Enhancing students' cultural competences through embodied knowing

Annaleda Mazzucato[a], Antonietta Argiuolo[b]

[a] *University of Naples Federico II, 80133 Napoli, Italy*
[b] *University of Naples Federico II, 80133 Napoli, Italy*

Abstract

The paper presents the theoretical framework underpinning a blended embodied approach to cultural competence education and the structure of the application prototype supporting its blended deployment in the context of formal curriculum and informal context. The approach embraces the conceptualization of an innovative approach through Tangible User Interfaces (TUIs) applied in the field of cultural heritage, promoting the acquisition of knowledge, competences, that allow to live and work with others in a county different from that of origin. Combining virtual and physical dimensions, the approach enables effective instructions to come into play, guiding the user exploration of tangible and intangible heritage; combining online interaction with traditional place-based classroom methods and materials, with some elements of student control over time, path, or place. Tangible smart objects mediate the interaction between the learner and the digital interface, involving sight, touch and smell, making possible a multisensory learning scenario and introducing an enormous potential in psycho-pedagogical learning practices.

Keywords

Tangible User Interfaces (TUIs), Cultural Heritage Education, Embodied Learning, Experiential Learning.

1. Introduction

Learning cultural competences in a world whose borders are becoming increasingly more blurred is a key aspect for new generations. Moreover, the present Knowledge Society requires citizens to be aware of their past, that is their cultural heritage [1]. However, cultural heritage education, in most countries, is still based on traditional teaching methods, where one teacher holds lessons to crowded classrooms, using books or at most using printed materials. Even when cultural artifacts are shown, they are only through a screen. And if also local cultural heritage can be experienced when travelling to another country, it could be difficult to adapt to new environments, without knowing the cultural background. That yields an important need that stands alongside with second (or third) language learning: teaching values, myths, cultural values and heritage of the visiting country. It is a very urging need in a globalized country and particularly in the European Community, which favors multiculturality throughout its borders.

2. Cultural competence education

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EMAIL: annaleda.mazzucato@gmail.com (A. 1); antonietta.argiuolo@unina.it (A. 2).
ORCID: 0000-0002-6492-3942 (A. 1); 0000-0002-5284-5115 (A. 2).

From a recent survey requested by the European Commission to assess the attitudes and opinions of Europeans about cultural heritage, it emerged that a large majority of respondents (88%) agree that Europe's cultural heritage should be taught in schools [2]. Article 13.a of the Faro Convention expresses the need to "facilitate the inclusion of the cultural heritage dimension at all levels of education, not necessarily as a subject of Heritage conservation, but as a fertile source for studies in other subjects". Emerging right under international law [3], access to and enjoyment of cultural heritage has a multidimensional and multidisciplinary character and identifies the tangible and intangible traces of values, beliefs, knowledge and traditions, in continuous evolution; it can be a powerful tool for teaching different disciplines; it supports the acquisition of transversal competences to be provided through lifelong learning, as a key measure in Europe's response to globalization and the shift to knowledge-based economies [4], that fosters active citizenship, intercultural dialogue and social cohesion [5]. While both formal and no formal curricula include efforts to expose students to different cultures, it is increasingly important to develop cultural awareness paths. It is not sufficient to teach cultural knowledge or language proficiency, as students must learn to examine cultural knowledge, values and belief to enhance their cultural competence. The role of the educational path is to provide learners not only with the skills needed for employment in a sustainable economy, but with the skills and values to live and work with others in ways of integrative thinking and practice (e.g., actively engage different cultures, traditions, histories), being able to clarify their own and others' worldviews through dialogue and socialization, recognizing that alternative frameworks exist.
Based on this assumption we propose a blended educational approach through heritage, supporting exploration of tangible and intangible heritage for the acquisition of knowledge and skills that allow to live in a county different from that of origin, combining online interaction with traditional place-based classroom methods and materials with some elements of student control over time, place, path, or place.

