

CO-CREATION AND PEDAGOGICAL INNOVATION IN HIGHER EDUCATION: AN ACCOUNT OF TWO TRAINEES AND FACILITATORS PARTICIPATING IN THE DEMOLA PORTUGAL INITIATIVE

Susana Amante, Filipa Rodrigues Pereira, and Ana Isabel Silva

Received October 2nd, 2023; First Revision December 15th, 2023; Second Revision March 7th, 2024;
Accepted March 25th, 2024

ABSTRACT

Between 2021 and 2023, the Polytechnic Institute of Viseu (IPV), in Portugal, conducted two interdependent projects aimed at training teachers and fostering collaboration between industry and academia. These projects involved teams of students tackling challenges posed by local companies and non-profit organisations. One such challenge, 'The Mission of Libraries', explored the future role of libraries in society, partnering with the António Lobo Antunes library. Another challenge, 'Born to Save' collaborated with ARTIDERCA-Agência Criativa to enhance people's lives, particularly through children and their engagement with first aid practices. This paper presents the methodologies, tools, platforms, and tasks employed in addressing these challenges. Through a case study methodology based on the trainees' reflections on their facilitation process, the study subscribes to the core values identified by the training entity Demola Global. These values, namely communication, action, curiosity, diversity, imperfection, and responsibility contribute to co-creation and help build bridges between academia and the labour market. Such dynamics underpin active learning methodologies, impacting students, teachers, and communities. This research highlights the importance of pedagogical innovation training in preparing teachers to integrate challenge-based learning into their teaching practices and align with the expanded mission of Higher Education Institutions. The implications for policymakers lie in the need to support projects like the Demola Portugal Initiative, fostering collaboration between academia, industry and society to address innovative, real-world challenges.

Keywords: Co-creation, Higher Education, Innovation, Learning, Digital Tools

Susana Amante is an Associate Professor at the School of Technology and Management of the Polytechnic Institute of Viseu (IPV), in Portugal. She holds a Ph.D. in English Philology from the University of Salamanca, and she was awarded the 'Doctor Europaeus' Mention through a joint supervision programme with the University of Coimbra (2011). She was PI of the 'Learning based on co-creation processes' project at IPV (2021-2023), and her research spans Literatures and Cultures, Gender Studies, Language Didactics, Translation, and Languages, Innovation and Entrepreneurship.

Filipa Rodrigues Pereira is an Associate Professor in the Department of Communication and Art at the School of Education of the Polytechnic Institute of Viseu, responsible for course units in the areas of vector drawing, infographics and audiovisuals. She holds a PhD in Information and Communication on Digital Platforms, a Master's degree in Multimedia Communication with specialisation in Digital Audiovisual, and a degree in Social Communication. She is a researcher at the Center for Studies in Education and Innovation.

Ana Isabel Silva is an Associate Professor at the School of Education of the Polytechnic Institute of Viseu (IPV) and is affiliated with the Centre for Studies in Education and Innovation (CI&DEI). She holds a Ph.D. in Languages and Literatures, Linguistics, and Language Teaching from the Portuguese Catholic University. She teaches in teacher training courses, Basic Education, and the Master's in Special Education. Her academic interests converge on studies of language and its uses in different linguistic and communicative contexts; Portuguese Linguistics, Portuguese Sign Language, and Didactics of Portuguese Language.

INTRODUCTION

Participation in training programmes focused on pedagogical innovation is crucial for academics to enhance their teaching practices and support active learning among Higher Education students through cross-disciplinary and collaborative work (Amante and Fernandes, 2023; Carlos, Reses and Soares, 2023; Amante and Fernandes, 2022; Fernandes and Amante, 2022; Lidolf and Pasco, 2020). This aligns with the broader objective of Higher Education to meet workforce demands, fostering innovation and contributing to a more dynamic and responsible economy.

As the landscape of academia, the labour market, and other public spheres continue to evolve due to scientific and technological advances, stakeholders face an increasing need to adapt and innovate (van Aduard de Macedo-Soares et al., 2016). Teaching staff, in particular, are now tasked with a third mission that extends beyond traditional roles, encompassing the production, application, and dissemination of knowledge through collaboration with non-academic sectors, thereby benefitting society at large (Costa et al., 2021; Sargento and Ferreira, 2023). We can even say that, in our contemporary Higher Education, there has been a notable transformation underway, which implies the transition from the traditional third mission to a more comprehensive quintuple mission. This expanded model integrates the public or civil society as a crucial fourth component, emphasising not only economic profit but also social value. Taking this evolution even further, there has been the incorporation of a socio-ecological perspective that underscores the interconnectedness of society and nature, and, in a so-called quintuple helix, it acknowledges the significance of sustainability and the co-development of society and the natural world (Mironova, Kumar and Murugesan, 2019; Martini, 2023).

