

# An Interactive Module for Learning and Evaluating the Basic Rules in Health Consultations

Maël Addoum\*, Yannick Bourquin\*, Quentin Bleuse\*, Auriane Gros<sup>†‡</sup>, Jean Breaud<sup>†</sup>, Marilou Serris<sup>‡</sup>, Philippe Robert<sup>†‡</sup>

\* *ISART Digital*, Paris, France

<sup>†</sup> *Laboratoire CoBTek*, Université Côte d'Azur, Nice, France

<sup>‡</sup> *Département d'Orthophonie*, Faculty of Medicine, Nice, France.

**Abstract**—The practitioner-patient relationship (PPR) is essential to the improvement of health care services for patients suffering from cognitive impairments. However, teaching medical students how to develop a healthy PPR using conventional approaches is difficult, due to the lack of real context. To address this issue, *TeachMod* presents a new educational game-based course that offers an interactive and immersive learning through two different scenarios of psychiatric consultations. The course was tested and evaluated with 64 undergraduate students who expressed a positive attitude to the game design and its pedagogical content. The survey results indicate that the course is sufficiently intuitive to foster learning the fundamentals of an ethical and appropriate PPR.

**Index Terms**—e-learning, e-health, psychiatric consultation, practitioner-patient relationship.

## I. INTRODUCTION

The practitioner-patient relationship (PPR) is the cornerstone to delivering high-quality health care. In addition to medical skills, performing a healthy PPR depends on multiple non-clinical abilities such as communication, empathy and trust [1] [2]. For instance, an effective communication contributes to the improvement of patients' health and emotional state [3]. Showing empathy and caring allows patients to effectively discuss their health issues, leading to better diagnosis and therapies.

Therefore, maintaining a healthy and respectful PPR plays a very important role for ethical and efficient medicine, especially when dealing with vulnerable subjects with cognitive impairments. These subjects may not be able to easily express their needs and problems, particularly when using technological tools for e-health [4] [5], which requires additional communication skills from psychiatrists to ensure an adequate medical consultation process. However, teaching non-clinical skills for medical students is sometimes difficult due to a lack of time [6], patient standardization, internship opportunities, instructors and the absence of real-world context in traditional courses.

Recently, game-based learning has been recognized by educational systems as gamification motivates participants through fun and risk-free learning. The educational games can thus represent an alternative solution to learn the basics of interactions between patients and their psychiatrists. However, most game-based tools have been designed to focus on clinical skills training in a particular area. Certain previous works

have reported the training of non-clinical skills required for good PPRs, but they have mostly targeted medical practitioners [7]. To the authors' best knowledge, there is little research documenting the basic rules for establishing healthy relationships between general health professionals (such as doctors, psychologists, speech therapists, nurses, or any other health care professionals) and neuro-atypical patients in both face-to-face and e-consultation.

In this context, we decided to focus on speech therapists, psychiatrists and patients with cognitive impairments. We developed an e-learning module that aims to adequately prepare the undergraduate students in providing an appropriate PPR. This module, called *TeachMod*, offers an interactive media of real-world contexts through two different scenarios: face-to-face and remote e-consultation. The potential of *TeachMod* is investigated through an experimental survey.

In this article, the pedagogical objectives and the technical architecture of our e-learning module are detailed in section 2. Section 3 presents and discusses the results of the surveys conducted with 64 students. We conclude by summarizing the proposed module and discussing our future work.

## II. METHODS

### A. Educational objectives and scenarios

Our e-learning module, *TeachMod*, is dedicated to higher education and meets pedagogical needs. The target audience is undergraduate students in all fields related to health care. *TeachMod* aims to train and assess the students' skills that concern the basic rules required for humane and ethical consultations between practitioners and patients with cognitive impairments. These skills represent the aptitudes for achieving a healthy PPR in terms of communication, behaviors, professionalism, ethics and caring. In this paper, two types of cognitive disabilities in patients are addressed: motivational and language disorders. Two scenarios were used : (1) face-to-face consultation and (2) e-consultation, with each scenario containing a different learning purpose. The scenarios were filmed by health professionals at the *Claude Pompidou Institute* of the University Hospital Center (UHC) of Nice, France. Several moments of interest were simulated in the videos, which correspond to Critical Situations (CS) caused by external disrupting events or behaviors. For each CS encountered by the patient, a question with multiple

responses is proposed to students to promote and test their reaction to the outlined interpersonal skill.