3. Theoretical framework

3.1. Enhance embodied knowing through the applications of tangible user interfaces

Two main theoretical frameworks initiate the conceptualization of embodied knowing underpinning the approach we propose: experiential learning [6, 7] and situated cognition [8, 9, 10, 11]. Learning is a process whereby knowledge is created through the transformation of experience. The internalization of the learning experience, fundamental in the learning process, is successful when concepts and knowledge are anchored to real-life problems and scenarios [12]; learning cannot be separated from the context where it takes place, it is a contextual experience that occurs through interactions with the environment [9].
Furthermore, experience is thought to be a bodily event, the body is itself the site of learning and a vehicle for learning [13, 14, 15], that involves senses and perception in the mind/body action and reaction learning process. Humans tend to perceive the world around them as made up of affordances [16] – that is, opportunities for action. It is clear that for humans is essential to be able to perceive the world around them and to navigate through it [17].
Considering experience and thus learning as a bodily event refers more generally to the embodied cognition paradigm [18]. The cognition is embodied in, as much human sensory and motor system do affect thought and emotion. In other words, interactions between body and environment which it is surrounded by, play a key role in shaping the way someone thinks and feels. Mind is not isolated from the body [19] but it is rooted in it. According to this paradigm, only thinking of an object or a concept bring about the experience linked to it [20]. As a matter of facts, many studies on human brain confirm that seeing or smelling or tasting or listening to something, activate the same brain networks as merely thinking of the same concepts [21, 22]. An example of this phenomenon are the numerous studies on mirror neurons system [23].

It follows that action is crucial for learning [18] in many ways: it could help building references in conceptual knowledge. For example, empirical evidence shows that second language learning and mathematics needs embodied strategies as a base for enhanced understanding and learning [19].
Future directions should focus on favoring embodied learning. This could be thought of as interaction with teachers/lecturers as well as using new technologies and tools. Multisensorial approach to education should be central in the "enculturation" processes [24], which include norms and values acquisition of someone's cultural heritage [25]. Socialization and maintenance of values, ideas, and concepts have always been considered involving embodied learning, rather than mere "mental processing" [23], but body and mind are still considered separated in modern cultural learning processes. Grosvenor [26] considered the senses as "mediating between mind and body, idea and object, and self and environment" (p.686).
This implies ruling out practices implicating senses other than the sight, like smell. Indeed, researchers claim that promoting a learning that involves all the sense improves students' performance and teachers' work [27]. For example, olfactory stimulation could enhance the interaction between learner and objects, favoring long-term memory [28].
Perception is always multisensory: the brain integrates continuously information from different sensory modalities to ensure a smooth perception of what is going on around us [28]. Although sight is the predominant sense in learning literature, a future direction should apply for the role of touch and smell and taste on learners' experience, particularly talking about enculturation. When coming in touch with other culture, though, language learning is an important aspect, but not the only one. For a complete experience, one should come in touch with cuisine, art, way of living, and in a multisensory way. Reflective observation and active situated experimentation are a continuum processing, triggered by tasks of the cultural heritage narrative, whilst concrete experience and abstract conceptualization is a perception continuum, indicating the emotional response toward the task arousal. Within this multisensory process, new knowledge and competences emerge as a result of the current experience; evoking previous knowledges is understood it and checked to be used in the current scenario; incorporated into one's present framework of knowledge [29, 30].

4. Prototype description

4.1 Blended Experiential Learning Application

The software design is oriented by its educational purpose, balancing accuracy and accessibility, graphic concept and interactivity model. The narrative of scenarios is hinged on tangible and intangible cultural elements and interactions built as problem-oriented tasks. The player deals with multidimensional data through a gamified learning experience in which visual and spatial, auditory and tactile aspects interact through the use of TUI applications.
The software was created as a first prototype of the EULALIA[1] project funded by European Commission developed for Android devices[2].
Tangible User Interfaces (TUIs) is a paradigm that allows the learner to interact with didactic tools through the development of innovative and inclusive learning tools. TUIs paradigm allows a continuous interaction between user and digital interface, e. g. a software installed on PC or smartphone. This interaction is granted through tangible objects that can stimulate different senses, including touch, smell and taste.
The users interact with the digital interfaces and is guided to perform actions within scenarios whose elements are anchored to physical and real objects, characterizing elements of the tangible and intangible cultural heritage. The software that allows the scenarios development and logic is STELT [31], which also encompasses the options the communication protocols of the hardware (RFID/NFC readers) that support TUIs application [32]. STELT (Smart Technologies to Enhance Learning and Teaching) is a recently developed platform that allows the use of tangible interfaces STELT (Smart