To effectively fulfill this evolving mission of Higher Education Institutions, and embrace the quintuple helix model, teaching staff require comprehensive training in pedagogical innovation. As Guerra and Costa (2021, p. 1) remind us, “A pedagogical innovation can be the introduction of a resource and/or strategy that, when implemented and evaluated by teachers, leads to student learning”. Thus, the training in pedagogical innovation should equip them with the skills and knowledge necessary to seamlessly integrate a socio-ecological perspective into their teaching practices and to incorporate pedagogical tools aligned with this expanded mission.

This need for pedagogical innovation training sets the stage for national projects like the Demola Portugal Initiative to flourish. Actually, the Demola Portugal Initiative aims to provide teachers with methodologies that facilitate co-creation, project-based learning, and knowledge sharing, thereby enhancing the learning process itself (Demola Global, 2023a). The Polytechnic Institute of Viseu (IPV) was one of fourteen Portuguese Higher Education institutions that ran two concurrent projects, focusing on pedagogical innovation and active learning methodologies: ‘Learning based on co-creation processes’ (a teacher training course, funded by POCH and held by Demola Global), implemented through the ‘Link Me Up – 1000 Ideias’ project (funded by COMPETE and aiming at developing cooperation between academia and industry).

The project entitled ‘Learning based on co-creation processes’ (POCH-04-5267-FSE-000818), our focus in this study, started formally in January 2021 and its first edition finished in July 2021. Its main objective, as listed online at https://site.ipv.pt/cocriacao_proj.htm, was to enhance the quality, effectiveness, and efficiency of teaching practices by introducing new tools and methods. Through this initiative, teachers were provided with the opportunity to experiment with co-creation, acting as co-creators during their training sessions, and later as facilitators of co-creation processes. They supported their teams of students in learning, sharing, and co-constructing knowledge, scenarios or solutions to societal challenges and issues raised by local organisations/partners. Additionally, the initiative aimed to develop competencies in

teachers to bridge the gap between academia and industry, preparing students to meet the needs of society and enabling their participation in sustainable development and addressing real challenges. Thus, teachers helped students develop and enhance their transversal skills in the co-design of innovative and sustainable projects that called for critical thinking, communication, teamwork, and collaborative work, supported by technological platforms and resources (IPV, 2023).

Just like the first edition, conducted online via Microsoft Teams for a total of 344 hours (192 hours of synchronous sessions and 152 hours of asynchronous workload), the second edition occurred weekly from September that year to February 2022. It retained the same objectives, tools, and tasks but introduced some changes and new approaches. These included two face-to-face bootcamps – one in Coimbra and another in Porto for the northern group of Polytechnic Institutions – and increased breakout room discussions amongst the several participants from the Consortium.

The third and fourth joint editions took place from January to June 2022, based on the same principles and methodologies, despite the addition of some new tasks and other features, such as the creation of five thematic tracks: ‘Healing the Planet’ (Sustainability), ‘Future of Work’ (Work Life), ‘Human Beings in the Modern World’ (Human Nature), ‘Byte-Powered Future’ (Technology) and ‘Value Creators of Tomorrow’ (Business) (Demola Global, 2023b).

The concurrent projects ended for the teaching staff, students, and companies in June 2023, upon completion of the sixth edition, and the total participation of “... 900 polytechnic teachers, 600 companies from Portugal and internationally and around 5,000 students from Portuguese polytechnics and international institutions” (Demola Global, 2023c).

Some of the platforms used were Demola Atlas (<https://atlas.demola.net>), Demola Chat (<https://chat.demola.net>), Demola Portal (<https://portal.demola.net>) for students, and Miro (<https://miro.com>). The first one enabled task management, since, on Demola Atlas, the trainees/facilitators could monitor the students’ contracts, their pre-evaluation, their progress, submission of individual or group tasks, and their final assessment. The students completed the different tasks using Miro, a collaborative, online canvas with different templates, in which teams could unleash their creativity designing mind maps and empathy maps; tested hypotheses; identified stakeholders/user groups; created affinity diagrams and, among other tasks, analysed and compiled information (e.g., PESTLE analysis; ‘How might we...?’ questions). They used Demola Portal, then, to submit their work. Demola Chat provided all participants with the opportunity to communicate and share resources effectively. Canva (https://www.canva.com/pt_pt/), a free graphic design platform, was also used in this process, both by students to make their videos for the final pitch, and by trainees to write their final report, in which they reflected upon the whole process as facilitators.

