challenges. Currently, higher educational institutions offer various online courses, including MOOCs, related to the wine field (Di Fuccio & Toto, 2021). These courses are motivated by their impact on local economies, the increasing demand for professionals with scientific competencies and specific knowledge, and the growing number of wine enthusiasts seeking to improve their tasting skills. However, most of these online courses focus solely on declarative learning, lacking solutions for procedural learning based on experiential training, which is crucial in the field of wine tasting. Only a few examples incorporate sensory recognition in MOOC-based learning (Limone et al., 2022).

Theoretical framework

The theoretical and methodological framework of this report draws inspiration from the experiences described in the previous sections. It is particularly influenced by the Montessori applied practice and rooted in the organismic theories of Piaget (emphasis on "learning by doing") and Vygotsky (development of potential and relevance of the social context). This approach ensures the activation of highly effective learning mechanisms, such as the Learn To Learn competence, which is recognized by UNESCO as a fundamental skill for the 21st century.

The theoretical framework of this thesis is based on the principle of "learning by doing" (Dewey, 1936) and harnesses the learning potential inherent in manual activities, which provide multisensory and motor acquisitions in addition to cognitive stimulation. In this perspective, Montessori emphasizes the importance of hand usage as a "window to the world" that conveys a wealth of sensory and motor information, influencing higher cognitive functions. Bruner (1990) also recognizes the fundamental role of manipulative actions in psychological development and representational cognitive activities. It is an activity that involves sensorimotor processes transferred and represented in neurocognitive structures, where they are performed as "simulated acts" in a virtual mind (Newcombe & Shipley, 2012).

The learning facilitated by "doing" and concrete action, promoted through the use of various technologies integrated into the project, serves as an educational tool that effectively supports both school and extracurricular teaching practices. Collaborative learning is also encouraged through the shared use of project materials.

This approach places the child as the protagonist of the knowledge construction process, emphasizing tools that promote individual and social activism. Children are not perceived as passive containers in the educational process but as architects of

their own learning progress. In our theoretical framework, this mechanism is transferred to the learner, the student in enology who uses physical and tangible objects for olfactory learning to improve their skills in the fields of winemaking or viticulture. The idea is that knowledge construction fosters individual activism, including that of the student learning through a MOOC (Di Fuccio, 2022).

The proposal of technological devices to support education aims to place students as "actors" in a self-education process, for which the teacher serves as a guarantor and supervisor. In this case, the teacher is online, and the system is based on artificial agents that manage learning. Self-education becomes a decisive and indispensable process. The system not only assists teachers, who, due to limited numbers, cannot constantly supervise the learning performance of all students in large classes, especially in enology education where continuous supervision is necessary, but also aims at personalizing learning programs. This is achieved through the formulation of specific objectives for each learner and the development of a performance tracking system that provides feedback for modifying and reformulating the individual learning path on an ongoing basis. This is facilitated by the use of artificial intelligence and tutorial mechanisms integrated into the system.

The construction of prototypes and methodologies focuses on the flexibility of the system and personalization based on individual needs, an indispensable goal in order to adapt teaching to the educational needs of all students in an inclusive perspective. This includes addressing Special Educational Needs (linguistic minorities, economically disadvantaged social groups, students with learning difficulties, and individuals with various disabilities). Special education can benefit significantly from the versatile use of materials designed to be both attractive and pedagogically effective, with extraordinary self-learning potential.

The perspective is to promote the social inclusion of all students, with particular attention to students belonging to sensitive groups, through the shared use of

learning materials and participation in group activities. Social inclusion has positive repercussions not only on the quality of learning but also on the emotional and relational aspects within the class group. It also has a positive influence on the psycho-physical health of those experiencing the sense of inclusion (with broad benefits).

From the individual's interaction within the social group and in harmony with the environment, active learning inputs can be produced. This type of active learning is particularly crucial in the 21st century, with the advent and prevalence of technological devices that increasingly stimulate active interaction. The available opportunities must be seized to ensure that learning and education keep pace with the times and optimize the experiences for both learners and educators.

This report strongly investigates the role of Tangible User Interfaces (TUIs), drawing strength from the Montessori-inspired multisensory approach and the role of object manipulation. Objects within a learning environment can be approached in a pseudo-playful manner. It captures the essence of the "learning by doing" theory, where the innate need of children to explore the world through play is combined with the opportunities provided by new digital devices. However, manipulation and multisensory experiences cannot ignore the traditional experiences currently developed in schools.

The technological enhancement aims to provide:

1. Immediate online feedback without the need for continuous involvement of teachers or tutors in every exercise.

2. Personalized exercise proposals based on the educational objectives set by the teacher.

3. An engaging and appropriate framework for the child, involving dynamic storytelling to immerse the child in a simultaneously educational and enjoyable dimension.

4. Session tracking, useful for teachers to take appropriate measures and subsequently motivate the learner, and for parents to assess their child's progress, aligning educational proposals at home.

5. Flexibility in the use of teaching materials in formal contexts such as classrooms and informal contexts such as homes.

Hybrid-technology/manipulation approach

The classical approach to human interaction with technology involves simulating real actions through specifically created devices. A typical example is the mouse, a ubiquitous device that allows users to move a pointer on a screen to simulate certain operations. In the case of tablet games, by recognizing the movement of a finger, we can simulate billiard shots (adjusting the angle and power), drive cars, or alternatively control an entire soccer team.

The hybrid approach revolutionizes this perspective by placing manual action and the reproduction of everyday actions at the center, without the filter of simulation. Simulation becomes a mere enhancement of the action. For example, a physical card is used in the real world, which triggers a simulated action in the digital platform, with a semantic connection to the object itself. It is through the exercise that the object is linked to a specific "meaning". In our case, the scented jars will be the vehicles for learning, and the "meaning" will not deviate far from their ontological matrix. The jar with the Sherry aroma in the application will simply indicate Sherry itself. In this case, the connection between the object and its meaning remains unchanged. What will be altered is the use of the jar. Typically, in enology, enology kits are used, consisting of a number of olfactory jars that help the operator learn the various main aromas of wine. It is important to emphasize that this represents initial learning for novices, as individual aromas are introduced sequentially, allowing for the learning of each specific scent. As students progress in their enology studies, they will first learn about blends and a series of mixed aromas, which they will subsequently taste directly from the glass, allowing for not only olfactory but also gustatory learning.

The objective of this manual is not to explain in detail the workings of olfactory learning and its differences from gustatory learning, but to propose a different pedagogical framework for learning mediated through a distance learning course that also improves knowledge of the individual aromas present in wines. The

olfactory course mediated by technology aims to go hand in hand with learning through slides and video courses that the MERGO project will develop.

Hybrid learning environments

Hybrid learning environments combine real tools with enhanced manipulative actions, offering improvements over traditional manipulative techniques and digital learning. These environments have several strengths (Di Fuccio, 2022):

1. They overcome the limitations of excessive screen reliance in digital applications by actively engaging students in tasks that involve interacting with devices and the surrounding environment.

2. They provide a means for assessing student sessions, serving as a valuable tool for teachers.

3. They reduce the costs associated with traditional structured lessons that require continuous teacher support.

4. They enable personalized learning paths tailored to individual students.

5. They connect elements within familiar environments like homes, museums, or schools, creating intelligent environments that enhance learning experiences.

The primary goal of hybrid learning is to create an engaging educational setting that incorporates playful elements, resembling a 2.0 environment both inside and outside the classroom. By focusing on manipulative actions and fostering collaborative behaviors, these environments not only facilitate the acquisition of essential cognitive skills but also promote social inclusion.

Customizing educational paths becomes feasible by identifying specific objectives for each student and utilizing Artificial Tutoring Systems (ATS) to track their progress. This real-time feedback allows for the continual redefinition and adjustment of the educational path to better suit individual learners.

Enhanced learning environments for remote education

In this paragraph, the focus is on developing improved learning environments. The idea is to create an environment where learners can utilize familiar spaces, such as their own rooms, and transform them into enhanced and suitable settings for learning and remote education. Rather than being confined to separate classrooms, the learning environment should seamlessly integrate into learners' daily activities by enhancing the spaces themselves.

The aim is to bring the learning environment into students' homes, even for those with sensory disabilities, by following a few simple guidelines. The goal is to enable students to set up their own learning laboratories wherever they prefer, whether it's next to their PC where they study or in their cellar where they indulge in their passion for homemade wine.

The criteria that will guide the development of multisensory learning environments are as follows (Di Fuccio, 2022):

- Accessibility: The space should facilitate easy access for students, both in terms of logistics and interface. Accessibility involves providing user-friendly materials and removing architectural barriers or obstacles. Students should not come into contact with hazardous materials or objects, such as those that are easily ingestible, fragmented, or involve fire. The virtual and physical spaces should be designed to offer zones of interest and age-appropriate materials. In the case of the MERGO project, accessibility should be a fundamental principle applied to both the digital application and the online course (MOOC). The goal is to create an environment that encourages free exploration, self-awareness in space, and distraction-free olfactory learning. Accessibility also includes providing exercises suitable for students' cognitive levels, with progressive enrichment based on their achieved results or feedback from teachers (both in physical and virtual forms).

- Interactivity: The system and environment should provide continuous stimuli and surprises to engage learners. Through ongoing interaction, students should receive explicit and/or implicit responses that guide their experiential process and bring the elements they've learned during MOOC lessons to life. Interactivity should go beyond mere stimulation and serve as an event that fosters the growth of learners. By actively engaging with the environment, students become familiar with it quickly and have the opportunity to discover new characteristics of wine and delve deeper into the material covered in the online course. With advancements in technology, highly interactive elements can be seamlessly incorporated into students' study spaces.

