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Title: Students as teacher whisperers: a case study of course co-creation for and with students

Abstract (maximum of 150 words): Since 1999, the Bologna Process has advocated towards a new teaching paradigm, the so-called student-centred approach to learning, as well as towards more coherence of the higher education system across Europe. This paper explores how co-creation of course contents and learning activities, for and with students, may be implemented to sustain a student-centred evolution of teaching. Located at the crossroads between action-research based method and case study, our co-creation initiative strives for the enhancement of the student's learning experience. Using statistical and qualitative data, this paper investigates how a 3-years-long course redesign with the support of co-creating students has induced significant effects on the curriculum, on the members of the pedagogical team and on the student cohort. Consequently, we suggest that in most higher education systems, student-staff partnership through co-creation is a highly adaptive process that may improve multiple dimensions of teaching and learning in a student-centred way.

Key words (up to five): higher education, course design, student-centred, co-creation, partnership

Text of paper (1,000-3,000 words, excluding references):

INTRODUCTION & HYPOTHESIS

The genesis of the co-creation implementation

The Bologna Process, initiated by the Sorbonne (1998) and Bologna (1999) declarations, has given rise to the European Higher Education Era (EHEA) and has had, for more than twenty years, a great impact on universities across Europe (Guccio, Martorana and Monaco, 2016; Agasisti and Bolli, 2013). Besides student mobility and the harmonisation of quality-certified university degrees, the Bologna Process also promotes more skills-oriented teaching activities and a student-centred approach to teaching. As one of the 49 EHEA members, the French community of Belgium (FcB), which is in charge of education policy for the French-speaking part of the country, has fully adopted the Bologna Process philosophy via the so-called "Paysage" Decree (2013) by defining a common set of academic degrees and related programme learning outcomes for all its publicly subsidised universities and by giving students the opportunity, like in many countries, to get a degree by accumulating credits at their own pace instead of in a limited number of years. Amongst the many ripple effects -positive and negative- induced by this Decree, teachers are now facing a massive diversification of the students' backgrounds as well as a wave of disengagement from learners towards their educational journey.

Addressing diversity and disengagement issues is perhaps one of the many factors that have put student-centred approaches back on the table (Bovill, 2013). Implementations such as co-creation of course contents or course designs with students appear to be an interesting trail towards maintaining students' engagement and motivation by directly including them in the problems at hand. Students can be a fundamental part of how to design and/or profoundly modify a curriculum[1]. In literature, the definition of co-creation isn't yet set. It can be characterised as a process based on the collaboration between students and a teacher, and in some cases, collaboration tends to evolve towards a real partnership, where students gain equal role as other members of the pedagogical

[1] As defined by Bovill (2013); Fraser and Bosanquet (2006). The latter entails not only the content and organisation of a course and the programme but also the process of teaching and learning through interactivity.

staff in the decision-making process and responsibilities (Bovill, Bulley and Morss, 2011). Co-creation seems to be a complex phenomenon with a wide variety of applications (Bovill, 2022).

This paper, based on a case study in the French Community of Belgium, will investigate how a course co-design approach for and with students has been established in the Bologna-driven student-centred perspective of teaching of EHEA, exploring how it can be implemented and which outcomes can be expected throughout the process.

OUTLINING THE APPROACH

The trigger year 2018-2019: where are the students?

At Université libre de Bruxelles (ULB), the course of "Physics of Information Technology" PHYS-S201 cohort includes around 280 students per year, with some variations depending on the academic year. The course deals with applied physics and consists of 40 hours of traditional lectures intertwined with 18 hours of exercise and 12 hours of laboratory sessions. The course represents five credits (ECTS), that means an average of 150 hours of student workload (including attendance at all activities listed above). The learning objectives of PHYS-S201 are explicitly and publicly available, as requested in FcB by Decree.

At the end of the academic year 2018-2019, observations confirmed that PHYS-S201 was experiencing the commonly reported students' disengagement phenomenon.