In the next few pages, we intend to emphasise the significance of engaging in training programmes aimed at pedagogical innovation for academics. We will achieve this by examining specific methodologies, tools, platforms, and tasks that shaped two out of the sixteen challenges featured in the third and fourth concurrent editions. From finding a partner organisation and outlining a societal challenge faced by that entity to marketing and selecting students from the consortium, and even from abroad, after considering their applications, to training sessions where tools and strategies were learnt and put into practice, to meetings with teams and member(s) of the organisation, in which facilitation skills were put to test, ... – all those perceptions, learnings, and practices will be discussed. Demola Global conveys that communication, action, curiosity, diversity, imperfection, and responsibility are the core values that contribute to co-creation and help build bridges between academia and the labour market. Therefore, these had to be developed by teachers first, so that they could guide their students in developing ideas collaboratively and accepting different points of view, reaching common goals. Ultimately, the study highlights the imperative for policymakers to endorse projects like the Demola Portugal Initiative. These

endeavours play a pivotal role in promoting collaboration amongst academia, industry, and society to tackle innovative, real-world challenges.

METHODOLOGY

Teachers' reflections play a fundamental role in improving educational processes, as the following quotation highlights: "En esto contexto, se asume que la reflexión que realizan los docentes es fundamental para la mejora de los procesos formativos y un imperativo en la incorporación de prácticas innovadoras que impacten en los resultados de aprendizaje del estudiantado" (Brevis-Yéber, Mas-Torelló & Bueno, 2022, p. 270)⁹. As suggested, introspection is imperative for the integration of innovative practices that can have a positive impact on students' learning outcomes.

As previously mentioned, this study aims to outline two challenges that two teachers at the Polytechnic Institute of Viseu designed during their Pedagogical Innovation training in the 'Learning based on co-creation processes' project. They subsequently facilitated these challenges from January to June 2022, as part of the third and fourth joint editions of the 'Link Me Up – 1000 Ideias' project. These initiatives were integral components of the broader Demola Portugal Initiative. This research adopts a qualitative methodologic approach (Sampieri, Collado and Lucio, 2006) to analyse the dynamics that underpin active learning methodologies and that have a far-reaching impact on the profile of the student, the teacher, and the surrounding communities. In fact, this research aligns with the objectives outlined above, emphasising the development of competencies in teachers to work as facilitators of co-creative projects that bridge the gap between academia, non-academic sectors, society at large, and sustainable practices. The selected challenges, involving a public library and a private company, both situated in the region of Viseu, not only offered diverse contexts for learning but also underscored the Demola Portugal Initiative's commitment to addressing real-world issues with a focus on inclusivity and sustainability, according to the researchers' reflections on the projects they participated as trainees and facilitators. Data were collected from their reflections on their facilitation process of 'The Mission of Libraries' and 'Born to Save', making it a case study, since the methodology relies on empirical evidence and allows for the description, understanding and explanation of human behaviour (Babbie & Mouton, 2001, p. 270). As Flick puts it (2023, p. 8), "[t]he subjectivity of the researcher[s] (...) becomes part of the research process. Researchers' reflections on their actions and observations in the field, their impressions, irritations, feelings, (...) become data in their own right, forming part of the interpretation..."

The two IPV teachers, who both participated as trainees and facilitators in the Demola Portugal Initiative projects, collaborated with the coordinator of the pedagogical innovation training course for this article. Together, they illustrate the Initiative's pivotal role in equipping teaching staff with tools and new active methodologies. These enabled multidisciplinary and multicultural student teams to seek innovative solutions, thereby enhancing their transversal skills: critical thinking, communication, teamwork, leadership and adaptability, all supported by technological platforms and resources. Their reflection upon each challenge illuminates the phase prior to the implementation process, the work developed, the difficulties encountered, and the outcomes achieved.

While the findings resulting from the researchers' reflections on the Demola Portugal Initiative and, specifically, on the two challenges, are confined to the regional context of Viseu, the fact is that this pedagogical innovation training course and the implementation of active learning methodologies occurred in other Higher Education Institutions across Portugal. Demola Global's business model had already been

⁹ *In this context, it is acknowledged that the reflection undertaken by teachers plays a crucial role in enhancing formative processes, and it is deemed imperative to incorporate innovative practices that have a positive impact on student learning outcomes (our translation).*

successfully applied in Spain (Catalá-Perez, Rask and Miguel-Molina, 2020) and, among other settings, in Japan (Kämpfi, 2019). The proven success of the Demola methodology contributes to its marketability and reputation. This lays the groundwork for the emergence of analogous initiatives worldwide, replicating innovative pedagogical approaches and improving educational practices.

SETTING THE SCENE, RESULTS AND DISCUSSION

Both challenges were developed concurrently, each one aiming to solve its own societal shortcomings. Let us start by getting to know the one entitled 'The Mission of Libraries' and then 'Born to Save'.

