



## Short Courses: Sharing Knowledge with Students, from Students

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### Abstract

*The undergraduate years are crucial for students to broaden their horizons and learn about new research areas. However, most of the times the training opportunities that students could resort to to complement their academic education are not specifically designed for them, for being too advanced, significantly expensive or occurring during the week, overlapping with academic commitments. With this in mind, the Centre for Ecology, Evolution and Environmental Changes (cE3c), based at the Faculty of Sciences of the University of Lisbon, Portugal, joined efforts with the Association of Biology Students of the Faculty to create an offer of brief training opportunities aimed at undergraduate Biology students: the Short Courses. During the academic year 2017/2018, thirteen Short Courses were organized (corresponding to 215 vacancies), spanning areas as diverse as ecology, taxonomy, programming and science communication, and putting in direct contact researchers, PhD and Post-Doctoral students from cE3c - as trainers - with undergraduate students - as participants. Furthermore, to meet the students' needs the courses had the duration of 1-2 days, were scheduled for public holidays and weekends, and the inscription cost was kept at a minimum possible to ensure just logistic needs and the payment of the trainers' work. In this first edition, the Short Courses registered a global occupancy rate of 83%, with several courses sold out. As expected, the majority (70%) of participants were undergraduate Biology students from the Faculty, but the Short Courses also welcomed master and doctoral students, and participants from other faculties across the country. The evaluation surveys reveal that all participants rated the initiative as either "Very Good" (maximum) or "Good", with very positive appreciations about the organization and the pertinence of the courses to their academic education. Trainers also praised the initiative, emphasizing its importance for communicating their work and inspiring a new generation for their research area. Evaluation results and suggestions will be used for improving future editions of the Short Courses.*

**Keywords:** Science education; Science Communication; Undergraduate education; Soft skills;

### 1. Our motivation

The undergraduate years are crucial for students to broaden their horizons. It is also an important period for students to acquire skills that will be important in their near professional or academic career, such as programming skills, laboratory techniques and soft skills. Frequently these skills are not explored in depth during the bachelor's degree, as time must be allocated to the heavy curriculum of each discipline.

In the academic year 2017/2018, the Faculty of Sciences of the University of Lisbon (FCUL) had 3202 undergraduate students, of which 732 attended the Bachelor Programme in Biology – the one with the largest number of students in the Faculty [1]. In collaboration with its research units, the Faculty offers several brief training opportunities – however, these are mostly aimed at Master and postgraduate students, being too advanced for undergraduates or significantly expensive. Frequently these training opportunities also take place during the week, overlapping with academic commitments.

### 2. The project: Short Courses

To meet the students' needs, the Centre for Ecology, Evolution and Environmental Changes – cE3c, based at FCUL (Portugal), joined efforts with FCUL's Association of Biology Students to create the *Short Courses*: an offer of brief training opportunities – with the duration of 1-2 days – aimed at undergraduate Biology students.

The courses were scheduled for public holidays and weekends, and as far as possible from periods of the academic year identified by the Association of Biology Students as periods of greater academic work, to ensure that students could participate. The inscription cost was kept at a minimum possible, just enough to ensure the payment of the trainers' work and logistic expenses.



We aimed to have preferentially PhD students and PostDoctoral researchers as trainers – for some of the trainers it was their first teaching experience. The fact most trainers had been undergraduate students themselves not long ago also allowed them to identify more easily the students' difficulties.

In July 2017 we launched a call among cE3c PhD students for the submission of *Short Courses'* proposals. In the previous academic year, the Association of Biology Students had also undertaken a survey to identify areas in which undergraduate students were more interested in complementary activities. With that in mind, we also sent invitations to cE3c PostDoctoral researchers and Professors in key areas.

The *Short Courses* were launched in September 2017, through social media (our main communication channel) and posters affixed at the Faculty. Students interested in enrolling were asked to complete a pre-inscription form, also indicating their academic area and level. As this initiative was preferably aimed at undergraduate and Master Biology students of the Faculty, students from other scientific areas and institutions would start by being placed in a waiting list. After the inscription deadline for each course, these students would also be admitted whenever there were vacancies available.

The courses spanned diverse scientific areas, from Ecology to Taxonomy, from Programming to Scientific Writing and Science Communication. Whenever appropriate, the training would take place not only in the classroom, but also involving field trips and laboratory classes (Fig. 1).

At the end of each course, we asked participants to fill out a brief survey to collect participants' assessment of the scientific content of the course, logistical aspects, and suggestions on what should be improved in future editions. Trainers were also asked to fill out a brief online survey, focused on their evaluation of logistical aspects, in understanding if they would be interested in proposing again a *Short Course*, and in understanding how they perceived the impact (if any) of their involvement in this initiative in communicating their research.



Fig. 1: The *Short Courses* spanned diverse scientific areas and took place in different environments – not only in the classroom, but also involving field trips and laboratory classes whenever appropriate.