- Customization: The environment should directly cater to the individual needs of each student, following a criterion of individual characterization. As previously mentioned, personalization plays a crucial role in developing a suitable learning environment. Exercises should adapt to students' levels, offering tasks that align with their existing knowledge. Personalization should also extend to the learning paths, which should be adaptable by teachers. It is important to consider personalization in terms of timing and usage within the platform. Therefore, teacher supervision is essential for maintaining overall control and preventing inappropriate behaviors.

- Functional specificity: Spaces and environments should include distinct zones for various activities based on teachers' choices. It is the teachers who prepare activities and provide appropriate materials for the digital and physical environments to facilitate students' progress. Proposing cooperative group activities, even in virtual settings, in collaboration with expert winemakers is crucial. Cooperative learning techniques like the Jigsaw method can serve as powerful mechanisms in this regard. It is important to allocate specific time and physical areas for cooperative games separate from those dedicated to individual learning.

In the MERGO project, cooperative techniques will be employed during multiplier events, but the goal is to create functional environments for olfactory training.

- Differentiation of stimuli: The system and environments should offer a diverse experiential dimension that intertwines with the learning process. This includes incorporating playful elements aimed at stimulating multiple competencies, such as cognitive, linguistic, and logical skills. While interactions with various exercises should selectively stimulate specific competencies, overall stimulation should be reduced to maintain a focus on task resolution. Game sessions should be well-organized and time-defined for students. The stimuli or feedback from the environment should be as non-directive as possible, allowing students to learn from their mistakes through practice.

MERGO project

The MERGO (Mooc in Enology aimed at Reinforcing competences applying Game-based approach and Olfactive learning for wine tasting) project, funded by the EU, aims to bridge the gap between declarative learning and procedural learning in the field of enology. The project combines a MOOC for declarative learning with procedural learning enhanced by the application of TUIs. The incorporation of gamification elements further enhances user engagement.

The objective of the MERGO project is to develop innovative ICT tools and a validated pedagogical framework to enable autonomous and distance training for students in olfactory learning. The tools utilize artificial intelligence modules, such as adaptive artificial tutors, to orchestrate olfactory stimuli recognized by a digital interface. The project has developed a first prototype using TUIs and Internet of Things (IoT) concepts. The prototype includes NFC-tagged odor jars that can be recognized by smartphones equipped with NFC antennas. Users engage in olfactory exercises based on task assignments co-created with experts from the wine sector. The gamified process creates a sense of flow, leading users through the learning experience (Csikszentmihalyi, 1997).

Tangible User Interfaces

In recent years, Tangible User Interfaces (TUIs) empowered by artificial tutoring systems have emerged as innovative tools. TUIs enable users to interact with tangible and multisensory objects, including those containing odors, which can be recognized by a digital component. This technology provides a new avenue for enhancing academic learning methodologies, giving students autonomous tools to engage in learning activities. TUIs go beyond traditional analog tools by allowing users to operate in the real environment with physical objects while interacting with a digital interface. They offer a natural and inclusive approach through their multisensory nature.

A useful definition of Tangible User Interfaces in made by the MIT's Tangible Media Group[1]:

"Tangible User Interface (TUI), based on the physical embodiment of digital information and computation, in order to transcend the current dominant paradigm of "Painted Bits" or Graphical User Interfaces (GUI). Humans have evolved a heightened ability to sense and manipulate the physical world, yet the GUI based on intangible pixels takes little advantage of this capacity. The TUI builds upon our natural dexterity by embodying digital information in physical space. TUIs expand the affordances of physical objects, surfaces, and spaces so they can support direct engagement with the digital world."

The term Tangible User Interface (TUI) was coined in 1997 by Hiroshi Ishii and Brygg Ullmer following George Fitzmaurice's work on the Bricks prototype (Fitzmaurice, Ishii, Buxton, 1995). Bricks are Lego-like blocks that, when placed on an Active Desk, can be detected by the system and used as input devices to interact with graphical representations. Moving the bricks allows for actions such as object manipulation, rotation, and transformation (if multiple bricks are moved simultaneously) within the virtual environment displayed on the device.

[1] https://tangible.media.mit.edu/vision/

In their 1997 article "Tangible Bits: Towards Seamless Interfaces between People, Bits, and Atoms," Ishii and Ullmer introduced the concept of TUI as a departure from the traditional Graphical User Interface (GUI). TUIs enable us to transform the surrounding world into an interface that facilitates communication with the digital realm by linking physical objects to digital information (Ishii, Ullmer, 1997).

The mouse serves as an early example of a Tangible User Interface. It is a tangible and physical object from the real world that, based on our dexterity, allows us to interact with the digital information presented in Graphical User Interfaces, such as the windowed interface of Windows. By manipulating the mouse, we navigate through the graphical and virtual elements, effectively bridging the gap between the physical reality and the digital realm.

Interacting with physical and tangible objects disrupts the virtual system, resulting in the recognition of the object's attributes, which can vary depending on the specific application. Object recognition can be based on factors such as its informational contribution, spatial dimensions, or assigned meaning, as demonstrated in the following examples.

This book places a strong emphasis on TUIs, which represent an intriguing frontier due to their inherent ability to engage the five senses through a multisensory approach. In the next section, we will explore various applications of tangible interfaces within this manual.

In the context of wine tasting, TUIs can play a crucial role in enhancing the basic sensory training of students by incorporating olfactory stimuli recognized by a digital interface. This approach enables procedural learning based on olfactory recognition, supported by adaptive artificial tutor systems. TUIs provide an opportunity for personalized learning, allowing students to progress at their own pace. Furthermore, the gamification approach inherent in TUIs enhances user engagement (Vaibhav & Gupta, 2014).

Co-Creation

The co-creation process plays a vital role in the MERGO project. It involves stakeholders and experts from the wine sector, including researchers, wine tasting experts, professionals from wine companies, and winegrowers. These stakeholders collaborate in the co-creation of learning exercises, ensuring their alignment with the aims of the MOOC syllabus. The exercises are designed as Open Educational Resources (OERs) embedded in the MOOC, enabling olfactory learning. The feedback and input from the experts help refine the exercises and ensure their relevance to the wine sector.

Alongside the co-creation process, the MERGO project seeks to engage various organizations, including HEIs, businesses, and the third sector. The project's objective is to evaluate the initial prototype and collaborate with field experts to co-design new exercises utilizing the MERGO Odour Game kit. This approach aims to foster a collaborative and dialogical environment, where the diverse skills and competencies of stakeholders and researchers contribute to the creation of shared value (Vargo et al., 2008). The project framework incorporates dimensions of sustainability, open innovation, and value co-creation (Rupo et al., 2018).

Massive Online Open Courses (MOOCs)

MOOCs, which stands for massive (targeting a wide audience), open (free and unrestricted attendance), online (delivered via remote online platforms) courses, represent a form of distance learning. While it is challenging to pinpoint a specific watershed moment or attribute the creation to a single inventor, the international literature often refers to three individuals—Downes, Siemens, and Cormier—as the "fathers" of this methodology (Cormier, Siemens, 2010). These professors from Manitoba University in Canada created their first MOOC in 2008, serving as a model for subsequent experiments and paving the way for large-scale entrepreneurial projects like Coursera, Udacity, edX, and FutureLearn. These platforms, which emerged a few years after the initial trials at Manitoba's teaching laboratory, experienced substantial global impact, growing from 2,300 online students to millions of simultaneous users. The term "massive" proved prescient and fitting. MOOCs are not limited to a small number of users accessing online course material; instead, they attract tens or even hundreds of thousands of learners, with millions of people participating overall. For instance, Coursera, one of the leading MOOC platforms globally, currently boasts approximately 40 million users—an incredible figure considering that just a few years ago, universities could only claim a few hundred thousand enrollees. This growth in the number of learners (over 100 million worldwide at present) and courses (over 11,000) reveals new and unprecedented horizons in lifelong learning pathways (source: https://www.classcentral.com/report/mooc-stats-2019/).

Over the course of 20 years, a significant cultural evolution has taken place. MOOCs encompass a wide range of subjects and are offered by various stakeholders, including companies, higher educational institutions, universities, and museums. These entities provide specific content tailored to their target audience. The key strength of this approach lies in the ability to make courses accessible to all users without limitations. In this context, the University of Foggia, a leading partner in the TUNED project, plays a central role as one of the promoters of the Italian MOOC

platform called EduOpen, which involves around a third of Italian universities. Currently, there are several MOOC providers, with FedericaWebLearning, promoted by the University of Naples, being one of the most significant (Stracke et al., 2019).

MOOCs possess distinctive features. Notably, they aggregate educational offerings from different higher educational institutions, enabling the promotion of top courses from leading global universities to a vast audience without restrictions. Courses can encompass traditional subjects, lifelong learning topics, or scientific dissemination. MOOCs provide access to specific areas of interest, allowing learners to acquire new knowledge or enhance critical skills through continuous learning updates.

Another possibility offered by MOOCs is the sharing of open educational resources or the provision of concise teaching/learning modules focusing on specific topics. The possibilities are vast, utilizing free content to meet specific needs. In this regard, MOOCs facilitate a high level of personalization in the learning process.

The term "MOOC" was coined in 2008 by David Cormier after Stephen Downes and George Siemens created the course "Connectivism and Connective Knowledge." The first MOOC, "Introduction to Artificial Intelligence," was launched by Stanford University in 2011 and attracted over 160,000 participants (De Notaris et al., 2021).