First, evidence demonstrated that, statistically, the attendance rate (the ratio between the number of students attending the lesson in the lecture room and the total number of enrolled students in PHYS-S201) dropped significantly throughout the year, from 50% attendance for the first course to 10% for the last one, with an average of 21%. Moreover, the average class final grade for the year 2018-2019 was 10/20, which is the minimum value for automatic success in FcB; 10/20 is -1/20 in comparison to the previous year and the historically lowest average grade since more than 10 years. Additionally, the overall student success rate (the ratio between the number of students getting the PHYS-S201 credits and the total number of enrolled students in PHYS-S201) of the year 2018-2019 was 61%; that is to say, a huge and never-before-seen 18% drop in the success rate compared to the year 2017-2018.

Second, the yearly institutional online teaching assessment by the students survey (EEE) was conducted; all students of the cohort were invited to answer anonymously a questionnaire of 22 items evaluated by a Likert scale and to eventually leave open comments. Observing a 27% response rate (the ratio between the number of collected responses to the survey and the total number of enrolled students in PHYS-S201), the survey highlighted very positive feedback for the course PHYS-S201 (more than 90% global satisfaction), but 5 items exceeded the 15% mark of non-satisfaction:

- Unclear course contribution to the programme (21%)
- High rhythm of activities all along the term (26%)
- Missing more detailed support than lecture slides (21%)
- Lack of preparation to the final assessment format (27%)
- Workload felt larger than 5 credits (53%)

To address these statistical and qualitative observations, the choice we made was to implement a forward-thinking "co-creation for and with students" dispositive for the PHYS-S201, taking inspiration from other universities that seemed to successfully implement ways to stimulate not only students' motivation but to bring change to the curriculum in the hope of stimulating success rates,

attendance at courses, and so on (Bovill, 2022).

MATERIAL & CONCISE ANALYSIS
A reinforced pedagogical team

Based on the above-mentioned 2018-2019 evidences, the existing pedagogical staff i.e. the teacher and three teaching assistants was reinforced by co-creating students. Following the student roles theorised by Bovill et al. (2016), we then included Consultants, pedagogical Co-designers and Co-researchers.

In our case, **Consultants** were defined as all students being part of the cohort, as well as Co-designers and Co-researchers newly added to the team. Throughout the years, PHYS-S201 students have been offered surveys regularly, on a three-value time scale: yearly (through an institutionally standardised EEE survey), monthly (through online PHYS-S201-specific surveys placed on the UV platform[2] and through focus groups[3]), and instantaneously (through self-evaluation quizzes placed on the UV platform and through an anonymous online voting system during lecture sessions). Consultants were generally asked how they use the various course resources and what could be improved in the curriculum, primarily focusing on certain parts of the contents and the main organisation of the lessons.

Regarding the focus groups, the selection process was based on four criteria: gender, programmes they are enrolled in (management or economics), whether credits of the course have been previously validated, and participation as a representative in some institutional student body or club. As the gender gap is particularly important in STEM and especially in physics (Cimpian, Kim and McDermott, 2020), it was essential for our team to make sure that the students participating in the process have equal representation. More generally, the diversity of the students' backgrounds seems to be fundamental to being able to discuss with those who have difficulties with the curriculum.

Pedagogical **Co-designers** are students who are paid for a student job of 120h per year to take part in this process. Via weekly meetings with the teacher, teaching assistants, pedagogical advisors, and regular exchanges with consultant students, co-designer students are fully integrated in the pedagogical staff of PHYS-S201, and they are focusing on problem-solving regarding the curriculum as any team member. The team meetings constitute unique moments of exchange during the academic year, allowing the co-designer students to practise negotiation (Bovill, 2022), to debate, and to participate in the implementation of shared-found solutions. To allow them to participate to the best of their abilities, co-designers also regularly benefit from pedagogical training provided by the teacher, the teaching assistants, or the pedagogical advisors. Their work is spread over the entire academic year. It can be considered like an internship with a teaching team seeking to improve its practices.