#### 4. Results

Thirteen *Short Courses* were organized in the academic year 2017/2018, corresponding to 215 vacancies [2]. In total, 180 students enrolled in the courses, which corresponded to an occupancy rate of 83%, with six courses sold out. The main audience corresponded to undergraduate students (70%), as expected, among which the majority (58,7%) was attending the third and last year of their bachelor's degree (Fig. 2). Remarkably, the courses also attracted more advanced students: 22,2% of the inscribed participants were Master students, while 2,8% were PhD students (Fig. 2).

The dissemination of this initiative through social media allowed us to reach a wider audience than initially expected: some inscriptions came from students of other institutions, not only in Lisbon but also, in some cases, from other parts of the country as well.

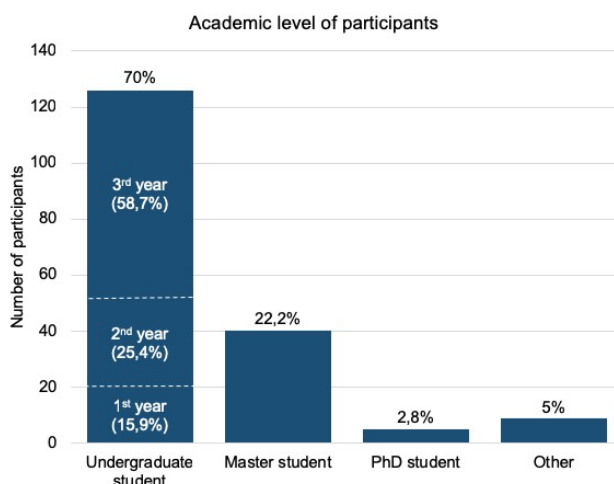


Fig. 2: Academic level of the participants inscribed in the *Short Courses*, according to the data gathered in the pre-registration form.

#### 4.1 Evaluation by the participants

The participants' surveys were organized in three sections: evaluation of training, evaluation of logistics and overall opinion. Each section corresponded to a five-point scale rating question.

The participants' overall opinion about this initiative is very positive: 89,8% of the participants affirmed that the course they attended corresponded to their expectations "Completely" or "A lot"; this result increases to 90,6% when asked if they considered the course important to their academic background (Fig. 3 a)).

The participants' satisfaction rating concerning the trainers and scientific content of the courses was also very positive: for all the categories – such as the courses' utility, relevance and appropriateness, and overall performance of the trainers – the overall majority of the participants rated as either "Good" or "Very Good" (the maximum). Only three participants rated three categories with "Reasonable" (Fig. 3 b)).

While also corresponding to a very positive evaluation, the participants' satisfaction rating concerning logistic aspects did not gather the same overall consensus. The quality of the coffee-breaks was the most disputed question: 5,3% evaluations as "Terrible" and "Bad", while 15,3% classified the coffee-breaks as "Reasonable" (Fig. 3c)). As we monitored these results from course to course, by talking informally with some participants we understood that the more critical evaluations were due to the fact that the coffee-breaks were little diversified, an aspect which was improved in later courses.

#### 4.2 Evaluation by the trainers

The *Short Courses* involved 19 trainers, of which 11 were PhD students or Master's degree holders, 7 were PostDocs and 1 was Assistant Professor. After each course the trainers were asked to jointly fill out an online evaluation survey, so that one response was collected per course. The first author of this paper, co-organizer of this initiative, was simultaneously the trainer of three courses – as such, her responses were not considered to the survey so as not to influence results. Also, when a course had more than one edition trainers were also asked to fill out the survey only once.

The trainers' evaluation survey was structured in two sections: evaluation of logistics – a five-point scale rating question –, and opinion and suggestions (open-ended questions). In total, n=8 answers were collected.