### 1) Face-to-face consultation

The first scenario consists of a traditional face-to-face speech therapy consultation, comprising three sequences: reception, waiting room and consulting room. Information about the duration, location, persons involved and number of CSs for each sequence is listed in table I.

|            | Duration | Place           | Persons involved                                  | Number of CS |
|------------|----------|-----------------|---|--------------|
| Sequence 1 | 2 min    | Reception       | Patient<br>receptionist                           | 3            |
| Sequence 2 | 1 min    | Waiting room    | Patient<br>companion<br>Speech therapist          | 3            |
| Sequence 3 | 8 min    | Consulting room | Patient<br>companion<br>Speech therapist<br>Nurse | 13           |

TABLE I: The information for each video sequence of the first traditional scenario.

During sequence 1, learners are expected to interpret the receptionist’s attitude and the way the patient was received (see Fig. 1a). Three CSs are presented that highlight the receptionist’s smiling/welcoming face, the administrative procedure, and the patient’s mobility, assistance, and orientation to the waiting room. Students are asked to list behaviors to avoid when greeting patients and how to appropriately orient them.

Sequence 2 takes place in the waiting room (see Fig. 1b). The CSs outline the way the speech therapist approaches the patients and their companions, and the physician’s decision about whether or not to allow the companion to join the patient in the consulting room.

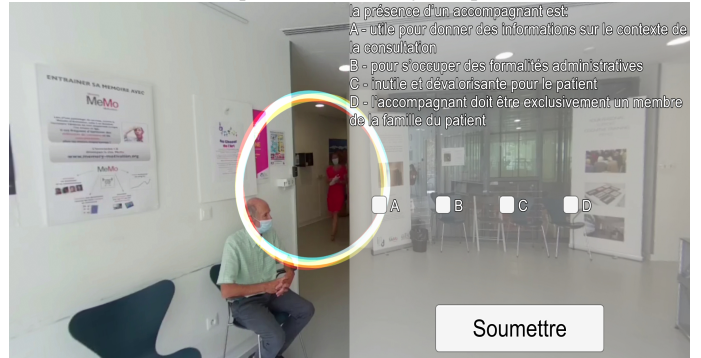
The last sequence films a consultation practice (see Fig. 1c). During this sequence, we interrupt the discussion with a nurse entering the consulting room. In this situation, the students are asked to choose the practitioner’s best reaction to such a disruptive event. The purpose of this sequence is to train and assess the student’s cognitive competencies in addition to the soft skills necessary for a good PPR. Therefore, at different moments of interest, the students are invited to answer theoretical and practical questions that are necessary for conducting an interview effectively and politely such as: how the clinician should initiate the discussion; the importance of the previous exchange; how to be aware of the patient’s emotional state; how to adapt language style according to the patient’s profile; the strategies and techniques to use that test and foster patient motivation and language impairments. Finally, the students produce an evaluation report describing the patient’s clinical and mental conditions based on their diagnosis and deductions.

### 2) E-Consultation

The second scenario consists of a telepsychiatric consultation. Our choice was motivated by the consequences of the COVID-



(a) sequence 1: secretary reception



(b) sequence 2: waiting room



(c) sequence 3 : consultation room

Fig. 1: The speech therapy consultation of scenario 1

19 pandemic on both students and patients. Lockdown and social distancing have shifted educational institutions around the world from conventional learning processes to e-learning platforms [8]. In parallel, the health system has recommended the use of telemedicine. The crisis has significantly progressed, which continues to drive the need for telepsychiatric consultations [9].

