

BIOTECHNOLOGY, MILLIONS THAT CAN GENERATE BILLIONS: TEACHER PERSPECTIVE ON STUDENTS' ASSESSMENT

*An overview on bringing Inquiry Based Science Education (IBSE) into the classroom
or the 5 "letters" no one told me about*

Getting prepared

IBSE is a great challenge and requires substantial investment from both teachers and students. The activity underlying this discussion was set up under the 1st SAILS Portuguese workshop for teachers: "Why is there so much talk about INQUIRY across Europe? A proposal to work with the science curriculum in the classroom" on May 2013 and implemented this school year (2013-14) with lower secondary students.

Rubric

The rubric focused on:

- Searching and selecting information sources;
- Synthesizing and analyzing gathered information;
- Communication skills (construct arguments and defend conclusions).

For each criterion three performance levels were described (3 - "excellent", 2 - "competent" and 1 - "needs work").

The rubric was discussed in the classroom, clarifying assessment criteria and performance levels considered.

Empowering students

It's all about feedback!

Developing autonomy and planning skills is more about posing the right questions than giving good answers!

Assessment and Evaluation

Assessment took place throughout the activity but only on the lesson when the role-play debate was held, students wrote their critical analysis and delivered their *worksheet* (information sources and argumentation) so that it could be evaluated.

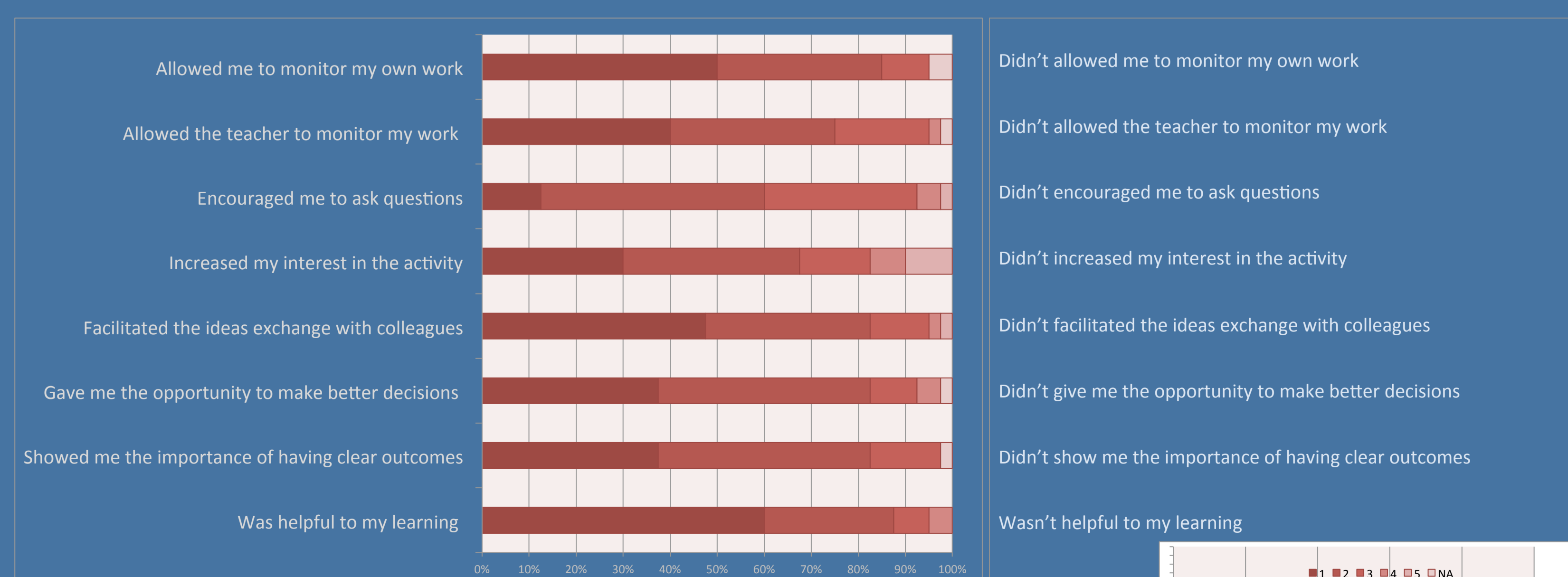
Time

IBSE it's all about time. Time to get prepared, time to work in class, time to think, time to discuss, time to develop, time to grow, time for edification, time for education.

IT WAS GREAT!

Data concerning students' perceptions about the rubric and all the assessment process was collect using a semantic differential developed by SAIL's Portuguese team and data concerning the teacher perspective was collected using the pupils' written documents.

For students "Knowing the assessment criteria regarding this activity ..."



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Abstract:

Biotechnology will have a significant impact on all our lives and that of future generations. Like any tool, biotechnology is being used to solve some of our problems and provide benefits to various sectors. However, as with any tool, biotechnology could have negative effects¹. In the Portuguese Basic Education Curriculum, Biotechnology is perceived as a central concept and students are expected to develop skills such as recognizing the importance of a critical analysis in relation to ethical issues of some scientific and technological applications. The activity "Biotechnology – Millions that can generate billions?", was developed with lower secondary science students, and culminated in a role-play debate. Students initially read a newspaper article about government funding of biotechnology research and industries. After a brief discussion, students were given different roles. Assessment criteria focusing on: searching and selecting information sources; synthesizing and analyzing gathered information and communication skills; were discussed and clarified in classroom. A synthesis of the arguments discussed on the debate was held on the last lesson on this thematic and students were given a written feedback of their work. The activity was a truly remarkable teaching and learning experience for it allowed students, who until then maintained a passive attitude towards their learning process to become involved and motivated on proceeding Science studies. We aim to provide examples of the evidences analyzed in student assessment, concerning the communication skills, and discuss the difficulties and potentialities on the application of the assessment tools used (criteria and performance levels considered), regarding the development of student's scientific literacy, and it's feasibility considering the teacher's context.

¹ Keener, K. and Hoban, T. (2014). *Biotechnology Questions and Answers*. [online] Available at: <http://www.ces.ncsu.edu/depts/foodsci/ext/pubs/biotech.html> [Accessed: 26 February 2014].