

A Micro learning approach based on a Telegram bot: a gender-inclusive language experience

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Abstract— Corporate training requires special designed courses that can be compatible with job routines. Micro-learning has emerged as a suitable solution, since it is based on micro-content or pills of content that can be consumed in rest-breaks. In this paper we introduce a novelty technical proposal that allows learners to interact with micro-content throughout a Telegram bot. We have put this idea into practice to train workers within the use of gender-inclusive language.

Keywords-component; micro-learning; Telegram bot; corporate training; gender-inclusive language

I. INTRODUCTION

Human capacity to stay focused on a single aspect, without distractions, is reduced. Some studies concluded that users only pay attention during 8 consecutive seconds when surfing the Internet [1], other analyses reflect that the most successful videos on YouTube last from 60 to 90 seconds, and the number of views decreases proportionally to their length. When talking about more specific areas, like didactic talks, the lengths are longer, like in TED talks, where the average length for highest impact is 10 minutes.

Additionally, lifelong learning is a fact, workers need to continuously update their skills. However, traditional approaches are not effective enough. On the one hand, trainers need to invest a long time in preparing the teaching material (some estimations [2] considered that no less than 43 preparation hours per training hour). On the other hand, trainees also need to invest a long time and interrupt the working routine. Within this scenario, some studies consider that only 15% of workers will be able to apply the new knowledge, and 80% will forget it in approximately one month. These facts have entailed a progressive change to replace traditional formal

education by distance-learning or blended learning approaches [3].

Within this context, micro-learning arises as a good alternative [4] since it is based on providing self-contained content, mainly interactive and/or audiovisual, brief (lasts 10 minutes maximum) that offer several advantages in the learning process. First, this brevity and concision improves the students' engagement (lower dropout rates and better response of trainees). Second, it improves the knowledge retention, since its nature is coherent with short-term memory and the forgetting curve [5]. Finally, the quick creation, aggregation and distribution of micro-content helps the trainers and trainees to perform their tasks: learning costs are estimated to drop by 50%, tripling the speed at which new content is assimilated.

In this paper we introduce a new approach to support the micro-learning paradigm. Instead of using the classic LMS (Learning Management Systems), such as Moodle, or specific apps for mobile devices, we propose to use an already diffusion and interaction channel universally available that will be the perfect way to distribute and get any audience: a Telegram bot (<https://core.telegram.org/bots/api>). As a proof of concept, we have developed micro-content for a transversal topic that has recently got a lot of attention in the corporate field: training in gender-inclusive language.

The approach we introduce in this paper is the evolution of our previous research work within the micro-learning area. Previously to this mobile access based on Telegram, we defined and provided a suitable strategy to integrate micro-learning in traditional e-learning platforms [6], work financed and evaluated within the ERASMUS+ Capacity Building for Higher Education project ELEMEND: Electrical Energy Markets and

Engineering Education (585681-EEP-1-2017-1-EL-EPPKA2-CBHE-JP).

The structure of the paper is the following. Section II focuses on the architecture and the technical solution to support micro-learning using a Telegram bot. Section III overviews the gender-inclusive content that we have generated and, finally, Section IV summarizes our approach and future work.

II. MICRO-LEARNING SERVICE

The decision to have a Telegram Bot was supported by the following reasons. On the one hand, we have taken into account deployment costs. We pursue to get the widest possible audience at the lowest possible cost. Telegram app is already available for all the typical mobile devices operating systems, so by using this app we already avoid specific cost in developing, deploying and maintaining the front-end part of the architecture. On the other hand, we have taken into account social aspects, as important as the economic ones. Again, Telegram is a well-known company and it is definitively more probable that any user downloads the Telegram app than any other specific app that we might create from scratch.

A. Micro-content definition

There are some successful approaches for micro-learning, specially Web-based solutions like Grovo (<https://www.grovo.com>) or the Coursmos platform (<http://coursmos.com>), and for mobile devices, like Duolingo (<https://www.duolingo.com/>). According to these previous experiences and the main recommendations in the literature [7], we have defined our micro-content unit as a self-contained learning element composed of two parts (Fig. 1): (i) an audiovisual element that describes and explains the new concept or skill and (ii) a brief assessment section based on a multiple-choice questionnaire.



Fig. 1 Structure of a micro-content

Micro-contents are designed in a Web-based authoring tool that we have implemented. This tool helps trainers to define new content in a simple way, without being IT experts. It also acts as a repository for the learning content. The interface, following the WYSIWYG philosophy (What You See Is What You Get) is displayed in Fig. 1. The layout has two identifiable parts: on the

top, the space to include the video and, on the bottom, the interface to create the questionnaire.