Co-researchers are students who have research activities linked to the co-creation process. For us, that role was materialised by students doing their master's thesis directly linked to the co-creation project, allowing the pedagogical team to collect learning analytics and to gain more deep statistical data analysis on the PHYS-S201 course (and similar natural science courses of the programme, like

[2] UV: "Université Virtuelle"is the virtual Learning Management System moodle platform of our institution used by our students for their courses.
[3] Focus group method is a common tool for collecting qualitative feedback; the groups of 8 representative students were constituted following the Focus Group Guidelines provided by our institution (Postiaux, 2018); they meet on a monthly basis without the attendance of the teacher to let them express their student-voice as freely as possible; the minutes of these meetings are written anonymously.

chemistry, statistics, mathematics, …). Co-researchers, on their part, can access non-public data and benefit from improving and learning pedagogical skills, both by attending and by being part of the co-creation process that shows "the ropes", and by pedagogical formation provided by other members of the staff.

As observed by Bovill et al. (2016), these different roles tend to overlap, as some students take on different roles throughout the year.

The team also includes a half-time pedagogical advisor (who provides research skills in education and active listening for students) and a part-time techno-pedagogical counsellor providing help implementing the technological sections of co-creation (ex: online voting, data collection, data analysis, dashboards, etc.).

In total, in the 3rd year of the co-creation implementation (2022-2023), we had 13 members actively contributing a part of their workload to the PHYS-201 team activity.

Results: How co-creation impacted … everything?

Based on our 2021-2022 observations[4], we suggest that the co-creation process had significant effects on three dimensions of the learning and teaching process, i.e., on the curriculum (1), on the members of the partnership (2), as well as more generally on the cohorts of students (3).

On the first dimension, the partnership between students and other members of the staff has had clear impacts on the **curriculum**. Amongst them is the evolution of communication between the PHYS-S201 team and the cohort regarding the course, making it weekly (by sending every Sunday the "PHYS-S201 to do list of next week") and more efficient (by using bullet points and synthetic information) as recommended by the Consultant students. A PHYS-S201 agenda for the complete 5-month term is made available on the UV platform, which is helping enrolled students to follow the course rhythm and to self-organise. Another implementation is the course organisation into weekly thematic modules, each of which is made self-sufficient so that missing a module is not critical to following the next ones. This is an attempt to minimise disengagement during the term, providing opportunities for the student to get back on track with a "fresh start". Additionally, to address a difficulty reported by the 2018-2019 EEE survey, clear course objectives and learning outcomes are now explicitly explained at the beginning of each course module so that students can better comprehend the role of PHYS-S201 in the degree. Furthermore, a new pedagogical approach has been implemented, using a 1/3 flipped classroom scheme, i.e., asking students to prepare 1/3 of a course session content to give more time in the classroom for applications and leaving 2/3 of the content for more classical but systematically interactive lecturing. The 1/3 ratio value has been defined as a realistic volume of homework by co-designer students regarding the workload of the students for other courses during the term. Course supports have also greatly changed to address another difficulty in 2018-2019 with the goal of responding more accurately to different learning strategies and allowing students with jobs or other obligations to still follow the course with all the content at hand. For example, using Co-creators and focus groups feedback, the presentation of each course session was made available in podcast and video keynotes of the slides were recorded. Finally, the curriculum now also includes various formats of self-formative assessments like an on-site formative written exam, and multiple online self-evaluation quizzes that students can use to better prepare themselves for the final evaluation.

[4] Results from the 2022-2023 EEE survey are not available at the moment we write the present paper, but they will be included in the EUA L&T 2024 Forum presentation.

On the second level, we observed results within the **staff members**. Amongst them, co-designer students and consultant students have declared that they now possess an unprecedented understanding of how a curriculum is designed, gaining clarity on the evidences that impact the design of a course. Another reported feedback from co-designer students is about the pedagogical training they received, giving them the opportunity to gain expertise on theory and practice regarding education; some of them are now seriously considering applying for teaching assistant positions at the end of their study journey. Co-designer students have also claimed to have constructed skills in team and project management, the co-creation process allowing them to train how to express different opinions and set out arguments to co-construct mutual understanding and pragmatic solutions regarding issues brought by the cohort or the partners. We also suspect that the co-creation process has had an impact on the increased trust relationship between all enrolled students and the pedagogical staff. As for the teaching assistants, they have declared to better understand the needs and the learning strategies of the student cohort and, consequently, to be able to provide better adjustments to the curriculum and the lessons. Finally, the co-creation process had an impact on the cognitive representation of learning for the teacher. The partnership, and the improved global interactions with the class have greatly supported his teaching mission, which can be considered as a major step in the teacher's continuous professional development.

