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Índice

29. @Erizainbot, a mobile chatbot for facilitating learning and collaboration outside the classroom in Health Sciences Education

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Abstract

This randomized controlled study assessed the impact and utility of a chatbot through Telegram for teaching complex theoretical aspects of a science subject of the degree in Nursing, while practicing oral communication. Data on system utilization and user perceptions suggest that the chatbot prove to be a tool that facilitates learning and collaboration outside of the classroom.

Keywords

Chatbots, M-Learning, Telenursing, oral communication.

Introduction

The use of Information and Communication Technologies (ICTs) has increased significantly from the last decade of the twentieth century to the present. As a consequence, the ICT revolution has had important impacts on all levels of our lives, including teaching and learning (Mcloughlin and Lee, 2008). Current educational research identifies the importance of supporting learning with communication technologies, creating environments that suit with today's digitally-minded students (Andone et al., 2007). Indeed, in the last decades, the use of ICTs in the processes of teaching and learning is becoming widespread in many universities across the Globe, including the degree in Nursing (Wilkinson et al., 2012), due to the relevance that ICTs are acquiring to help nurses to provide plan care, education and health promotion. It is a great opportunity for "Telenursing" (TN), but it makes essential the formation of professional nurses for the practice of TN in a safe, competent and ethical way (Eulàlia Juvé et al., 2007).

A core competency of TN according to the Competence Framework of the International Council of Nurses (ICN) is the therapeutic communication and

interpersonal relationships, made through the ICTs (Eulàlia Juvé et al., 2007). However, there is a lack of training regarding patient communication.

We suggest that early and appropriate communication training is necessary to help students achieve effective communication strategies with patients. Due to the limited time students spend with patients, an alternative to this is training with simulated patients (Berkhof et al., 2011). As Glick and Moore (2001) point out, "multimedia applications can achieve not only real-time connections, but also can help construct a virtual patient as a teaching-learning and evaluation platform". In our study, we focused on nursing students' ability to communicate with virtual patients, to whom they should orally respond to diverse questions related to theoretical contents of a science subject. This pedagogical approach fits within the theory of constrictivism, due to the fact that the student is the main responsible of the elaboration of the answers, thus the creation of knowledge, being the teacher a facilitator figure (Piaget, 1970). To do so, they must use a Telegram chatbot called @Erizainbot, a popular instant messaging (IM) application used by millions of worldwide users. Even though using chatbots in education is not a new issue, what is really a fresh approach is to integrate those chatbots in the IM mobile application that the learners are using on a daily basis.

Objectives

Through the implementation of this online application with access via smartphones and the analysis of data on system utilization and the perceptions of students about the chatbot, we pursued the following objectives:

1. Respond the question about whether the designed chatbot might be an educational tool easy to use due to its versatility and flexibility of use in time and space, and if it could be a useful tool to help students become more involved in the subject.

2. Respond the question about whether the designed chatbot might be a useful tool for improving oral expression, helpint students familiarize themselves with the task of communicating effectively.

3. Know what should be improved in the design of the chatbot for future versions.

Methodology

Chatbot design

A Telegram based custom chatbot system was built and used. A chatbot is a software agent that can engage in a conversation with one or more humans. The conversation can be in the form of text messages, voice or a combination of both. The chatbot was tailor-made, entirely programmed for being used in this course. First, users of the chatbot start a new voice challenge sending the */challenge* command to our chatbot, named @Erizainbot. Our bot asks the user some questions that they have to answer using short voice messages. The Telegram system

record users' voice-messages and save some metadata about each recording (who was the recorder, when was it recorded, duration, file system path, etc.) in a voice cache database. After that, our bot executes an assignment script to randomly assign some evaluators to each recording. For evaluating purposes, it offers an */evaluate* command that shows the evaluator his/her pending voice-recording assignments. After listening to each one, the bot asks the evaluator to assess the audio using a numerical grade from a 1-5 Likert scale for three evaluation criteria (information quality, communication skills and appropriate registry), taking as reference a rubric of evaluation previously facilitated by the teacher.