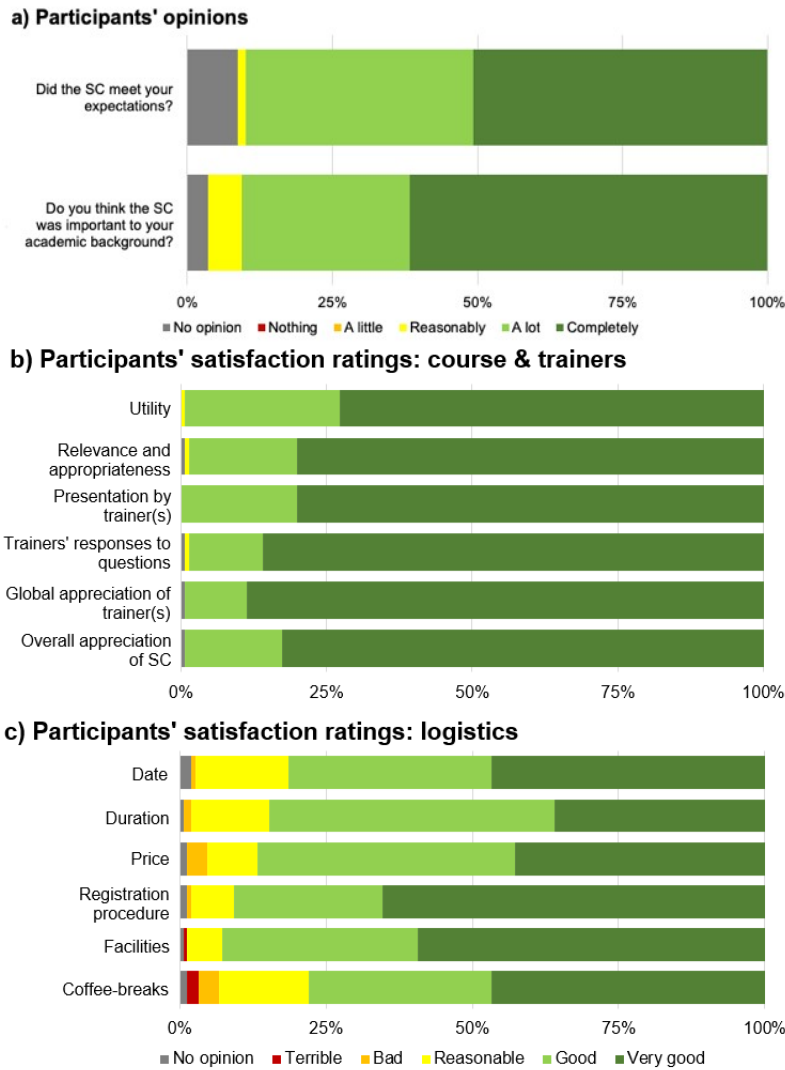


Fig. 3: Results of the participants' evaluation surveys, considering a) their overall opinion (n=138 as these questions were inserted after the first course), and the participants' satisfaction ratings concerning b) course and trainers, and c) logistics (n=150).

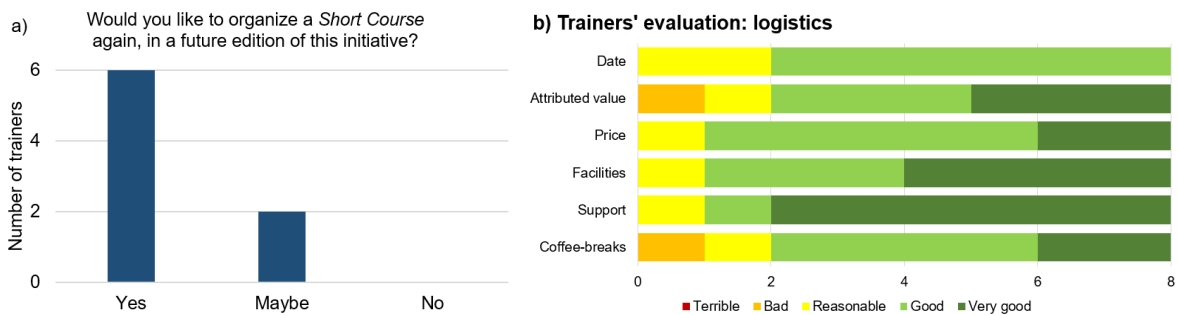


Fig. 4: Results of the trainers' evaluation surveys (n=8), considering a) whether they would like to organize a *Short Course* again in the future, and b) their evaluation of logistics.

Concerning their motivation to propose a *Short Course*, trainers mostly highlighted their interest in gaining experience as trainers (for several of them it was their first teaching experience) and in giving visibility to their research area. Six of the eight answers were positive about organizing a *Short Course*



again in a future edition (Fig 4a)), and emphasized that organizing a course was important for them from the perspective of communicating their research, as highlighted by these excerpts: “Yes, as some of these students end up working with us during their Master’s theses”, “It was important, because it allowed me to disseminate the results I had the opportunity to collect as a researcher”, “Yes, by the involvement of young students who could constitute the new generation of taxonomists”.

Concerning the trainers’ evaluation of logistics, all categories received at least six (out of eight) votes as either “Good” or “Very Good” (Fig 4b)). Only the coffee-breaks, and the value attributed to the trainers’ work, received one answer each as “Bad” – concerning the latter, this is related to the fact that the payment to each trainer could not be too high in order to keep the inscription cost accessible to students.

## 5. Discussion and Conclusions

The high number of inscriptions by our target audience and the positive evaluations by both participants and trainers allow us to affirm that the first edition of the *Short Courses* was very successful – an outcome that encourages us to organize this initiative again in the near future. In following editions, we will work towards broadening the scientific areas covered by the courses, following suggestions presented by the participants, and simplify the inscription process and the trainers’ payment.

We also aim to involve more PhD students and PostDocs as trainers: to strengthen their role as mentors of undergraduate students and also to reinforce what is, to several of them, their first teaching experience, through which they can also gain new perspectives on their research.

## 6. Acknowledgements

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