HSCI2020

Viana do Castelo
Portugal
13-17 July 2020

Can We Use Music as a Useful Teaching and Learning Strategy? A Pre-experimental Design Applied to the Study of Fermentation

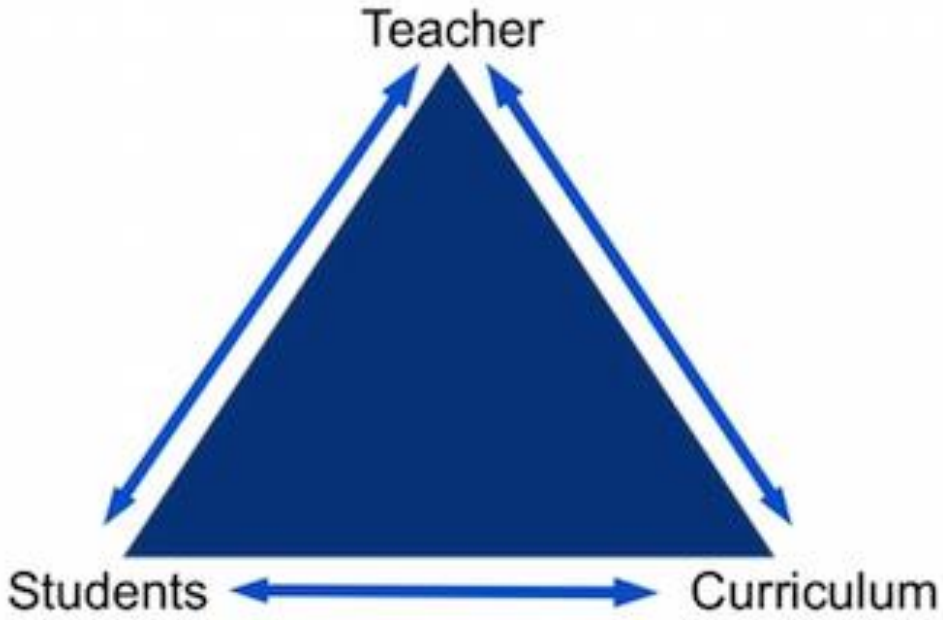
M. Paz[1,2*]; M.L. Abrunhosa[1] & L. Calafate[1]
[1]*Science Teaching Unit, Faculty of Sciences of Oporto University, Portugal*
[2] *College of Gaia, Vila Nova de Gaia, Portugal*
*Corresponding author: martacpaz@gmail.com

Introduction

XXIst century society

- Information and knowledge acessible in an immediate way.

- Teachers need to select, conceive and implement new teaching methodologies and strategies, in order to engage students with the school curriculum, commit them to their learning process and thereby improve the construction of knowledge.



Goal

Verify if the use of music to teach scientific content, could increase students' motivation and learning of scientific concepts.

Sample

- Convenience sample of 30 students
- 10th grade Biology and Geology class

Curricular contextualization

- 10th grade curriculum of Biology and Geology
- Transformation and utilization of energy by living beings - Fermentation

Methodology

- **Pre-experimental design**

Traditional class plus practical work

Fig. 1 – Images from the practical work of alcoholic yeast fermentation *

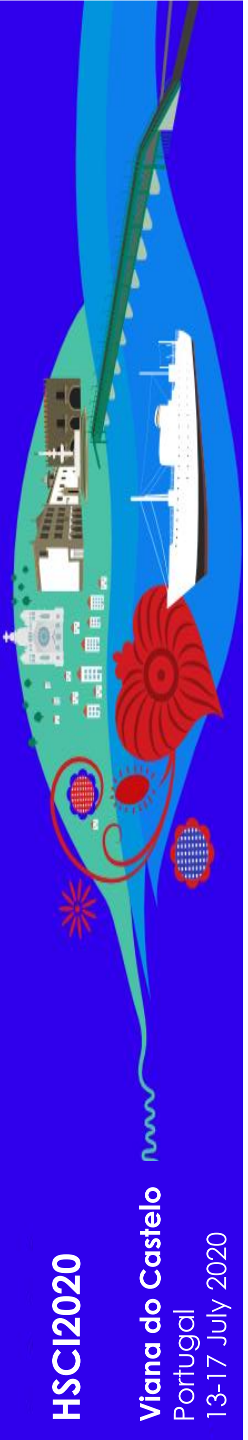
Pre-test

Music experience

- The lyrics of a recent famous portuguese pop song, was adapted to the scientific theme of the fermentation process.
- Students learnt the lyrics in the class and sang it with the teacher *

Post-test

*** Practical work procedure and music available in extra materials.**



Results

Table 1. Descriptive statistics obtained in the pre-test and post- test results

	Pre-test	Post-test
Average score	45,8%	75,5%
Standard deviation	20,9%	18,1%
Minimum	3,4%	25,9%
Maximum	85%	100%

The Wilcoxon's statistical test for paired samples (non-parametric) allowed to attest that the post-test results reflect a statistically significant increase in the classifications obtained ($Z = 4{,}47$; $p < 0.00001$), for a confidence interval of 99%.

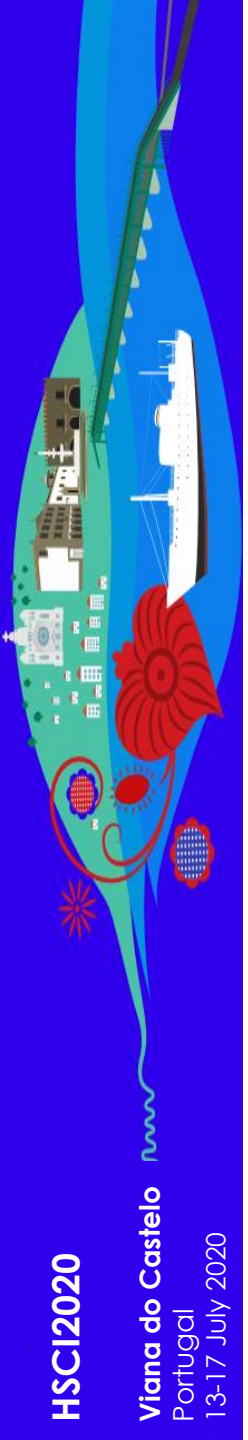
Conclusions

The results seem to be good indicators of the effectiveness of using music as a teaching and learning strategy, in a particularly difficult theme, such as the fermentation process, by:

- promoting the acquisition of scientific content;
- increasing both students' motivation and engagement in the science class.

Reflection and future investigations

Potential for using non-traditional forms of teaching scientific content (such as music and perhaps other forms of art, like acting or poetry) as complementary strategies to formal science education.



HSCI2020
Viana do Castelo
Portugal
13-17 July 2020

End of presentation

Thank you so much for your attention!

Extra materials