Generation of a teaching learning community for the development of autonomous work through the use of authentic learning in a Human Molecular Genetics course

Daniel Moena[1][0000-0001-6072-4295] María Soledad Orellana[2][0000-0003-4977-6427], Fernando Faunes[2][0000-0003-2657-2552] y Patricia Perez-Alzola[2] [0009-0002-7720-4143]

[1] Universidad Técnica Federico Santa María, Arteaga Alemparte 943, Hualpén, Bío Bío, Chile
[2] Universidad Andrés Bello. República 239, Santiago Centro, Chile
daniel.moena@usm.cl

Abstract. Authentic learning is a methodology that develops critical thinking in students, allowing them to connect theoretical learning with real situations. Personal study activities, which contribute to autonomous work, turn out to be the key to internalize and mature knowledge, significantly improving learning reception. In this study, authentic learning was used in 363 Dentistry students in a Genetics course, through the development of activities relating theoretical contents with dental genetic diseases. 70% of the students indicated that the activities were easy to carry out and were in accordance with the theoretical contents, allowing them to better understand the concepts worked in class and improve their personal study times. In addition, 73% of the students were motivated by the course activities and 65% considered that the instruments to perform them were adequate. On the other hand, 33% of the students considered that participating or not in the activities had the same result in learning.

Keywords: Authentic Learning, Autonomous Learning, Feedback, Critical Thinking

1   Introduction

An effective way for student to develop critical thinking is through authentic learning, this allows connecting theoretical learning with real experiences or phenomena, wich allows top their knowledge into practice in the development of solutions for cases or closer experiences. to real life (Latorre-Cosculluela et al., 2020). On the other hand, autonomous learning is presented as the ability of an individual to acquire knowledge, skills and competencies independently, without the constant supervision of an instructor, being key to internalize and mature knowledge (Klimenko & Alvares, 2009). For its part, the use of authentic learning activities in personal study hours significantly favors the reception of learning (Cabero Almenara & Palacios Rodríguez, 2021).

Based on this, we worked on a Genetics subject, with authentic learning activities in the personal study time of first-year Dentistry students from Andrés Bello University, Chile.

2   Theoretical Framework

The transition from high school to college is challenging for first-year students to social and academically adaptation as they are faced with an unfamiliar environment and new learning experiences that can be stressful (Domenech et al., 2019). In addition, many students lack basic tools to guide their personal study effectively, hindering their autonomous learning. This type of learning is essential to verify the achievement of competencies, improving planning and teaching-learning process, directly related to academic success (de León, 2020).

The authentic learning methodology challenges students to solve problems as if they were in real situations, allowing them to learn by developing critical thinking to make their own decisions (Retana & Rodriguez-Lluesma, 2022). By using this methodology for personal study, students can improve the way they plan their study and better understand the concepts covered in class.

Consequently, the use of authentic learning methodologies for the development of personal study favors the way in which students plan their study, improving the understanding of concepts covered in class. This is how the use of genetic pathologies as a focus of study can promote autonomous learning and improve the understanding of concepts outside of the theoretical class.

3   Methods

The study group considered 363 first-year Dentistry students (6 sections). To work on autonomous learning times, work groups of between 5 to 8 students were generated, assigning each group a dental genetic pathology. The activities were developed asynchronously on Jamboard platform, giving each group specific tasks that related the theoretical contents with the assigned pathology. The feedback of the activities was done synchronously through the Kahoot application. In order to integrate the activities, an infographic was made by group. Data analyzes were performed through perception surveys and course approval rates.

4   Results

The following table summarizes the participation of the students in intervened sections:

Table 1.- Participation of students in activities carried out for the Human Molecular Genetics course

Campus	NRC	N° Students	Activity 1	Activity 2	Activity 3	Activity 4
Santiago	1365	97	90	76	69	53
Santiago	1366	87	87	53	63	54
Viña del Mar	1503	60	42	41	32	30
Viña del Mar	1504	17	15	10	4	4
Viña del Mar	1505	52	33	21	22	21
Concepción	1278	50	50	42	40	40
	Total	363	317	243	230	202

A 60% total approval was obtained, 5% higher than the previous year.

A perception survey was performed, where 156 of 365 possible students participated, 148 of them authorized its use for the analysis of results.
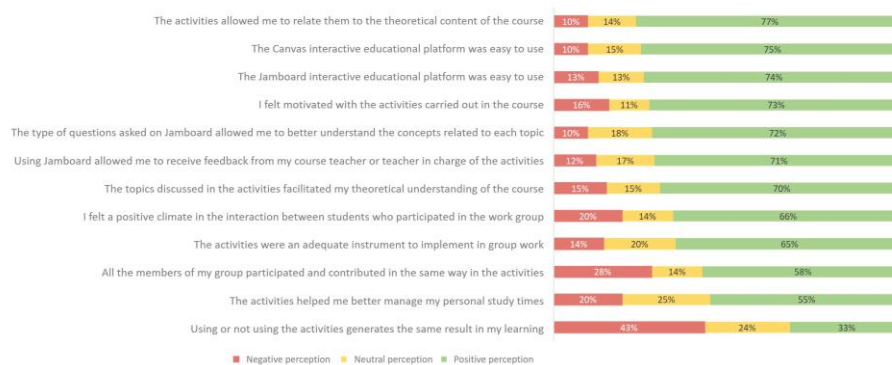

Fig 1. Results of perception surveys performed in human molecular genetics course.

When analyzing the results (figure 1), it is observed that around 70% of the students found that the implemented authentic learning activities were easy to use and relevant to the course. On the other hand, more than 50% reported an improvement in the management of their study time, 73% felt motivated and more than 65% found the appropriate instruments in addition to favoring interaction between students. Finally, a third stated of the studentes considered that participating or not in these activities would have the same impact on their learning.

5   Discussion

The development of autonomous learning activities, through authentic learning, allowed an increase of 5% in the percentage of approval compared to the previous year in online format. This is relevant, considering that the approval percentages were higher than those of face-to-face format prior to the pandemic. These results may be a reflection of greater motivation on the part of the students, being able to better internalize the concepts delivered. As additional data, we found that close to half of the students did the activities to obtain a bonus in the evaluations, which suggests that many first-year students are not yet aware of the importance of autonomous learning and starting them on this path can be crucial for the development of this skill.

6   Conclusions

- 60% approval was obtained, 5% higher than the approval of the previous year.
- Participation in at least one of the developed activities was 87%.
- 50% of students performed the activities expecting a bonus in evaluations, allowing them to work on their personal learning.
- Most first-year students are not aware of the importance of autonomous learning.

7   Limitations and Future Research

One limitation is that students value autonomous learning without incentives, without understanding its importance for academic development. Because of this, it is necessary to work on autonomous learning strategies that improve the ability of first-year students to learn consciously and systematically.

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