Since the emergence of MOOCs in 2011/2012, there have been discussions about their disruptive potential for traditional teaching paradigms and didactic methodologies reliant on frontal and transmissive lectures. This innovation in the field of learning opened up unprecedented possibilities, allowing individuals in rural regions to access high-quality courses offered by prestigious institutions like Harvard, provided they have internet connectivity. This democratization of

knowledge access aims to overcome barriers, such as geographical limitations or disabilities, by offering free access to educational content.

MOOCs and Games

Gamification is an approach that applies game mechanics in non-game contexts to engage users. The use of gamification in education has been well-documented since its introduction in 2008, but its proper implementation began in 2010, with its definition being "the use of game elements in non-game contexts" (Deterding et al., 2011). It is distinct from educational and serious games, as the latter are not primarily focused on entertainment.

Gamification extends game elements to contexts unrelated to games, such as marketing, sales, or education. Although education is the most significant field of application for gamification, this paragraph focuses on the connection between MOOCs and games. Games in education are often referred to as "serious games."

Serious games are games that maintain a typical game structure while incorporating an educational objective. The term "serious games" emerged in the early 1970s, thanks to the work of Abt, and gained attention in 2002 with B. Sawyer, D. Rejeski, and the Serious Games initiative, which explored the use of games for specific types of training, such as military personnel. Since then, an intense and fruitful debate has taken place, primarily focusing on defining serious games.

The most widely accepted definition, proposed by Michael and Chen in 2006, states that serious games are designed for purposes other than pure entertainment, incorporating educational or training elements. They find applications in various industries, including education, health, emergency management, engineering, and the military.

From a pedagogical perspective, serious games are grounded in constructivist learning theories, which assert that knowledge is constructed through experiential learning and activities that involve exploring the world. Various pedagogical models, such as experiential learning, inform the design and implementation of serious games. Virtual experiences, like real-world experiences, enable information acquisition, memory retention, and behavioral changes through a learning-by-doing approach (Dewey, 1938). Learning is no longer limited to passive knowledge transfer between teachers and learners but encompasses active and conscious acquisition of new knowledge through continuous experimentation, expert guidance, and supervision. These elements make learning an engaging and captivating experience that enhances motivation and promotes successful completion of training paths.

When integrating serious games into MOOCs, there needs to be a strong connection with the course structure, enabling learners to apply what they have learned (De Notaris et al., 2021). Research on the integration of serious games into MOOC learning pathways is still in its early stages, but scholars highlight the motivational and learning benefits of educational gamification. Games allow learners to interact with multimedia environments in ways that surpass books, audio, or video materials. They enhance cognitive skills, procedural and declarative knowledge, and critical thinking abilities.

The integration of serious games and MOOCs presents exciting possibilities, and several experiences have explored this intersection.

The Potential of Video Games in Teaching Practices

The evolution of video games over the past few decades has had a significant impact on the lives of many individuals and has influenced the organization of social practices. Video games have brought about transformations in various aspects, including the rise of gamification processes.

Defining a video game is not as simple as describing it as an interaction between players through a monitor or television screen. Video games have evolved to offer immersive experiences that were once only imaginable in utopian literature or comics. They have had a profound cultural effect, shaping the language of digital communication and influencing film iconography and literature. The timing of narratives and character interactions in contemporary novels are deeply influenced by video games, making them a global phenomenon of immense proportions. The serious games market has experienced continuous growth, which has been further accelerated during the COVID-19 pandemic.

The serious games market is a subset of the larger video game market, which was estimated at $151.06 billion globally in 2019, with an annual growth rate of 12.9% projected from 2020 to 2027. The serious games market itself is estimated to have been valued at $2.731 billion in 2017 and is projected to reach $9.167 billion by 2023, with an average annual growth rate of 19.2% during the period from 2017 to 2023. Different sources may provide slightly varied projections, but it is evident that the market is expanding rapidly, and future estimates suggest a continuation of this growth trend. Key factors driving this market growth include increased adoption of serious games by companies for management and training purposes, the growing use of mobile devices for educational games and learning, and the rise of digital skills, digitization, and social media.

Some challenges are associated with inconsistent game design and a lack of knowledge about these tools. However, the market growth in Germany alone is expected to reach $370 million from 2020 to 2030, with an annual growth rate of

19%—consistent with the global trend. The use of serious games in employee training is considered a significant driving force in this growth.

Notably, statistics from Europe's Video Game Industry (ISFE) reveal interesting insights about video game usage in 2020. Among the population aged 6 to 64, 51% play video games, with 59% using mobile devices (smartphones or tablets) for gaming, and 51% playing on computers. The average age of video game players is 31, and it is worth noting that 45% of European video players are women, with 86% of them preferring single-player experiences. When it comes to mobile gaming, women make up 51% of the gamer population.

The history of video games has been characterized by rapid evolution. It all started with the first video game, which emerged almost serendipitously as scholars and engineers sought a break from their research activities to engage with the technologies they worked with. They experimented with programs primarily designed for recreation rather than scientific purposes.

Video games nowadays

The video game industry is the most sought-after market in the entertainment sector. In 2020 alone, the revenue generated by video games exceeded $100 billion. Video games have expanded into new avenues of communication, such as social games on social networks, gaming apps, and their integration into portable devices like smartphones. They have become increasingly present in our daily communication tools. Let's now examine the prevalence of video games in Italy. It is important to note that the age distribution of players has shifted over time. While electronic device usage was once more common among the 6-24 age group, there is now little difference between men and women in terms of video game consumption. The number of gamers is well-distributed across all age groups, including individuals between the ages of 40 and 55. Remarkably, around 80.6 - 81.4% of respondents in this age range reported playing video games at least once in the previous six months.

This data is surprising and should be a cause for reflection and concern. It is notable that a high percentage (71.1%) of interviewees started playing video games before the age of 18, while only 17.1% began after the age of 25. Generally, it appears that regular gamers are mostly found within the 18-24 age group. This may be attributed to the relatively fewer work commitments in this stage of life, allowing for more leisure time dedicated to video games.

Furthermore, video games have significantly permeated social networks, even those that are not typically associated with gaming.

Gee's Principles as a methodological tool for the MERGO project

James Paul Gee, a researcher from California and author of "How a Video Game" (2013), has significantly influenced the scientific community in the intersection of games and education. His work was instrumental in formulating his principles, based on the understanding that video games are complex tools that can evoke fear or lead to techno-addictions unrelated to genetic development (Toto, 2018).

The following are Gee's principles:

1. Identity

- Deep learning requires learners to make a long-term commitment and adopt a new identity.

- Learners need to feel involved and take on a new sense of self to facilitate learning and commitment.

2. Interaction

- Games provide powerful interaction, fully engaging the user within the virtual world.

- The student/player must take action, as the game responds and evolves based on their decisions.

3. Production

- In games, players become co-designers by actively shaping activities through their actions and decisions.

- Users create content, elements, and new challenges within the game.

4. Risk-taking

- Games provide a safe environment for users to take risks, allowing for analysis of the effects of failures and negative actions.

- The game can always be restarted, encouraging users to explore, take risks, and try new things.

5. Customization

- Games are designed to personalize interactions based on users' actions and decisions.

- Customization allows users to proceed at their own pace, according to their skills.

6. Agency

- Players experience a sense of agency and control through the previous five principles.

- They feel a sense of ownership and control over their actions in the game.

7. Well-Ordered Problems

- Problems in games are structured into levels or other settings.

- The problems stimulate the formulation of hypotheses to solve increasingly challenging problems.

8. Challenge and Consolidation

- Learners develop problem-solving skills within a level, and the game introduces new classes of problems to further enhance knowledge and expertise.

9. "Just in Time" and "On Demand"

- Games provide verbal information when it is most needed, either "just in time" or "on demand."

- Information is presented synchronously, with immediate feedback on each interaction.

10. Situated Meanings

- Games associate the meanings of words with specific actions, images, and dialogues.

- They illustrate how meanings vary across different contexts within the game.

11. Pleasantly Frustrating

- Well-designed games ensure a flow state, where players are immersed in the action and face challenges that can be overcome with previously acquired skills.

- This state of challenge and reward is highly motivating for learners.

12. System Thinking

- Games present background scenarios and external systems to be understood and solved.

- Games encourage players to think about relationships and connections, rather than isolated events or facts.

13. Explore, Think Laterally, Rethink Goals

- Games allow for exploration and the generation of "out of the box" solutions, fostering creativity and divergent thinking.

- At the same time, games encourage players to thoroughly explore before moving forward quickly.

14. Smart Tools and Distributed Knowledge

- Characters and other elements within a game are considered "smart tools" that players manipulate.

- In multiplayer games, the knowledge needed to play is distributed among real people and their virtual characters.

15. Cross-Functional Teams

- Games promote cooperative learning and a collaborative approach through team-building actions.

- Effective teamwork arises when players have different skill sets, covering various areas of expertise.

16. Performance Before Competence

- Players can perform within the game before fully mastering the required skills, facilitated by the game's design.

How design a course in enology: a proposal of a framework

In the MERGO MOOC we intend to implement a course that could support the experts in enology to provide information for their students. The students could also be enthusiasts of wine, people that wants to learn wine tasting to became sommelier or even for the improvement of their skills in wine sector.

For this reason we consulted the literature in order to check which is the potential models for the development of courses in enology with a pedagogical framework.

Of all the literature available and consulted, the paper of Renata Marciniak published in the International Review of Research in Open and Distributed Learning, 2018, 19(2), entitled, "Quality Assurance for Online Higher Education Programmes: Design and Validation of an Integrative Assessment Model Applicable to Spanish Universities", presents a model designed to assess the quality of online Higher Education online programmes that includes the assessment of the quality of the programme itself, as well as its continuous assessment. The model guides the persons in charge of the implementation of online programmes and allows to conduct a more comprehensive assessment of the programme in order to discover its strengths and weaknesses, and opportunities for its improvement. The model can be also applied by online programme designers as a guideline for creating high quality programmes.

