GAMIFICATION APP "EXPRÉSATE CON CIENCIA" BOOSTS UTILITY AND ACCEPTANCE FOR HEALTH SCIENCE STUDENTS

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Abstract

The utilization of pertinent scientific terminology holds significant value for university students, as it facilitates the dissemination of their ideas and could potentially augment their prospects for employment. Over the past few years, the level of knowledge of specific terminology has decreased among university students, making them difficult to learn from academic texts. In that context, an educational app ("Exprésate con ciencia") was been carried out to improve knowledge of scientific terminology through gamification between university students. Gamification has been shown to increase engagement, motivation, and learning outcomes, making it a powerful tool in educational contexts.

This work evaluates the grade of acceptance and utility of the app "Exprésate con ciencia" among university students of the University of Granada, Spain after its use. Five types of scores were employed to determine the grade of satisfaction and utility of the app ("generally useful", "its use is better than paper-based applications", "easy using", "innovative" and "motivating"). Data were recorded through a poll after the use of the application. The students were classified according to the university degree they were studying, and the relationship between the degree and the scores was determined using an unsupervised classification algorithm (clustering). These findings divided the population studied among two clusters. One of them was formed by students who coursed health science-related degrees, such as Pharmacy, Nutrition and Dietetics, Medicine, Physiotherapy and Psychology degree, while the other cluster was integrated by science-related degrees like Chemistry, Biology, Biotechnology and Food Science and Technology degree. The present results show that the students belonging to the cluster of health science-related degrees exhibited higher values of the parameters related to the usefulness and acceptance of the app compared with the students of science-related degrees. This fact could be associated with these areas of scientific knowledge requiring the use of specific terminology more frequently compared to degrees related to sciences.

In conclusion, the degree of evaluation and usefulness of the "Exprésate con ciencia" application depended on the users' field of study

Keywords: *Gamification, learning, university students, scientific terminology, health science students.*

1. Introduction

Terminology plays an important role in the understanding of contexts and specialized texts. Understanding the technical and scientific terminology helps students comprehend the main message of the document, and it helps specialists to transmit the content more effectively. However, there is a lack of specific knowledge of scientific and academic terminology among students in science-related university programs (Malmström, Pecorani & Sahw, 2018). This fact can affect their academic performance, motivation toward their subjects, and ultimately reduce their chances of obtaining employment. Some teaching methods that have been shown to improve knowledge acquisition, such as gamification and the use of information technologies (Murillo-Zamorano, López Sánchez, Godoy-Caballero & Bueno Muñoz, 2021), show promising results for implementing new knowledge among undergraduate students (Smiderle, Rigo, Marques, Coelho & Jaques, 2020).

This study aims to evaluate the effectiveness of an educational app in improving scientific terminology among university students.

2. Methods

2.1. Gamification app "Exprésate con ciencia"

The gamification app "Exprésate con ciencia" has been developed by Everyware Technologies, Granada, Spain. The development of this gamification app was supported by an educational innovation project funded by the University of Granada. This app is free to download and is available on both iOS and Android mobile platforms.

2.2. Survey

The survey was designed to collect information regarding the utility and level of satisfaction among users of the app. It included data about the academic programs of the students (type of university grade), as well as five questions about the usefulness and acceptance of the app. These questions included the general usefulness for the students, the preferences for its use compared to conventional material (paper-based), ease of use, innovativeness, and motivation for its use. Respondents were asked to rate each parameter on a scale of 0-4 points.

The survey was designed in the Google Docs platform and distributed via email by mailing lists of the University of Granada, social networks, and mobile phone devices.

2.3. Statistical analysis

The parameters that indicate the utility and acceptances were employed. Thus, the score of each parameter was calculated and their distribution in clusters by k-means was estimated employing the software Rstudio (PBC, Boston, USA).

3. Result and discussion

Table 1 shows the values of each parameter evaluated regarding the acceptance and usefulness of the app, divided by the type of university degree of the users. In all cases, the scores were high for all the parameters studied. Psychology and physiotherapy students reported the highest scores (4/4) on all parameters studied, while students of the Food Science and Technology had the lowest scores.
Gamification-based tools have been described as useful for university students in improving skills such as lecture attendance, content understanding, and problem-solving skills (Chans & Portugez Castro, 2021). Furthermore, several studies have found that the use of apps improves student engagement in the educational process (Pal´ová &Vejačka, 2020).