Participants and description of the experiment

This experiment was implemented in the first year subject "Structure and Function of the Body" at the Nursing School of Vitoria-Gasteiz, which is an interdisciplinary subject that addresses core concepts about the structure and function of the human body. A total of 41 first-year nursing students took part in the study. All the students had smartphones and knew how to use the IM applications Telegram and Whatsapp, being the great majority active users of the latter. The initial knowledge of chatbots and their application were basic for both the students and the nursing teacher. The nursing students were randomly assigned to both the experimental group (chatbot) or to the control group (no chatbot). Both groups received identical theoretical training in the classroom. For the experimental group, the chatbot offered the student the possibility of answering 4 or 5 subject-related questions by voice, elaborated by a hypothetical friend, patient or family member, thus simulating real situations and practical questions. The control group was asked to answer the same set of questions but, this time, formulated in a more neutral way (without simulating real life situations) and that had to be answered by writing on a paper (without using the bot). Finally we asked both groups to answer a final question using the chatbot to record their voice answers. A third group (evaluators) was asked to evaluate those final question voice responses, acting as if they were such patient or family member. A technical log was maintained to collect data on system utilization. User perceptions were collected through a questionnaire at the end of the quarter.

Results

Usage of the chatbot

Data about the voice recordings (who recorded it, how long it was, when was recorded, to which question was it an answer...) was stored in a relational database. There were 4 challenges distributed during nearly 2.5 months (from 2017-09-30 to 2017-12-11) with a number between 5 and 6 questions for each challenge. A total of 272 voice files were recorded during the quarter. The distribution is shown in figure 1. As we can see, as each challenge deadline approached, there were recording surges, even for first (testing) challenge. The last question of the 4th challenge had an extended deadline (2017/12/14) thus the final peak.

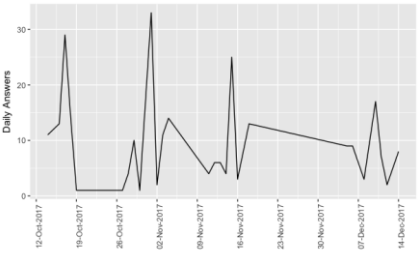

Figure 1. Line chart with the number of daily answers

Students' perceptions

The degree of satisfaction about the experience was evaluated through an online anonymous questionnaire that the students carried out at the end of the quarter. We asked our students to give their opinion about the utility of using a chatbot for voice-testing. From 27 answers, we summarize them as follow (multiple answers were possible, so percentages don't sum up to 100):

- 40 % (11/27) valued positively the option to review each subject using mobile based voice-tests, keeping it up to date.

- Some of them (2/27, 7 %) also highlighted that the bot helped them to involve more with the subject, because they tried to obtain the perfect audio-answer, what helped them to synthesize and be concrete and precise.

- Near 30 % (8/27) of the students underlined that the questions posed by the bot were practical, asking about everyday applications of the theory. One student said that "it is a way of learning by playing a professional role, trying to explain some technical concepts applied to everyday-life situations to non-professionals".

- Related to this, they also found themselves looking through their notes and additional sources of information. Specifically, they felt that this kind of reviewing was helpful for preparing the exam, besides being useful to favour the process of becoming an adult learner.

- Finally 22 % of the students (6/27) valued specially the availability of the bot for practicing whenever they want, in or out of the university setting, without any pressures. It fits each student schedule.

- They also described the experience as an original, entertaining and participative way of learning, which spurs their creativity skills.

We also wanted to know if recording their voices was a weird task for our users and if they felt comfortable or not with using their voices. Only 22 % of our students seem to feel comfortable recording their voices. Accordingly, 59 % seem to be uncomfortable generating voice answers (there is a 18 % that don't have an opinion here). 44 % of them declared they needed a specific space to practice voice-recording, what seems to be a real obstacle to practice (finding a suitable setting).

Regarding the question about if voice-recording exercise was a good option for improving their learning process, near 60 % of them agree or strongly agree with this idea, but there was a 26 % of them that were neutral about this item (and a minority, 15 % don't agree). Interestingly, when querying our students about their opinion regarding the usefulness of voice-messages for improving their cross-curricular competencies (oral expression, communication skills, ability to argue) the strong majority of them (85 %) agree with the idea (and nobody thinks the opposite).

We also asked them to highlight also the points that should be specially improved in future versions of the chatbot. The following lines summarize the aspects that the students consider should be improved: the bot should alert the students about the availability of new tasks (9/27); there is little time to answer (4/27); the option to change an already sent voice-answer should be easier (4/27).

Conclusions

This study suggest that @Erizainbot via Telegram results to be a tool that facilitates learning and collaboration outside of the classroom, and that can be a useful approach to develop cross-curricular skills such as oral expression.

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