Key points:

Based on the proposals made in the literature an online education programme should focus on clarifying and developing the following components:

1 Online programme justification (What is the reason for the existence of the online education programme?)

2 Online programme objectives (What is the online education programme for?)

3 Student profile (Who is the online education programme for?)

4 Thematic contents (What is going to be taught?)

5 Learning activities (How is the online education programme going to be carried out?)

6 Online teacher profile (Who is going to conduct the online education programme?)

7 Didactic materials and resources (What is the online education programme going to be carried out with?)

8 Learning assessment strategies (How is the student's learning process going to be assessed?)

9 Tutorial (What support is going to be offered to the students during the learning process?)

10 Virtual classroom of the programme (What is the virtual environment of the programme going to be like?)

These components define the quality of online Higher Education programmes and, thus, should be assessed in order to identify the strengths and weaknesses, and the opportunities for improvement, of each programme. By generating a complete model for quality assessment that includes indicators for online education programmes, and allows for the assessment of the pedagogical and technological components of the programme and of its planning, development, and results, we intend to promote an improvement process for the continuous adequacy of the programmes based on their quality objectives.

Model

The quality assessment model proposed contains fourteen dimensions. The first eleven dimensions make it possible to assess the quality of all of the components of an education online programme, and the last three dimensions verify the quality of all stages of the programme. The working definition of each dimension is:

- Dimension 1—Online programme justification: the determination of the reasons for the existence of the online programme.

- Dimension 2—Online programme objectives: the proposals and objectives to be achieved by the programme.

- Dimension 3—Student profile: a set of the defined knowledge and competences that must be met by new students and those who have completed the programme.

- Dimension 4—Thematic contents of the e-learning programme: themes and topics that constitute the online programme.

- Dimension 5—Learning activities: different tasks carried out by students.

- Dimension 6—Online teacher profile: particular features that characterize the person who gives the online programme.

- Dimension 7—Educational material: any material used by the online teacher or by the student to facilitate the teaching-learning process.

- Dimension 8—Educational strategies: strategies used by the online teacher to support the teaching/learning processes.

- Dimension 9—Tutoring: a coaching process during the learning process that is carried out by the online teacher via individual attention.

- Dimension 10—Assessment of student's learning: the evaluation and monitoring of students.

- Dimension 11—Virtual platform: a software that allows educational contents to be distributed and to carry out the online educational programme.

- Dimension 12—Initial assessment of the programme: an assessment carried out one week before the planned start of the programme in order to establish the degree to which the programme is prepared to begin, and to know whether it can be launched.

- Dimension 13—Processual assessment of the programme: an assessment of the programme at the midpoint of its course, done in order to maximize its

development, identify its weaknesses, to make decisions about how to eliminate them.

- Dimension 14—Final assessment of the programme: an assessment carried out immediately after the completion of the online programme to determine the degree to which the programme achieved its educational goals, and to measure the effects of the programme and student satisfaction.

Distribution of the Indicators Based on the Proposed Dimensions

Variable 1: The assessment of the quality of the e-learning education programme itself		
Dimension	*Number of associated indicators*	*Goal*
1. Justification of the online programme	3	to assess whether the online programme successfully explains and justifies itself so that students can see that the programme is useful, and can understand it in terms of their learning process and professional development.
2. Educational goals of the online programme	5	as ways of assessing whether the programme defines clear and measurable objectives and whether these objectives are coherent with the syllabus of the programme and are

		responsive to the demands of the labour market
3. Student profile	7	to assess whether the programme clearly defines its access and graduation profiles, and whether these are made available to the students.
4. Thematic contents of the online programme	5	assess the quality of the thematic content of the programme. They assess, among other things, whether the content is appropriate, taking into consideration the study load and whether the content is coherent with the educational objectives and the graduation profile of the programme, as well as whether the different topics and subjects are up to date, easily understandable, and arranged in a logical manner.
5. Learning activities	8	for the assessment of whether the learning activities meet the following quality criteria: different typology; contribution to the achievement of the educational objectives of the programme; encouragement of teamwork; definition of guidelines,

		schedules, deadlines, and delivery methods for each activity.
6. Online teacher's profile	3	qualifications necessary to teach the programme. These qualifications include the pedagogical and technological competences required for the online teaching/learning process.
7. Learning materials	9	to assess the quality of the teaching materials. Among other aspects. These indicators assess whether the teaching materials are appropriate, sufficient, up-to-date, motivating, and accessible by students.
8. Teaching strategies	3	assess the quality of the teaching strategies applied by the online teacher, focusing on their typology and coherence with the educational objectives of the programme.
9. Tutoring	7	to assess the quality of the individual and group tutoring sessions carried out by the online teacher. Moreover, they assess whether the teacher provides the students with appropriate feedback for each activity.

10. Assessment of the students' learning	4	assess the strategies applied for the continuous assessment of the learning process undertaken by the students. These indicators assess, among other things, whether the programme introduces clear assessment criteria and rules, and whether it applies them while taking into consideration the nature of each learning activity.
11. Quality of the virtual classroom	9	assess the quality of the virtual classroom and whether it allows to manage all stages of the programme, such as the preparation of the programme content, the implementation of the programme, the assessment of the abilities acquired by the students, and the assessment of the learning process.
Variable 2: The ongoing assessment of the online programmes		
12. Assessment of the initial stage of the online programme	4	to assess the three stages of the programme, that is, its initial, development, and final stages.
13. Assessment of the development	7	to assess the three stages of the programme, that is, its initial, development, and final stages.

stage of the online programme		
14. Assessment of the final stage of the online programme	7	to assess the three stages of the programme, that is, its initial, development, and final stages.
Total	81	

The System of Indicators for the Quality Assessment Model for Online Higher Education Programmes

Based on these indicators and dimension we derive the assessment of each of those with specific qualitative values.

Variable 1. The assessment of the quality of the education online programme itself

Dimension 1: Online programme justification

Indicators:

1. The online programme has been created in relation to the educational needs existing within the society.

2. The online programme responds to the labour market.

3. The reasons that justify the necessity of enrolling into the programme by the student are duly explained.

Dimension 2: Educational goals of the online programme

Indicators:

1. The educational goals of the programme are adequate to the demands of the labour market.

2. The educational goals are drafted based on the skills to be acquired by the students after completing the programme.

3. The educational goals are coherent with the contents of the programme.

4. The educational goals of the programme are measurable.

5. The educational goals of the programme are available and accessible to all persons interested in the programme.

Dimension 3: Access and graduation profile

Indicators:

Access profile

1. The access profile has been designed.

2. The access profile describes the previous education required in order to enrol in the online programme.

3. The access profile is accessible to all persons interested in the online programme.

Graduation profile

1. The programme contains the graduation profile.

2. The graduation profile has been defined in terms of the competences to be acquired by the students after completing the programme.

3. The graduation profile has been updated according to the needs.

4. Verification of whether the graduation profile of the programme is accessible to all persons interested in the programme.

Dimension 4: Thematic contents of the online programme

Indicators:

1. The thematic contents of the programme are appropriate taking into account the subject of the programme.

2. The thematic contents of the programme are proportional to the study load indicated in the syllabus.

3. There is coherence between the thematic contents of the programme and its educational goals.

4. The themes and subthemes of the thematic contents of the programme are arranged in a logical manner.

5. The thematic contents of the programme are reviewed on an annual basis.

Dimension 5: Learning activities

Indicators:

1. The learning activities proposed within the programme are of different types.

2. All the activities are coherent with the educational goals.

3. Instructions for each learning activity have been drafted

4. A schedule of the activities has been provided.

5. A deadline for the delivery of each activity has been set out.

6. The method and format of delivery has been described for each learning activity.

7. The proposed activities promote collaborative learning.

8. The volume of the learning activities is suitable to the teaching load of the programme.

Dimension 6: Online teacher profile

Indicators:

1. The online teacher has the appropriate professional profile according to the requirements of the programme subject.

2. The online teacher has the appropriate pedagogical competences in order to carry out the online teaching/learning process.

3. The online teacher has the technological competences necessary to carry out the teaching/learning process.

Dimension 7: Online teacher profile

Indicators:

1. The resources made available to the students are of different types.

2. The programme offers the basic learning resources.

3. The programme offers complementary learning resources.

4. The programme contains a set of Web-based learning resources.

5. All the learning resources are coherent with the educational goals of the programme.

6. The learning resources of the programme have been selected based on clear selection criteria.

7. The basic bibliography of the programme is described.

8. The complementary bibliography of the programme is described.

9. The basic and complementary bibliography is updated (30% of the bibliographical suggestions is dated no longer than five years prior).

Dimension 8: Educational strategies

Indicators:

1. The online teacher uses different types of teaching strategies.

2. The teaching strategies used by the online teacher are coherent with the educational goals.

3. The online teacher promotes different learning strategies among the students.

Dimension 9: Tutoring

Indicators:

1. The functions of the online teacher and of the persons involved in the development of the programme are defined and accessible by students.