Table 1. The score of general usefulness, preference of using the app (better than paper-based), ease of use, innovativeness and motivating depending on the scientific program of the users.

	General usefulness	Better than paper-based	Ease of use	Innovativeness	Motivating
Pharmacy	3.80	3.00	3.80	3.80	3.80
Nutrition and Dietetics	4.00	4.00	4.00	4.00	4.00
Biology	3.50	3.50	3.50	3.00	3.00
Biotechnology	3.50	3.00	3.50	3.50	3.00
Chemistry	3.00	3.00	3.00	3.00	3.00
Medicine	3.50	3.50	3.50	3.50	3.50
Food Science and Technology	2.50	2.50	3.00	2.50	3.00
Physiotherapy	4.00	4.00	4.00	4.00	4.00
Psicology	4.00	4.00	4.00	4.00	4.00

Furthermore, the results obtained agree with the preference of students for the use of paperless tools for learning (Zabukovec & Vilar, 2015) (Johnston & Salaz, 2019). The score for 'better than paper-based tools' parameter was high among the students who participated in the survey. Additionally, the designed application was described as easy to use by the students. Therefore, the parameter 'ease of use' was the most highly valued of all. Therefore, this parameter was the most highly valued of all.

Figure 1. k-means of each type of the student program of the university students.
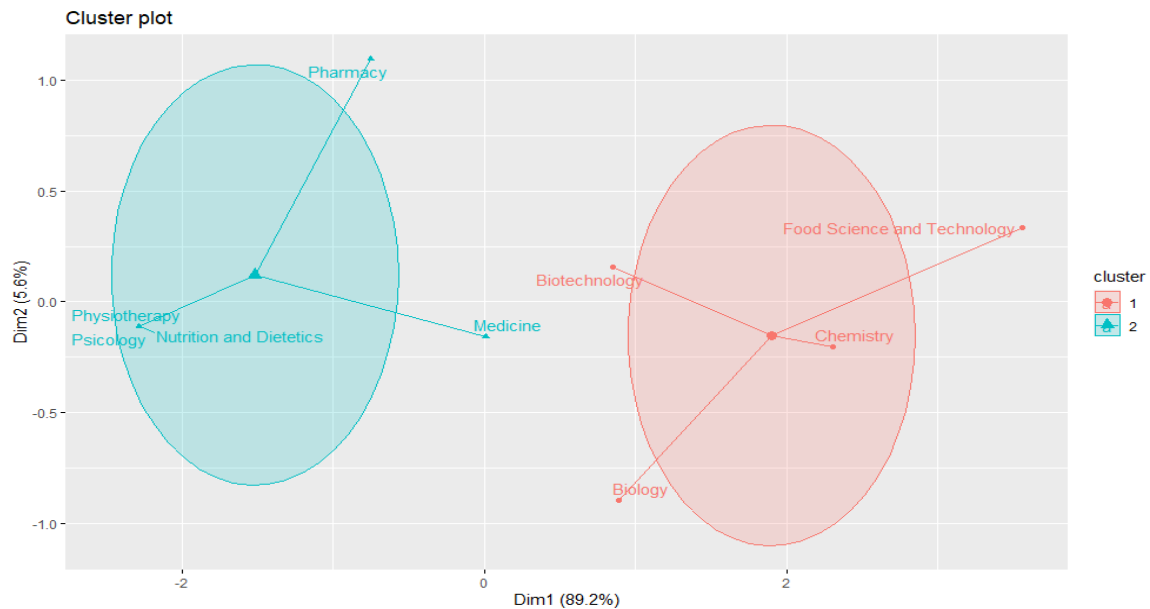
Subsequently, to determine which profile the application best suited, a clustering technique based on an unsupervised classification algorithm (k-means clustering) was performed. Figure 2 shows that the population of students could be classified into two clusters. On one hand, cluster 1 was formed by students of science-related degrees such as Chemistry, Biology, Biotechnology, and Food Science and Technology. On the other hand, students of health science-related degrees (Pharmacy, Nutrition and Dietetics, Medicine, Physiotherapy, and Psychology degrees) formed cluster 2. These findings suggest that the application was better suited to students of degrees related to health sciences. This may be associated with the fact that the application contains more scientific health terminology and that the content of specific terminology is more common in these university studies.

4. Conclusions

These results show that the "Exprésate con ciencia" app, based on gamification, is well accepted and useful by university students at the University of Granada. Furthermore, the results suggest that the perception of the usefulness of this application varies according to the scientific field of the students.

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