As for impacts on the third dimension, we see some (but not systematic) clear evolution on items observed in 2018-2019, previously mentioned.

First, on attendance, success rates, and the mean of the final evaluation, no significatively positive improvement is observed. The average attendance rate during course sessions remains around 20%, while the success rate of PHYS-S201 is still slightly higher than 60%. The persistently low attendance rate is, however, no longer a critical issue for us, as we designed the new course set-up to address various student learning strategies, including the one, highly increased after the pandemic, to follow a course whenever possible asynchronously, at his or her own pace, through recorded podcasts and online supports. The observation of the 60% success rate suggests that this strategy remains risky for a lot of "remote" students and that attending the course sessions on-site regularly all along the term while using intensively the recent implementations of PHYS-S201 remains the more efficient way to get the course credits.

Second, the institutional EEE survey gives us another way to compare the academic years 2018-2019 and 2021-2022. The EEE response rate for PHYS-S201 has risen from 27% to 33%, indicating that co-creation might be an incentive for involvement to participate in institutional surveys. If the student voice is actively listened to in the process, then perhaps it becomes a factor that motivates students to speak and engage. With respect to the 22 items of the EEE survey, we observe that almost all of them evolve towards a positive outcome. More specifically, concerning the 5 items perceived as a difficulty by more than 20% of the respondents in 2018-2019, we don't see significant changes yet in "Unclear course contribution to the programme" and "Missing more detailed support than lecture slides", despite the changes made in the curriculum. However, we observe major improvements for the other three items. The percentage of students considering the rhythm of activities to be too high dropped from 26% to 18%. This might indicate that the new structuration in modules and the new way to communicate with the cohort that has been implemented, using direct and synthetic information delivered weekly, might be a factor of change. We observe as well that students who declare experiencing a lack of preparation when it comes to the final assessment dropped from 27% to 9%. This item in particular indicates that students might feel better prepared, and that the curriculum provides more opportunities for self-assessment and training for evaluation through

mock exams and quizzes. Finally, the perception of a too high workload associated with the curriculum decreased as well, from 53% to 35%, an interesting result as none of the content of the course was removed or "lightened". This possibly indicates that the co-creation process allows students to better assimilate the workload by providing different strategies and better responding to different needs when it comes to learning.

CONCLUSION & PERSPECTIVES

Re-defining co-creation … or rather adding to it?

This paper allowed us to explore the implementation and impacts of a student-centred approach through the co-creation of course contents and learning activities in the context of higher education, aligning with the principles promoted by the Bologna Process. Our investigation focused on the transformation of the Physics of Information Technology curriculum (PHYS-S201) at the Université libre de Bruxelles (ULB), with the goal of enhancing student learning experiences and addressing issues of disengagement.

Our results suggest that the implementation of co-creation processes has significant positive effects on three distinct levels. Firstly, on **curriculum enhancement**, as it underwent important transformations through the collaborative efforts of co-designer students with the other members of the pedagogical staff. Communication with the cohort seems to be more effective, and self-formative assessments were included, enabling students to better prepare for final evaluations. Secondly, we observe indicators of **pedagogical staff development**, as it seems that co-creation allows co-designer students, consultant students, co-researcher students, and pedagogical advisors to experience professional growth and improve pedagogical expertise. Thirdly and finally, the **cohort of students** has been impacted as well, revealing positive trends when it comes to students' perceptions of their learning experiences revealed by the institutional teaching assessment by the student's survey (EEE). The high rhythm of activities, lack of preparation for final assessments, and perceived workload all showed significant improvements; creating what seems to be a more favourable learning environment. The increase in the response rate in institutional surveys also suggests that students may feel motivated and empowered to share their feedback, possibly because the curriculum is now actively including their voice in the process.

In conclusion, after a 3-years ongoing experience, it appears that the wide range of applications of co-creation and its lack of a definitive and concise definition in the literature doesn't seem to be a limitation, but rather an indicator that it is a highly adaptive and dynamic process. Consequently, we are convinced that co-creation of a course set up with students is a powerful tool in higher education to facilitate the need to share learning and teaching policies at the European level, whatever the institution's local context.

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