B. Architecture of the micro-learning solution

Fig. 2 summarizes the different software modules that are part of the global architecture. The front-end is the Telegram Bot, that has the Telegram Client as interface for the users. This client communicates with the back-end throughout an interface coined as InclusiBot, that is part of the back-end we have developed. The communication between the client device (Telegram client) and the InclusiBot is implemented throughout the Telegram Server (in the cloud), which is part of the Telegram solution for developers.

In order to have a totally modular solution, we decided to design and develop a REST API that allows our element (InclusiBot) to interact with the back-end. Having a REST API allow us to provide a more versatile solution, since the back-end can be used by other kind of learning clients, such as in our previous solution for a Moodle client [6].

Finally, the back-end is composed of the following main functional blocks: (i) the authoring tool, (ii) the authorization server, (iii) the student manager, (iv) the database system (composed of two MongoDB databases and one SQL database) and (v) the API that acts as a command dispatcher.

The authoring tool is out of the scope of this paper, but as it was previously mentioned, this web-based tool was designed to help trainers to easily create a micro-content. They can upload any short video as well as define the questionnaire (number of questions, text of the question, multiple answers and specify the right one).

The student manager allows the students to create a profile where some important data is stored: unique identifier (username), progress record (micro-content that was visited, micro-content that was successfully passed, errors, etc.) and demographic data for statistical purposes.

The database stores: (i) user's profiles and (ii) micro-learning content. This information is accessed by the authoring tool to store and to modify micro-content and by the authorization server to check the identity of the users, recover their progress records and to offer micro-content to students.

Finally, the interaction is built from the requests from the Telegram Bot to the REST API, which includes relevant functions as the following ones: (i) *students_signup*, to register new users; (ii) *identification_telegram*, to store the id of the user's Telegram within the user's profile; (iii) *check_user*, to check if the user is registered in the system; (iv) *list_microcontent*, to obtain the micro-content available for the user; and (v) *get_microcontent*, to get all the information within a specific micro-content.

C. Technologies and behavior of the micro-learning solution

On the one hand, the Telegram Bot has been developed using Python 3.6 and Python-Telegram-Bot 12.11, using the ConversationHandler class. On the other hand, the authoring tool and the authorization server were developed using de Django Web framework (<https://www.djangoproject.com/>), a Python

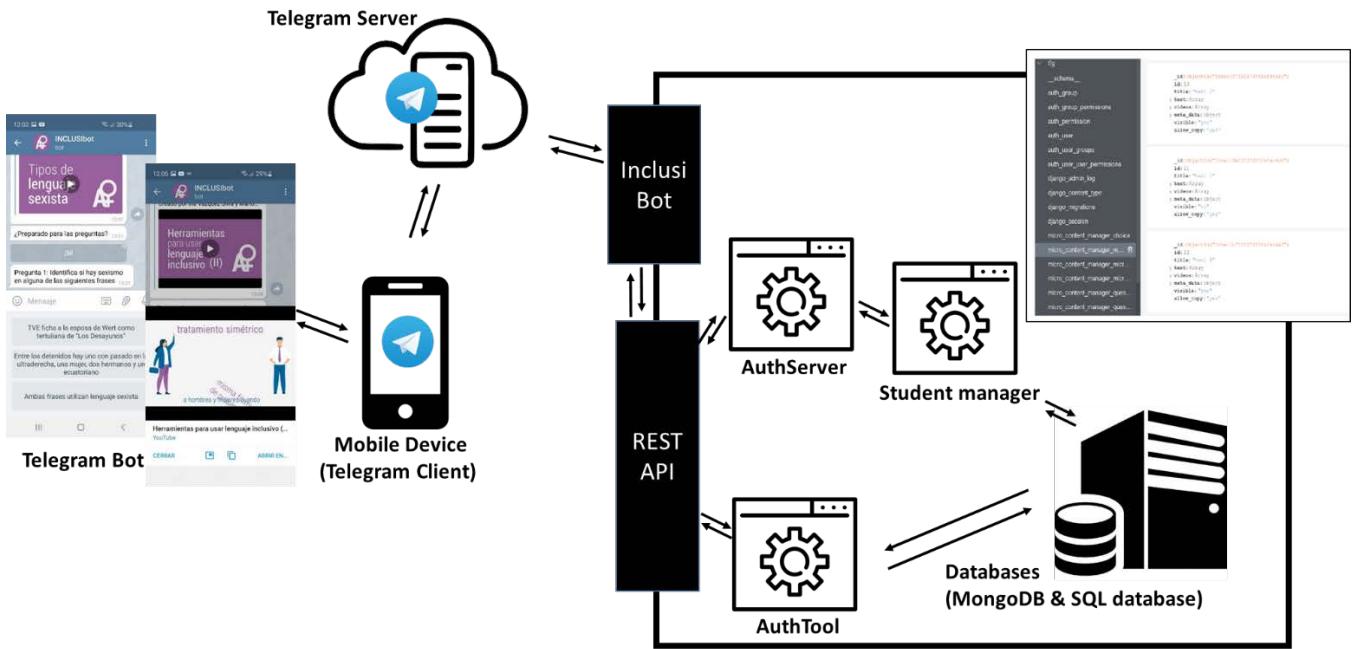


Fig. 2 Micro-learning architecture

web framework based on a MVT (Model, View, Template) architecture patterns that support quick development for Web-based solutions (using HTML5, JavaScript and CSS).