[1] eulaliaproject.eu/
[2] https://play.google.com/store/apps/details?id=it.smarted.eulalia&hl=en

Technologies to Enhance Learning and Teaching) software, a platform which allows implementation of augmented reality systems based on RFID/NFC technology [31]. These materials permit to link together smart technologies and physical materials, uniting the manipulative approach and digitalized technologies [33]. STELT can be a very flexible and useful tool to develop learning environment, so it can be used by psychologist or educators to develop an interactive environment for learning. For example, it was recently used to enhance a wide utilized tool for neglect neuropsychological assessment [34], the Baking Tray Task [16].

Each object, namely smart object [35], is equipped with a RFID/NFC supporting the connection object-meaning, making possible its association to a multisensory learning scenario [36], that requires users to employing the senses, including smell and taste, while engaging in the tasks.

In this context, a typical exercise is the quest on a physical map by browsing with the phone equipped with NFC sensor, which represents the sensitive points (well known by the designer of the scenario and programmed in the app using STELT). Each interaction with the map is aimed to improve the cultural competence of the user, by browsing and searching the next answer on the map.

The task for the student/learner is based on the exploration, in this case exploration of a map, where hot spots are hidden. The students browse through a physical device (the smartphone) a map, with direct references to cultural heritage and aspects related to the local culture of the place depicted on the map.

By using the STELT system, the prototype provides a simple mechanism to create new maps and exercises. The students and teachers become also able to creatively design an Open Educational Resource (OER), co-creating their Language Learning Strategy (LLS), in the form of a game scenario.

The game is embedded in a mobile APP that embody knowledge acquisition to real life context using tangible object starting from maps, cards, including also smells or tastes. The app constitutes a tool supporting blended learning, making possible individualized learning and self-regulated learning to happen. For a learning session it is required: i) the application on an Android smartphone, ii) the map equipped with NFC passive antennas.

The app enables effective instruction to come into play as learners are not only presented with real-world problems to solve, but also provided with how to solve the problems [37]. This mechanism supports effective and deep "[l]earning [,] promoted when learners are engaged in solving real-world problems [,] ... when existing knowledge is activated as a foundation for new knowledge [,] ... demonstrated to the learner... applied by the learner [,] ... [and] integrated into the learner's world" [38].

The Tangible User Interfaces (TUIs) and in particular, the RFID/NFC technologies are natural candidates to enhance some well-known psycho-pedagogical practices in a Technology Enhanced Learning (TEL) approach [39]. TUIs enable to develop a multi sensorial approach to cultural education that allows the user to explore tangible and intangible heritage involving sigh, touch and smell that has enormous potential in learning.

Figure 1: Develop a tangible map using NFC

5. Conclusion and future directions

This paper presents the structure of a game application embodying multisensorial learning experiences via TUI application and presents the theoretical framework underpinning its deployment. The game application can support the implementation of blended cultural competence education paths, including scenarios in three main fields, namely: 1) cultural heritage, 2) daily life situations, 3) langue, incorporating Common European Framework of Reference for Languages (CEFR). The next step brings to the deployment of a) development and implementation of scenarios and OER, b) piloting phase. OER will be developed in collaboration with schoolteachers and university lectures, applying a participatory approach in form of focus group workshop, stimulating dynamic discussion among participants guided by a moderator in such a way that all group members are engaged and active creating the scenarios. The piloting phase will encompasses two phases: 1) teachers and lecturers will be trained on how to use and embed the tool within the activities part of the curriculum; 2) students will make use of the tool to develop their language learning strategies, developing their own contents or reusing the courses contents. During the piloting phase, data will be collected, both qualitatively and quantitatively, to assess the following dimensions: development of language competencies, learning of cultural aspects of a city/country different from that of origin, personal development, and impact on the teaching and learning practice.

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