2. The online programme includes instructions regarding the communication methods with the online teacher.

3. The timetable of the tutoring sessions has been defined.

4. The online teacher carries out individual tutoring sessions.

5. The online teacher carries out group tutoring sessions.

6. The tutoring sessions carried out by the online teacher are monitored.

7. The students receive feedback regarding each task.

Dimension 10: Assessment of students' learning

Indicators:

1. Different strategies for the assessment of the students' learning process have been defined.

2. The assessment criteria of the learning process are accessible by the students.

3. The criteria to be used to grade the students' progress are detailed and accessible by the students.

4. The students participate in the process of determining and assessing the achieved progress.

Dimension 11: Quality of the virtual platform

Indicators:

1. The virtual platform includes a tool to submit activities or files.

2. The virtual platform offers tools that allow to manage the learning activities.

3. The virtual platform includes tools that allow to create group tasks.

4. The virtual platform contains tools that allow the students to create their own personal learning environments.

5. The virtual platform offers tools for the asynchronous communication.

6. The virtual platform contains tools for the synchronous communication.

7. The students can view the results of the completed exercises and/or exams in the virtual platform.

8. The virtual platform contains a tool that allows the online teacher to monitor and manage the students.

9. The virtual platform contains a section describing the functionalities of all the tools available in itself.

Variable 2. The ongoing assessment of the education online programme

Dimension 12: Initial assessment of the online programme

Indicators:

1 The programme is ready to be launched at least one week prior to its start.

2. All the resources (human, financial and technical) are sufficient to guarantee the quality of the development of the programme.

3. All the persons involved in the programme are ready for it to start.

4. The virtual classroom is ready to be used one week prior to the programme being launched.

Dimension 13. Processual assessment of the online programme

Indicators:

1. The teaching strategies used by the online teacher are appropriate in order to achieve the educational goals of the programme.

2. The learning activities are appropriate for the students to acquire the competences described in the graduation profile.

3. The planning of the programme regarding the activities, the deadlines and the resources is met.

4. The online teacher is involved in the execution of the programme.

5. The teaching materials and resources are suitable to the students' expectations.

6. Student's motivation is stimulated.

7. Some of the programme goals have been achieved.

Dimension 14. Final assessment of the online programme

Indicators:

1. Level of achievement of the educational goals set out for the online programme.

2. Level of fulfilment of the planned learning activities.

3. Level of students' satisfaction with the online programme.

4. Level of online teachers' satisfaction.

5. Impact rate of the online programme

6. Performance rate of the online programme.

7. Success rate of the online programme.

Resume

The MERGO MOOC will consider the two main variables that are stated in the previous paragraph including the **assessment of the quality of the education online programme itself the ongoing assessment of the education online programme.**

All the micro and macro-design of the MOOC will follow the dimension explained with the aims to consider and meet the indicators provided in the scheme reported above.

Courses in enology

In order to check with is the state of the art of the online MOOC on enology we developed a literature review.

We have searched the main twelve platforms dedicated to MOOCs, namely Coursera Inc., edX Inc., Udacity Inc., FutureLearn Ltd., Canvas Networks Inc., Open2Study Inc., Udemy Inc., openSAP (SAP SE), 360training.com Inc., Iversity Inc., Miríadax (Telefónica Learning Services S.L.U.) and Blackboard Inc., and also University sites with known formations in Enology, using the terms Oenology/Enology, sensory analysis and wine. The search resulted in 86 online courses offered in different languages: English, French, Portuguese, Spanish, Italian and German. From these courses, 7 courses were eliminated as they were not related to wine or presented not enough information about the contents. The courses not supplied in the English language were also eliminated (30 courses), and 4 courses were also eliminated because they were related to the topic “how to make wine at home” (including wine from fruit juices).

The majority of the courses (33) had as the main audience sommeliers and enophilists. Four of the remaining courses were devoted to wines from specific regions (Prosecco, Champagne, Provence, Rioja) and only 6 courses were of high education level and were devoted to wine in general including the sensory analysis of wines, all at the introductory or beginners level. The detailed program available for these MOOCs is presented in Table 1. The programs approach the sensory analysis of wines can be divided into two major groups: programs in which the effect of climate, viticulture practices, winemaking technology and grape variety on the sensory profiles of wines are used in order to highlight the differences between different terroirs and learn about the sensory analysis of wines (University of Adelaide, SupAgro, University of California, Taylors University). The other courses have, although not exclusively, a more directed approach to the sensory analysis of wines (UC Davis and the University of Burgundy). In these last two courses, the UCDavis courses besides focusing on the sensory description of wines also include the identification of wine defects and faults.

All MOOCs integrate declarative learning with standard lessons, with the exception of the MOOC from UCDavies in which basic taste and flavour standards are created for practicing blind tasting and to help students to develop a sensory vocabulary. Also a set of sniff standards are produced to practice fault recognition. At the end of the program, students are asked to develop a peer-reviewed project in order to demonstrate their understanding of the physiological process of wine tasting and the sensory techniques required for accurate wine analysis, by making a critical evaluation and description of a specific wine including the flavour and aroma of the wine. However no much interaction and training modes are proposed.

The MERGO MOOC will integrate both declarative learnings with standard lessons, both procedural learning with a game-based approach and exercises drafted by experts and researchers, with home-kits for wine tasting available at home (O3) and fully integrated into an e-learning strategy based on a pedagogical model (O1) in the wine sector, represented by the present report. The MOOC will include theoretical lectures based on enology topics, i.e. vineyard and the grape quality, organic wines, wine defects, sensory evaluation of wine, wine tasting techniques, valorisation of autochthons vineyards, production chain, etc. The course will offer online materials, such as podcasts, videos and, whenever possible, webinars. Practical experiences during the course will be entirely based on the MERGO Odour Wine Game (O3). The MERGO MOOC will incorporate collaborative construction functionalities (actually being a cMOOC) of a shared corpus opposed to the transmission of a corpus "state of the art" through classic xMOOC designs. Collaboration will be controllable in order to avoid chaotic or non-controllable learning. Drawing upon the theory of connectivism, the cMOOC will facilitate collaborative learning and communication when needed. Participants will also learn by making connections, through communicating and collaborating with others. This way, basic educational goals can be set and reached and at the same time, the subject offered is provided in a flexible manner. The assessment of learners will be multi-faceted. For the design and development of the MOOC we will use formal standards such as ELOT:1429 and MOOQ's Quality Reference Framework for MOOCs (based on ISO/IEC 40180). In order to introduce and well integrate the TUIs we propose a course for beginners.

Wine Tasting: Sensory Techniques for Wine Analysis

Developer: UC Davis –University of California

Aims of the course: The first module explores types of wine and help you set up your own tasting. You'll also begin to build a sensory vocabulary. In module 2 the learner review classic wine Wine Styles types of the world and set up flights of specific wines. Later we'll examine the various faults and defects that can appear in wine as well as techniques for spotting problems. In week 4 they delve into the complex world of wine and food pairings, and its "seven deadly sins." The course culminates in a peer review project in which you will apply the knowledge and sensory techniques you have developed throughout the course to assess a specific wine.

Course programme: affect the grape and wine flavor expression, and we'll discuss the concept of "terroir". Finally, you will create a set of basic taste standards for practicing blind tasting.

Wine Flavor and Aroma

In this module, the journey continues and we will compare and contrast the flavor profiles of eight classic red varietals and eight classic white varietals. We'll also discuss the growing requirements for each varietal as well as their cultural and historic background and growing locations. At the conclusion of this module, you will write a descriptive analysis of the aroma attributes you identify in a particular wine. Finally, you'll create flavor standards to help you develop your sensory vocabulary.

Common Wine Faults

Is there something wrong with this wine? This week we'll examine the philosophy behind what actually constitutes a fault in wine. We'll identify the most often-encountered faults and explain how to recognize them as well as determine what caused them. We'll also examine the Old World and New World sensibilities toward some of these faults, and discuss how some so-called faults may really be attributes that contribute to a wine's complexity. We'll differentiate between a fault and a defect and examine the range of classic faults and their origins. You'll learn

techniques for spotting problems and create wine defect sniff standards to practice fault recognition.

Wine and Food Pairing

Can you drink red wine with fish? In this module we'll discuss the often perplexing question of how to pair wine with food, and the physical, structural, textural, and aromatic aspects of both the "wine side" and the "food side" of the equation. We'll discuss ways to improve your ability to make flavorful choices and determine the structure and "weight" of a wine. To help you predict a good food match, we'll talk about the process of flavor profiling and how to decide whether to change a wine or food to make a pair work. Finally, we'll discuss the "seven deadly sins" of wine and food pairing, and you'll develop a personal wine and food scoring system.

Project: Fully Describe a Wine From an Unusual Region or Varietal

In this final module, we'll conclude our journey into wine tasting with a project that will demonstrate your understanding of the physiological process of wine tasting and the sensory techniques required for accurate wine analysis. You'll apply the skills you have developed throughout this course to making a critical evaluation and description of a specific wine. Working with fellow learners in this peer review process, you will demonstrate your ability to describe the appellation, climate, winery, varietal and winemaking style as well as describe the visual, and tactile aspects of the wine. You'll also describe the flavor and aroma of the wine, and make decisions about the best and worst food pairings for the wine.

Link https://www.coursera.org/learn/wine#syllabus

World of Wine: From Grape to Glass

Developer: University of Adelaide

Aims of the course: Learn about the principles and practices of how grapes are grown and wine is made. Whether you're a wine novice or a seasoned oenophile, you'll learn to confidently describe wine appearance, aroma, flavour and taste.

Course programme: Think about your favourite wine. Imagine the brilliance of its colour in the glass, the ripe fruit aromas on the nose, a hint of toasty oak and lingering tannins on the back palate. Perhaps you like a specific wine, but can't pinpoint the reason why. The attributes that make wine so enjoyable are achieved through the expertise of viticulturists and winemakers, whose decision-making in the vineyard and winery is underpinned by science – to be precise, viticulture and oenology.

The finer details can take years to learn, but in a matter of weeks this course will give you a broad understanding of the principles and practices used to grow grapes and make wine, and their impact on wine appearance, aroma, flavour and taste. You'll also gain an appreciation for how cutting-edge research is helping to secure the future sustainability of the global wine industry. Whether you're a wine novice or a seasoned oenophile, this course is for anyone who loves wine and wine tasting. You'll even get to make your own wine-- virtually at least!