In *TeachMod*, the e-consultation scenario takes place at the physician’s office as shown in figure 2. *Zoom* is used for video and audio real-time communication. The scenario lasts 8 minutes and involves the patient, clinician, and certain additional people (nurse and patient’s family member). It contains 12 CSs with which the student can interact and answer questions. The CSs mainly highlight the psychiatrist’s professionalism and attitude, including their ability to adapt questions and

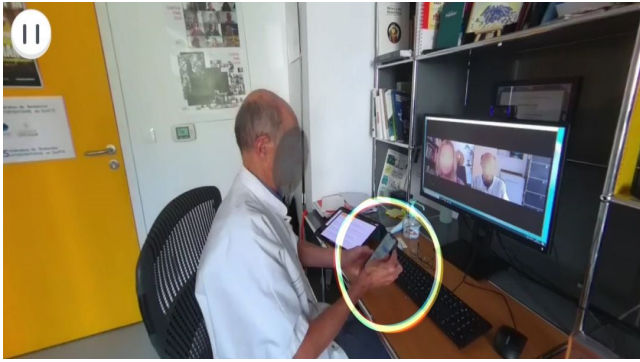


Fig. 2: The telepsychiatric consultation of scenario 2

dialogue according to the patient's stress and physiological state, avoid double-tasking during the medical discussion, and listen attentively to the patient. Communication and courtesy skills are also emphasized in this scenario which are outlined through the psychiatrist's cooperation as assistant in the event of technical problems, and their patience and ability to explain the e-consultation and e-prescription process. The students are asked to comment on the psychiatrist's behavior when a patient's family member interrupts the consultation and how they believe the psychiatrist should react. As with the previous scenario, the students should provide an assessment report of the patient's clinical conditions.

#### B. Technical aspect

*TeachMod* was developed by game designers and programmers using *Unity3D* in close cooperation with clinical staff. The application is compatible with *Apple* and *Android* for use on PC, tablet and mobile. It can be downloaded for free using this link<sup>1</sup>.

The videos were filmed with a narrative script to enhance user immersion and engagement. The recorded omnidirectional videos are then integrated into the engine. The camera can move according to the students' actions, allowing them to explore the scene in 360 degrees. The students can assess their skills by observing a number of CSs highlighted using an interactive virtual element (glowing circle) embedded in the scene as shown in figures 1a-b and 2. They are expected to click on the element to indicate whether or not the CS is appropriate. A graphical user interface was developed to display the associated question for each CS (see Fig. 1b) and the correct answer with the theoretical information (see Fig. 1c).

A reward system is designed to quantitatively evaluate the level of non-clinical skills. It is based on scores that increase with the student's correct answers. At the end of the consultation, all the student's actions are summarized, especially undesirable choices that have been identified, and the appropriate rule that should have been made instead is displayed. These results can be accessed by the trainer or supervisor. *TeachMod* can be taught with or without the help

of an instructor. The design method used in our e-module makes its educational objectives extensible. Further scenarios can be easily added, deleted or modified in *TeachMod* through a customization interface, allowing for diversification of study cases and health care areas, such as nursery and emergency services, rehabilitation, surgery, etc.

### III. RESULTS AND DISCUSSIONS

In this section, we test and evaluate the effectiveness and usefulness of our e-module, *TeachMod*, through an experimental survey carried out at the University of Cote d'Azur. The survey was conducted with 64 Master's students in speech therapy, who had a low expertise level in video games. To test the easy-to-use feature of *TeachMod*, all experiments were performed without demo sessions. The participants were invited to complete the two scenarios and answer all clinical/non-clinical questions. The results are assessed qualitatively and quantitatively.

Qualitatively, the experimental learning sessions were filmed in a classroom with groups of two students and recorded to observe and analyze the users' choices, behaviors and facial expressions, as illustrated in figure 3.



Fig. 3: Video analysis of the experimental learning session.

Quantitatively, at the end of the experimental learning sessions, all participants were required to complete a questionnaire to evaluate the user experience and pedagogical content of *TeachMod*. Two questions concerning the technical quality in terms of intuitiveness and interactivity are asked:  $Q_1$  (Is *TeachMod* interactive enough to engage the user?) and  $Q_2$  (How do you rate the ease of use of *TeahMod*?). The educational objectives are evaluated via further questions such as  $Q_3$  (How do you estimate the pertinence of the CSs presented in the proposed scenarios and their difficulty level?),  $Q_4$  (How do you judge the duration of each scenario?),  $Q_5$  (How do you rate your satisfaction with the integration of theoretical information in the videos?), and  $Q_6$  (Is *TeachMod* a good intermediate tool between theory and practice?).

The responses to questions  $Q_1$  and  $Q_6$  are binary (Yes or No) and are represented in figure 4. The other responses must be rated on a scale ranging from 1 to 5 (1: Very Dissatisfied; 2: Dissatisfied; 3: Neutral; 4: Satisfied and 5: Very Satisfied).