We have decided to use a NoSQL database engine (MongoDB, <https://www.mongodb.com>) because it supports different document structures, in JSON format (<https://www.json.org>). This entails that we can define and store different micro-content templates, supporting different number of videos, of questions, answers and so on.

When the user, throughout the Telegram bot, requests micro-content, this request goes directly to the Authentication server, which checks the user's profile and access to the database to recover the micro-content. The micro-content list is sent back to the client (Telegram bot) and, after that, when the user selects the specific micro-content that wants to see, the process goes on by requesting the micro-content information. This is displayed within the Telegram bot app interface and the answers from the users are sent back to the back-end, to be stored within the user's profile.

III. GENDER-INCLUSIVE LANGUAGE

Firstly, we analyzed what feminist training content could be adapted to the micro-learning paradigm and to the corporate environment, since training contents on gender equality are increasingly in demand in the business environment. After considering several options (such as the prevention of male violence in the workplace), we decided to address the issue of

inclusive language, since it seems to be especially suitable for the micro-course format. The contents developed focused on the following aspects:

- Understanding what inclusive language is and the relevance of its use to increase gender equality rates.
- Detecting different types of sexist language. In the micro-contents developed we focused on (i) the use of the generic masculine form (an important problem in the use of Spanish, although shared in other languages too [8]) and the use of language stereotypes that reproduce roles and stereotypes that perpetuate inequality between men and women.
- Getting to know techniques and tools that are easily applicable to the use of inclusive language.

Therefore, four micro-contents have been designed, each consisting of an explanatory and educational video and a set of questions and answers (single-choice) in order to assess the acquisition of knowledge.

The videos developed can be viewed on (https://www.youtube.com/playlist?list=PLPrsmplnrbuS3iyL6msVzueKxt4VD_ido) and have the following contents:

- Video 1: What is inclusive language? (published in <https://youtu.be/ZNwzAQVd9vY>) Definitions from the RAE (Royal Spanish Academy) are included where you can compare male/female definitions, newspaper headlines where sexist terms are used. The aim is to show how sexism is included in a general and common way in language without us often perceiving it. We include

- fragments of videos where we can see how boys and girls internalise sexist concepts from childhood
- Video 2: Types of sexist language (published in <https://youtu.be/5KSUVi1L8NI>). Different techniques are shown in order to identify different sexist languages, such as the use of the masculine form considered as gender unmarked; and the stereotyped use of language [9]. Newspaper and magazine headlines are used to highlight the problem, as well as a video of how children perceive this problem from an early age.
 - Videos 3 and 4: tools for using inclusive language (I and II, published in https://youtu.be/vSmL_jhG-yc and https://youtu.be/F8PrddM_vSo). The objective is to show a set of alternatives that allow the use of language without sexist forms: using neutral terms (instead of generic masculine terms), avoiding terms that have pejorative gender connotations for men and women, and showing the usefulness of a technique that is simple to apply: the rule of inversion. This consists of substituting a term with the opposite gender and seeing if the situation described is identical and/or equitable. If not, this should be corrected.

IV. CONCLUSIONS

In this paper, we introduce a new technical solution for micro-learning, based on using a Telegram bot to interact with the students/users. This approach has a twofold advantage. On the one hand, users do not need to install specific apps or software clients in their mobile devices, they can interact with a widely known app (Telegram). On the other hand, we do not need to create, deploy and maintain a specific app.

The Telegram bot properly supports the ad-hoc defined micro-content, with multimedia content and micro-quizzes for learners. Additionally, it allows the micro-learning engine to spread messages and alerts to users, in order to encourage them and increase the engagement.

It is worthy to remark that the micro-learning paradigm, however, is not appropriate to acquire complex, abstract concepts. It is more suitable for basic and repetitive skills, since it promotes practice to reinforce the cognitive processes and to guarantee their durability.

As a proof of concept, we have created a course to learn the use of inclusive language in Spanish, aimed at promoting gender equality in the workplace. We have concluded that micro-learning is an adequate paradigm, and we are currently

improving (i) the technical aspects, by defining new sequence paths and reinforcement paths for micro-content and (ii) creating new gender-equality content in order to be used in real environments.

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