Confidently describe wine appearance, aroma, flavour and taste. • Evaluate and communicate the various sensory attributes of wine using formal descriptive language

• Explain the structure, growth and development of grapevines and objectives of different vineyard management practices

• Contrast the different winemaking techniques employed in the production of different styles of wine

Link: https://www.edx.org/course/world-of-wine-from-grape-to-glass

Wines and Vines of Australia, New Zealand and South Africa

Developer: University of California, Irvine (UCI) - Irvine Extension

Aims of the course: Course Focuses on Wines from Australia, New Zealand and South Africa; Enables Business Professionals and Connoisseurs to Identify Distinguishing Characteristics the Specialized Studies Program in Wine Studies offers practical educational courses for consumers and professionals, providing a range of topics, including: traditional wine tasting methods, food and wine pairing, history of wines, types of wine products available, and classification of major worldwide wine producing regions. The Specialized Studies in Wine Studies program is the only university-level wine study program in Orange County designed especially for the serious wine connoisseur.

MOOC # OWU: Open Wine University (University of Vine and Wine, for All)

Developer: University of Burgundy

Aims of the course: The MOOC # OWU created by faculty at the University of Burgundy (members of the University Institute of Vine and Wine) proposes an in-depth look at the universe of vine and wine. From growing grapes to tasting wine, exploring terroir as you go, you will learn about all the stages in the making of French wines, up to and including the key aspects of wine tasting. Why is a wine white, red, sparkling or rosé? How can you train your senses to appreciate wine aromas? Beyond wine-growing techniques, this MOOC will also teach you about the history of grape varieties and terroirs, and the socio-cultural environment of vine and wine. In this class, several general themes around the vineyard and the wine will be investigated for 5 weeks.

From grapes to wine:

This theme aims to provide understand steps in wine elaboration through study of the raw material, micro-organisms, color extraction and work of winemaker.

Terroir:

This theme aims to decline fundaments to understand notion of "Terroir" through the study of soils, climates, grape varieties. The history of formation of some terroirs allow you to better understand this concept.

Senses of wine-tasting:

Here we will explain the basics of technique and its variants tasting. Information's induce from different senses allow certain characteristics of a wine such as ageing, grape variety and wine-making processes. A historical and social approach will teach you that tastes vary over time.

Transversally and synthesis:

In the final week, you will discover how to describe a wine through the three themes from the course.

Course programme:

- 1 - The first steps in vines and wine-tasting
- 2 - The interactions between vineyard soil, climate and microbial activity define the sensory and chemical enigmas of wines.
- 3 - Wines are the result of the complex processes both in the vineyard and in the winery, which also define the colour of the wines
- 4 - Wines that withstand the test of time, through terroir and tasting: a tale told by professionals, in the present tense
- 5 - 6 wines, 6 histories, 6 tasting sessions: a review of all the themes addressed in this class, with corrections

Link:
https://platform.europeanmoocs.eu/course_mooc_owu_open_wine_university_

Vine & Wine

Developer: SupAgro Montpellier

Aims of the course: This MOOC will initiate you to the scientific and technological bases which define the framework in which wine professionals work, from the vine to the glass. This international online course presents you with 4 key modules on wine-making and sales: the biology of the vine, viticultural practices, oenology and the wine economy

Course content:

Module 1 : Biology of the Vine

The annual cycle and the history of vine cultivation

Ecophysiology of the vine, relationships between soil-plant-climate

Development and ripening of the berries

Innovations with vine varieties

Module 2 : Viticulture

The annual viticultural cycle and installing the vineyard

Analysis of the ‘terroirs’ and of plant production

Vineyard management, irrigation, fertilisation and illnesses

Innovations in viticulture

Module 3 : Oenology

Biochemistry and grape must chemistry

Technical strategies, vinification and stabilisation technology

Fermentation and microbial actions

The chemistry of wines, aromas and quality testing

Module 4 : The Economy of the Wine and related sectors

Production to distribution statistics

Customer profiles and consumption patterns

The building and enhancement of the French wine sector

Structuring the French extended wine sector network and interactions

Introduction to Wines

Developer: Taylors University_ Malaysia

Aims of the course: This is a self-paced MOOC and it will cover everything about Wine. In this 14 episodes course, students will learn about plant source, understanding the wine label, food matching and many more.

These MOOC is designed for students who need a more flexible approach to learn mandarin than that offered in a standard classroom setting.

By the end of this course, you will be well armed to go into any wine store or restaurant and confidently select the beverage that you want.

Mr. Reuben Suresh Arthur is the owner of this MOOC. He is a specialist in oenology (the study of wines). In fact, he is only one of two certified trainers in Malaysia allowed to conduct the WSET (Wine and Spirit Education Trust) UK programmes. He is also an expert in all aspects of restaurant management, which includes customer service, menu planning, dining etiquette and food preparation.

Course programme:

The MOOC Structure

Episode 1 – Alcoholic Beverages (The Big Picture)

Plant source (fruit, grains and other parts)

Fermented beverages vs Distilled beverages

Episode 2 – What is wine?

Fruit wine vs wine

Episode 3 – The 4 different types of wines

Still wine / table wine / wine

Sparkling wine

Fortified wine

Aromatized wine

Episode 4 – Old World wines vs New World wines

6 major New World wines

5 Major Old World wines

Difference in wine style between the two

Episode 5 – Factors that affect the taste and quality of wine - The Grape Variety

Vitis Vinifera

Noble grapes

Major white grape varieties

Major red grape varieties

Other interesting grape varieties

Episode 6 - Factors that affect the taste and quality of wine - The concept of soil or *terroir*

Some famous regions and sub regions

Episode 7 - Factors that affect the taste and quality of wine - Viticulture

Episode 8 - Factors that affect the taste and quality of wine - Vinification

Episode 9 - Factors that affect the taste and quality of wine - Weather & Climate

What is vintage wine?

Episode 10 - Factors that affect the taste and quality of wine - Aging wine

Are all wines aged?

What does aging do to wines?

Where is aging done?

Episode 11 – Reading a wine label

New World vs Old World wine labels

Episode 12 – Storing, opening and serving wine

Episode 13 – Wine and Food matching

Episode 14 – Alcohol and You

Are there and benefits to drinking wine / alcohol

How does alcohol enter your body and what does it do to your body

What are the long and short term effects of alcohol on you.

Evaluation in enology combined with a MOOC

The evaluation plan defines strategies, procedures and tools to evaluate MERGO's activities and results from different perspectives. It tackles the following five dimensions:

AREA 1 - DEVELOPMENT OF COMPETENCES REGARDING THE THOERETICAL ASPECT OF WINE TASTING

AREA 2 - LEARNING AND IMPROVING OF OLFACTORY SKILLS IN WINE

AREA 3 - BOOSTING THE KNOWLEDGE TRIANGLE AND CREATION OF A COMMUNITY OF PRACTICE

AREA 4 - THE LEARNING TOOLS (MOOCs AND MERGO TUIs TOOL)

AREA 5 - IMPACT OF THE PROJECT

The evaluation plan paves way for the final report "IO4 - Report of the impact of TUIs in e-learning: best practices and recommendations ", summarizing the trials executions, the application and the impact of the MERGO technologies and methodologies. The final report also includes policy recommendations, based on best practice captured during the project and potential future exploitation.

Using a mixed methods design – including online surveys, interviews and expert reviews – the impact and success will be measured during the project timeline, enabling an in-depth understanding and formulation of policy recommendations at the end.

Evaluation plan logic

Each of the five dimensions mentioned above has been dissected, following the same four questions:

(1)What will be measured when evaluating?

(2) How will it be measured?

(3) When and how will data be collected?

(4) What are the targets?

1. What will be measured?

The question refers to the goal of the evaluation. The evaluation is conducted to measure progress within the dimension being considered. Not only this gives the project the possibility to identify issues following the piloting but also it gives an indication of what is recommendable to consider for future implementation.

2. How will it be measured?

The question refers to the methods applied to answer the evaluation question. Both quantitative and qualitative research tools will be used to measure the progress: online surveys, interviews, and expert reviews.

3. When and how will data be collected?

Outlining when the evaluation will be conducted and data collected and processed.

4. What are the targets?

The targets give an indication of achievement and success. In some cases, it is measured as a percentage, in others that there is no unforeseen discrepancy between the project dimension evaluation goal and evaluation report.

Area 1 - Development Of Competences Regarding The Theoretical Aspect Of Wine Tasting

What will be measured?

Evaluation objective: to assess the development of competences on THE THOERETICAL ASPECT OF WINE TASTING in students after the MERGO application.

How will it be measured?

Evaluation instruments:

- Quantitative instrument: pre and post questionnaires (i.e. self-assessment tool) with students, comparison with students that are not involved in the pilots (normal courses).

- Qualitative instrument: in-depth interviews with lecturers and students.

When and how will data be collected?

Data will be collected by University Partners distributing the survey links via email or learning platform, collecting answers anonymously. One of the survey links is to be sent to the students who will have/had access to the MERGO App and the other survey link to the reference group. The reason for making two surveys is to ensure both anonymity and to separate the two groups from each other, to better evaluate the progress.

The first survey (Appendix A), called pre-survey, should be issued during the first week of the course and answered within a period of 2 weeks.

The second survey, called post-survey, should be issued during the last week of the course and answered within a period of 2 weeks. Post-survey will be the same as pre-survey (Appendix A) to measure the improvement in the learning process.

What are the targets?

Number: 35 students

Indicators of achievement:

- Improvement of students' performance with the self-assessment tool.