<sup>1</sup><http://www.innovation-alzheimer.fr/relation-soigne-soignant/>

Table II shows the scores obtained for  $Q_2$  to  $Q_5$ . Open-ended questions are also proposed, allowing students to make suggestions for improving the UI/UX.

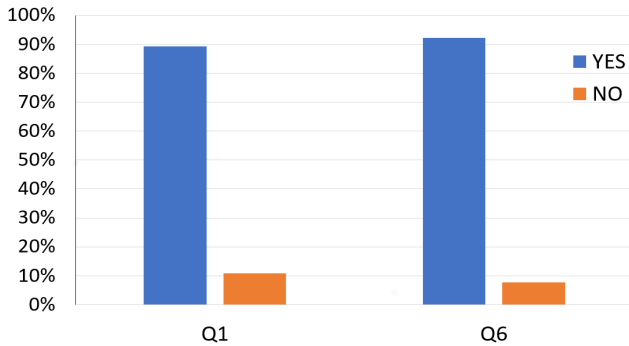


Fig. 4: Scores obtained for questions 1 and 6.

The data collected from the experimental sessions are analyzed. The responses to  $Q_1$  show that 89% of participants felt that the e-module was sufficiently interactive. This is ensured thanks to the design approach used in the application (omnidirectional videos, storyline scenario, clickable virtual elements, scoring system, etc.). Although there were no demo sessions, the answers to  $Q_2$  indicate that *TeachMod* remains easy to use by the students' despite their low level of expertise in computer games (18.5% satisfied and 33.8% very satisfied). This means that no technical skills are required to manipulate *TeachMod* which is "playable" for all clinicians. This is completely in line with our motivation to create an e-module which is easy-to-use by a wide range of health professionals. The results of  $Q_3$  show that 78% of learners agree with the relevance of the CSs and the theoretical difficulty level. Based on these findings, the simulated CSs are pertinent and represent real-context situations for psychiatric consultations. From  $Q_4$ , 78.1% of subjects had a neutral opinion about the duration of the scenarios. This high percentage can be related to their junior profile and lack of professional experience.

Concerning  $Q_5$  and  $Q_6$ , more than 60% of participants are satisfied with the pedagogical content and 92% believe that *TeachMod* could be an adequate intermediate solution between theory and practice. These results validate the aptitude of *TeachMod* as an appropriate educational e-module. Based on qualitative observations, the video analysis showed full student engagement during the learning session and a positive attitude to our e-module. In addition to the educational purposes, it is worth noting that *TeachMod* was entertaining and immersive due to the 360° panoramic videos and the design approach.

These quantitative and qualitative results confirm the achievement of our goal to develop a useful and intuitive tool for learning and assessing the basic skills for effective psychiatric consultations.

#### IV. CONCLUSIONS AND FUTURE WORKS

In this paper, a teaching e-module, called *TeachMod*, using real-context narrative clinical scenarios is proposed for

|       | Very Dissatisfied | Dissatisfied | Neutral | Satisfied | Very Satisfied |
|-------|-------------------|--------------|---------|-----------|----------------|
| $Q_2$ | 7.7%              | 20%          | 20%     | 18.5%     | 33.8%          |
| $Q_3$ | 0%                | 4.7%         | 17.2%   | 39.1%     | 39.1%          |
| $Q_4$ | 0%                | 7.8%         | 78.1%   | 9.4%      | 4.7%           |
| $Q_5$ | 7.8%              | 7.8%         | 20.3%   | 50%       | 14.1%          |

TABLE II: The scores obtained from the 64 participants for each scale of the rating questions.

medical students. The experimental surveys have shown their potential to train and assess the basic skills that ensure healthy interactions between clinicians, and patients with motivational and language impairments. The investigated results confirm that *TeachMod* meets the pedagogical objectives and could be an appropriate tool for learning non-clinical skills in undergraduate medical programs.

For the next step, we envisage pursuing two main objectives. The first consists of the study of new clinical scenarios for other health care areas. The second involves the increase in interaction and immersion of *TeachMod* by improving the gamification process using full virtual environments, more game mechanics, graphics and audio features. Thus enhancing student engagement and motivation.

#### ACKNOWLEDGMENT

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