80% of the students who had access to the MERGO application assessed a greater improvement of COMPETENCES REGARDING THE THEORETICAL ASPECT OF WINE TASTING than their peers who did not have access to the application.

Area 2 - Learning And Improving Of Olfactory Skills In Wine

What will be measured?

Learning and improving on the olfactory skills regarding single odors that can be found in wine

The development of olfactory skills in wine will be measured in students after using MERGO application.

How will it be measured?

- Quantitative evaluation instruments: pre and post questionnaires (games) (i.e. self-assessment tool) with students, comparison with students that are not involved in the pilots (normal courses).

When and how will data be collected?

Data will be collected by University Partners distributing the survey links via email or learning platform, collecting answers anonymously. One of the survey links is to be sent to the students who will have/had access to MERGO and the other survey link is to be sent to the reference group. The reason for making two surveys is to ensure both anonymity and to separate the two groups from each other in order to evaluate the progress.

The first survey (Appendix B), the pre-survey, should be issued during the first week of the course, to be answered within a period of 2 weeks.

Post-survey will be the same as pre-survey (Appendix B) to measure the improvement in the olfactory skills.

What are the targets?
LEARNING AND IMPROVING OF OLFACTORY SKILLS IN WINE

Indicators of achievement:

- Improvement of students' performance with the self-assessment tool:

80% of the students who had access to the MERGO application assessed a greater improvement of their olfactory skills than their peers who did not have access to the application.

Area 3 - Boosting The Knowledge Triangle And Creation Of A Community Of Practice

What will be measured?
Evaluation objectives: To enhance the collaboration processes at stake among the project participants

How will it be measured?
Quantitative instrument: Number of exercises made

When and how will data be collected?
Data will be collected along the project and during the final event

What are the targets?
Indicators of achievement:

- Number of users in the Community of Practices - target: 100……..

At the final event a community of practise will be constituted and it will practice with the odor platform.

Area 4 The Learning Tools (Moocs And Mergo Tuis Tool)

What will be measured?

Evaluation objective: to analyze the technical and pedagogical characteristics of the MOOC, i.e.

- the technical and pedagogical characteristics of the MOOC

- the technical and pedagogical characteristics of the platform in terms of functional suitability, usability, reliability, security, maintainability, and portability, following the ISO 25010 software quality model

- the usefulness of the platform's functionalities in terms of accessing and sharing OERs

How will it be measured?

Evaluation instruments:

- Qualitative instruments: expert review (Appendix D)

- Quantitative instruments: users' questionnaires SUS and GEQ (Appendix E)

When and how will data be collected?

Data will be conducted at the end of MOOC creation (Appendix D) and at the end of MERGO App implementation (Appendix E). UNIFG will submit review form to the Advisory board (at least two reviewers nominated by the partners).

Usability Scale (SUS) and the Game Experience Questionnaire (GEQ) questionnaire to users are the questionnaires decided for the evaluation.

What are the targets?

- High score of the technical characteristics of the platform (expert review): good qualitative acceptability of the platform

- Usefulness of the platform's functionalities for target audience (high score in questionnaires): minimum score 65/100 in SUS questionnaire.

- Number of OERs available on the learning platform: minimum 200.

- Access to the MOOC: target 500 users three months after the official project closure

Area 5 -Impact Of The Project

What will be measured?

Evaluation objective:

Exploring the impact of the pilot implementation on the traditional courses

How will it be measured?

Online interviews with one lecturer per University Partner are foreseen, regarding the pedagogy/didactics applied.

When and how will data be collected?

Interviews with the lecturers will be conducted at the end of MOOC creation (Appendix F).

What are the targets?

Pedagogical innovation: changes in the classroom and in professors' professional practices (qualitative)

- Adequacy of the model and tools to teachers' pedagogical objectives and contexts (qualitative)

APPENDIX A - MERGO survey on theoretical aspects

The grapes to be used for a fresh white wine should be: *

Please select all the items you consider valid.

- [ ] late-harvested
- [ ] when grapes reach the phenolic maturation and sugar level greater than 20 Brix when grapes have still a good acidity (pH less than 3.3) and sugar level greater than 18 Brix

Where are the anthocyanins located? *

Please make only one selection

- ( ) Mainly in the seeds of red grapes Mainly in the pulp of red grapes Mainly in the stalks of red grapes.Mainly in the skins of red grapes

Among these possibilities, what is authorized in organic farming? *

Please make only one selection

- ( ) the use of GMOs

the addition of synthetic pesticides

the addition of pesticides of natural origin such as copper or sulfur

Fermentation is the step in which: *

Please make only one selection

The sugars of the must are consumed with methanol and carbon dioxideproduction.

The sugars of the must are consumed with methanol and sulfur dioxideproduction.

The sugars of the must are consumed with ethanol and sulfur

dioxide production The sugars of the must are consumed with

ethanol and carbon dioxide production

Basic white wine production steps include: *

Please make only one selection

Destemming-crushing and maceration

before fermentationMandatorily alcoholic

and malolactic fermentations Pressing and

clarifying of must before fermentation

Cold maceration in white wines: *

Please make only one selection

enhances extraction of flavonoids

must be carried out at minus-zero temperatures

What is indigenous fermentation? *

Please make only one selection

- It is a fermentation that is done with “terroir” yeasts.
- It is a fermentation which is done thanks to commercial yeasts, brought by thewinemaker
- It is a fermentation that is done thanks to the yeasts naturally on the grapes andin the cellar.

The classic method for sparkling wines include: *

Please make only one selection

- fermentation of wines in bottle
- fermentation of wines in autoclave for at
- least 15 monthsfermentation of wines in autoclave

Fortified wines are: *

Please make only one selection

- wines to which sugar is added
- wines to which ethanol is added
- wines obtained by late-harvested grapes

What is the perception threshold? *

Please make only one selection

- It is the lowest recognition
-
-

concentration of the stimulusIt is the saturation concentration of stimulus

It is the lowest detection concentration of an unrecognized stimulusOption 4

How we define the body of a wine? *

Please make only one selection

- Consistence of positive flavors and aromas
- Amount of positive flavor and aromas Duration of the taste-olfactory sensations
- an array of metabolites in wine causing off-flavor
- an array of Saccharomyces Cerevisiae metabolites in wine causing off-flavoran array of Brettanomyces metabolites causing positive flavor

13. Cork taint is due to: *

Please make only one selection

- the fermentation step
- metabolites of mould growth on chlorine-bleached wine
- corks and barrels metabolites of Brettanomyces growth on chlorine-bleached wine corks and barrels

APPENDIX B - MERGO survey on olfactive skills

Pick and smell the aromas, then answer the following questions.

1. Which one of the following aromas is common to find in white wine from warm to hot climate? *

Please make only one selection

- 73
- 59
- 11
- 5

2. Pick the following smelling bottles and place them one to one on the board: - 2 - 36 - 88 - 53. Please smell all of them and reply the question: Which is thepositive odor related to the oak aging? *

Please make only one selection

- 2
- 36
- 88
- 53

3. *

Which smell isn't usually found in young red wines?

Please make only one selection

17

23

32

65

4. *

Which of the following odour is a defect in white wine?

Please make only one selection

7

52

2

83

5. *

Which odor does *Brettanomyces* cause in wines? (Select the correct aroma number).

Please make only one selection

75

57

88

84

6. *

Among presented aromas select the one representing floral aroma.

Please make only one selection

6

- [ ] 29
- [ ] 9
- [ ] 13

Which one of following aromas represents the typical young white wine aroma?

Please make only one selection

- [ ] 60
- [ ] 37
- [ ] 16
- [ ] 23

8. *

Which aroma is typical for Pošip white wine? (Write the correct aroma number).

Please make only one selection

- [ ] 12
- [ ] 6
- [ ] 5
- [ ] 20

9. *

Typical sparkling wine flavour (Select the correct aroma number).

Please make only one selection

- [ ] 54
- [ ] 50
- [ ] 6

51

Identify the main aroma of a young ruby Port (Select the correct aroma's number).

Please make only one selection

- 20
- 60
- 14
- 50

11. Organic wines are made with only little external inputs potentially leading to a better expression of aromas attributed to the grape variety. Which aroma doyou associate most with Cabernet Sauvignon? *

Please make only one selection

- 20
- 78
- 67
- 9

12. *

Organic wines are made with only little external inputs. Therefore, a clean harvest is crucial to avoid alterations of the wine later. Which one of the following aromas is the most representative of a clean harvest? (Select the correct aroma number)

Please make only one selection

- 59
- 77
- 74

19

During wine production sulphites are used as an anti-microbiological and antioxidative agent. In most white wines, microbial communities must be closely monitored to avoid the onset of the malolactic fermentation. Whicharoma would appear in the case of a malolactic fermentation ? (Select the correct aroma number).

Please make only one selection

50

69

51

41

14. *

What odour among these aromas is more linked to an elegant and harmonicwine?

Please make only one selection

6

5

25

24

15. Which of those is not characteristic of a "clean" wine? *

Please make only one selection

88

74

29

Which one of the aromas is common to find in red wines from late harvested grapes?

Please make only one selection

- 86
- 84
- 66
- 21

17. Which one you can likely find in Glera wine? *

Please make only one selection

- 8
- 22
- 18
- 21

18. Which one you can likely find in Okuzgozu wine? *

Please make only one selection

- 11
- 9
- 1
- 21

19. Which is the positive aroma that you can find in Alvarinho wine? *

Please make only one selection

- 83
- 85
- 28
- 23

Appendix C - MERGO revision

Do you have any potential conflict of interest with regards to MERGO? *

Please make only one selection

- ◯ Yes
- ◯ No

MERGO REVISION

Originality of MOOC based on the integration of theoretical lessons with olfactive games *

Please make only one selection

- ◯ High
- ◯ Average
- ◯ Low

Quality of presentation *

Please make only one selection

- ◯ High
- ◯ Avarage
- ◯ Low

Quality of questionnaires *

Please make only one selection

- High
- Avarage
- Low

Quality video recording texts *

Please make only one selection

- High
- Avarage
- Low

Quality of olfactive games *

Please make only one selection

- High
- Avarage
- Low

Interest to the readers *

Please make only one selection

- High
- Avarage
- Low

Overall recommendation *

Please make only one selection

- ◯ Accept in present form
- ◯ Accept after minor revision (correction to text editing)
- ◯ Reconsider after major revision
- ◯ Reject (the course serious flaws)

Quality of English language *

Please make only one selection

- ◯ English very difficult to understand/incomprehensible
- ◯ Extensive editing of English language and style required
- ◯ Moderate English changes required
- ◯ English language and style are fine/minor spell check required
- ◯ I am not qualify to assess the quality of english in this course

Comments and suggestions for authors

Appendix D - MERGO evaluation

Age *

_____

Gender *

Please make only one selection

- ◯ Male
- ◯ Female
- ◯ Other

I have a sommelier diploma *

Please make only one selection

- ◯ Yes
- ◯ No

System Usability Scale

Using a scale that starts from 1 (totally disagree) to 5 (totally agree) reply to the following questions on the use of MERGO app

1. **I think that I would like to use this system frequently.** *

Please make only one selection

Totally disagree

1

2

3

4

5

Totally agree

2. **I found the system unnecessarily complex.** *

Please make only one selection

Totally disagree

1

2

3

4

5

Totally agree

3. I thought the system was easy to use. *

Please make only one selection

Totally disagree

1

2

3

4

5

Totally agree

4. **I think that I would need the support of a technical person to be able to use this** * system.

Please make only one selection

Totally disagree

1

2

3

4

5

Totally agree

5. I found the various functions in this system were well integrated. *

Please make only one selection

Totally disagree

1

2

3

4

5

Totally agree

6. I thought there was too much inconsistency in this system. *

Please make only one selection

3

4

5

Totally agree

Totally disagree

1

2

3

4

5

Totally agree

7. I would imagine that most people would learn to use this system very quickly.

Please make only one selection

Totally disagree

1

2

3

4

5

Totally agree

8. **I found the system very cumbersome to use. ***

Please make only one selection

Totally disagree

3

4

5

Totally agree

1

2

3

4

5

Totally agree

9. I felt very confident using the system. *

Please make only one selection

Totally disagree

1

2

3

4

5

Totally agree

10.

11. I needed to learn a lot of things before I could get going with this system. *

Please make only one selection

3

4

5

Totally agree

Totally disagree

1

2

3

4

5

Totally agree

Game Experience Questionnaire

Please indicate how you felt while playing the game for each of the items, on the followingscale:

Not at all = 0
Slightly = 1

Moderatately = 2
Fairly= 3

Extremely = 4

12. I felt content *

Please make only one selection

Not at all	
0	◯
1	◯
2	◯
3	◯
4	◯
Extremely	

13. I felt skilful *

Please make only one selection

Not at all

0

1

2

3

4

Extremely

14. I was interested in the game's story *

Please make only one selection

2

3

4

Extremely

Not at all

0

1

2

3

4

Extremely

17. I thought it was fun *

Contrassegna solo un ovale.

Not at all

0
1
2
3
4

Extremely

15. I was fully occupied with the game *

Please make only one selection

Not at all

2
3
4

Extremely

17. I thought it was fun *

Contrassegna solo un ovale.

Not at all

0

1

2

0

1

2

3

4

Extremely

19. I felt happy *

Contrassegna solo un ovale.

Not at all

0
1
2
3
4

Extremely

20. It gave me a bad mood *

Please make only one selection

Not at all

2
3
4

Extremely

19. I felt happy *

Contrassegna solo un ovale.

Not at all

0

1

2

0

1

2

3

4

Extremely

21. I thought about other things *

Contrassegna solo un ovale.

Not at all

0
1
2
3
4

Extremely

22. I found it tiresome *

Please make only one selection

Not at all

2
3
4

Extremely

21. I thought about other things *

Contrassegna solo un ovale.

Not at all

0

1

2

0

1

2

3

4

Extremely

23. I felt competent *

Contrassegna solo un ovale.

Not at all

0

1

2

3

4

Extremely

24. I though it was hard *

Please make only one selection

Not at all

2

3

4

Extremely

23. I felt competent *

Contrassegna solo un ovale.

Not at all

0

1

2

0

1

2

3

4

Extremely

25. I was aestetically pleasing *

Contrassegna solo un ovale.

Not at all

0
1
2
3
4

Extremely

26. I forgot everything around me *

Please make only one selection

Not at all

0
2
3
4

Extremely

25. I was aestetically pleasing *

Contrassegna solo un ovale.

Not at all

0

1

2

1

2

3

4

Extremely

27. I felt good *

Contrassegna solo un ovale.

Not at all

0
1
2
3
4

Extremely

28. I was good at it *

Please make only one selection

Not at all

2
3
4

Extremely

27. I felt good *

Contrassegna solo un ovale.

Not at all

0

1

2

0

1

2

3

4

Extremely

29. I felt bored *

Contrassegna solo un ovale.

Not at all

0

1

2

3

4

Extremely

30. I felt successful *

Please make only one selection

Not at all

2

3

4

Extremely

29. I felt bored *

Contrassegna solo un ovale.

Not at all

0

1

2

0

1

2

3

4

Extremely

31. I felt imaginative *

Contrassegna solo un ovale.

Not at all

0
1
2
3
4

Extremely

32. I felt that I could explore things *

Please make only one selection

Not at all

2
3
4

Extremely

31. I felt imaginative *

Contrassegna solo un ovale.

Not at all

0

1

2

0

1

2

3

4

Extremely

33. I enjoyed it *

Contrassegna solo un ovale.

Not at all

0
1
2
3
4

Extremely

34. I was fast at reaching the game's targets *

Please make only one selection

Not at all

2
3
4

Extremely

33. I enjoyed it *

Contrassegna solo un ovale.

Not at all

0

1

2

0

1

2

3

4

Extremely

35. I felt annoyed *

Contrassegna solo un ovale.

Not at all

0
1
2
3
4

Extremely

36. I felt pressured *

Please make only one selection

Not at all

2
3
4

Extremely

35. I felt annoyed *

Contrassegna solo un ovale.

Not at all

0

1

2

0

1

2

3

4

Extremely

37. I felt irritable *

Contrassegna solo un ovale.

Not at all

0
1
2
3
4

Extremely

38. I lost track of time *

Please make only one selection

Not at all

2
3
4

Extremely

37. I felt irritable *

Contrassegna solo un ovale.

Not at all

0

1

2

0

1

2

3

4

Extremely

39. I felt challenged *

Contrassegna solo un ovale.

Not at all

0

1

2

3

4

Extremely

40. I found it impressive *

Please make only one selection

Not at all

2

3

4

Extremely

39. I felt challenged *

Contrassegna solo un ovale.

Not at all

0

1

2

0

1

2

3

4

Extremely

41. I was deeply concentrated in the game *

Contrassegna solo un ovale.

Not at all

0

1

2

3

4

Extremely

I felt frustrated *

Please make only one selection

Not at all

2

3

4

Extremely

41. I was deeply concentrated in the game *

Contrassegna solo un ovale.

Not at all

0

1

2

0

1

2

3

4

Extremely

I felt like a rich experience *

Please make only one selection

Not at all

0

1

2

3

4

Extremely

I lost connection with the outside world *

Please make only one selection

Not at all

2

3

4

Extremely

0

1

2

3

4

Extremely

I felt time pressure *

Please make only one selection

Not at all

0

1

2

3

4

Extremely

I had to put a lot of effort into it *

Please make only one selection

Not at all

2

3

4

Extremely

0

1

2

3

4

Extremely

Not mandatory - Final comments

42. Final comments

Appendix E - Opinions and expectations with regard to MOOC

1. Role/experience in the oenological/pedagogical sector *

2. Name and surname *

3. email *

4. Do you know what is a MOOC? *

   Please make only one selection

   - yes
   - No

5. Have you ever attended to an online course? Yes *

   Please make only one selection

   - Yes
   - No

6. The oenological studies can not do without tasting and olfactive learning *

Please make only one selection

totally disagree

1

2

3

4

5

totally agree

7. The oenological learning need of laboratory work in presence *

Please make only one selection

totally disagree

1

2

3

4

5

totally agree

8. Do you think that an online course with a practical part of olfactive learning could be useful? *

Please make only one selection

totally disagree

1

2

3

4

5

totally agree

9. In your opinion, how important is the self-assessment? *

Please make only one selection

totally disagree

1

2

3

4

totally agree

10. The possibility of repeating the online course several times constitutes an advantage for the student

Please make only one selection

totally disagree

1

2

3

4

5

totally agree

student

Please make only one selection

totally disagree

1

2

3

4

5

totally agree

12. What are the strengths compared to a conventional course? *

Please select all the items you consider valid.

- [ ] The self-assessment
- [ ] the possibility to repeat the course
- [ ] the possibility to use the tool autonomously
- [ ] the possibility to use the tool from each place
- [ ] Altro: _____

13. What are the weaknesses compared to a conventional course? *

Please select all the items you consider valid.

- [ ] lack of tasting
- [ ] lack of a direct relationship with the teachers
- [ ] Altro:

14. After having received knowledge on the MERGO project and after having looked at the Intellectual Outputs, could you give an example of its application and say how it could be useful for teaching? *

15. comments *