The Mission of Libraries

Traditionally, the mission of libraries has universally been recognised as central to supporting learning, literacy, and reading, empowering literate, informed and participative societies. Communities rely on them for freedom of expression, yet libraries have had difficulty attracting audiences other than those in schools. Rethinking the role and mission of libraries was, thus, of utmost importance. How to do it? This was the challenge: *Once upon a book... what and how will the libraries of the future be changed?*

In light of the above, and in attempting to answer our research question, a team of four students and a facilitator working in the Department of Language Sciences at the Polytechnic Institute of Viseu met the partner entity, the António Lobo Antunes Municipal Library, located in Nelas, Portugal, to discuss the overall direction of libraries and the different ideas that could contribute to solving this societal challenge. This challenge allowed the team to work within communities, inviting them to engage in this process. This means and requires updating traditional roles in our digital age in order to better understand community needs. So, they departed from some questions that they felt the urge to answer, such as: what can services and librarians do to meet the changing user expectations? How can Libraries (re)impact peoples' lives? How can we help libraries (re)track communities' steps towards them? What will the libraries of the future be like?

It seems that, nowadays, libraries also need to be part of solutions that enhance key policy objectives in today's information society. This includes digital skills, creating equitable access to digital content, sustainable development, employment, and education. This goes hand in hand with the quintuple mission of Higher Education Institutions, discussed above.

Taking all this into account, it is important to describe the processes of co-creation and collaboration that took place right from the beginning till the end of the project. Once the challenge was defined in partnership with the entity, it was time to select the students to form the team. For this purpose, just like the other 15 challenges, this one was also published in the Atlas Platform (Demola Portal for students - <https://portal.demola.net>) and widely disseminated in several sessions organised locally at the five schools belonging to the Polytechnic Institute of Viseu and also in an online main session for all IPV students.

Each challenge got several applications, from students enrolled in the Polytechnic Institutes that make up the Consortium and also from other national and international Higher Education Institutions. To do so, applicants submitted their CV and their motivation for having applied to each specific challenge. The selection process meant that 48 students were distributed among the 16 challenges that took part in the two joint editions, the third and fourth ones. Focusing specifically on 'The Mission of Libraries', there were two students taking the Degree in Basic Education (teacher training), one exchange student from Brazil,

already graduated in Philosophy and, at the time, studying Business Management, and a student taking the Degree in Plastic Arts and Multimedia, all of them studying at IPV (cf. Fig. 1). Once the team was formed and the agreements were signed, mechanisms were streamlined to schedule the first meeting in which the participants introduced themselves.



Figure 1. Meet the Group (Source: 'The Mission of Libraries' students' report)

Besides this, the functioning, and the schedule of tasks over the 10 weeks were explained, as well as the tools available so that the team members could work collaboratively and cooperatively in real-time remote environments, such as Demola Chat, Miro, Zoom and Microsoft Teams, as we will explain further.

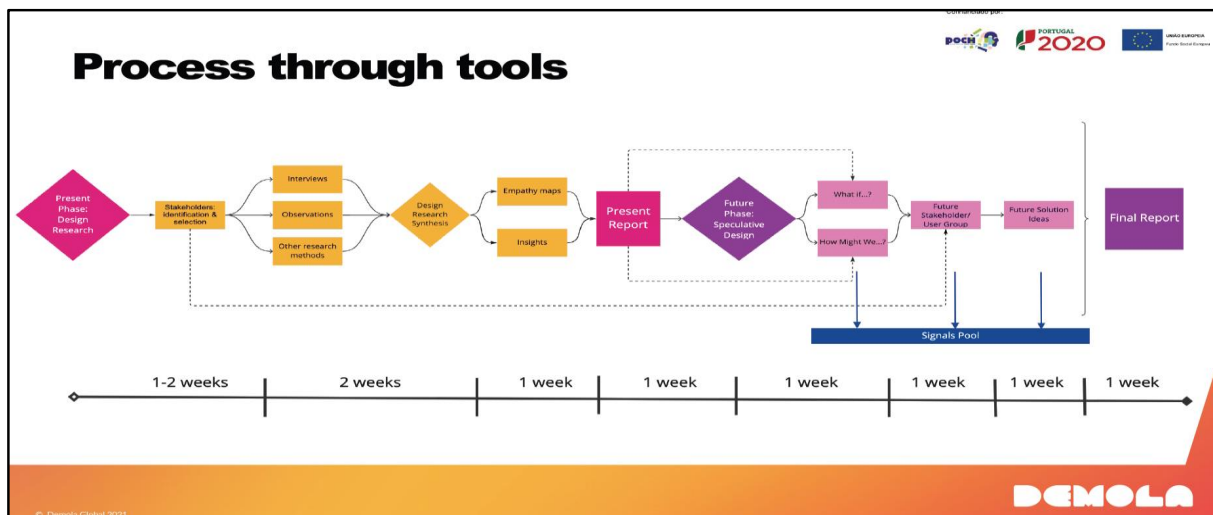


Figure 2. The ten-week process (Source: Demola Global, 16th training session)

The team met every Friday from 11:00 am to 12:30 pm. The partner entity participated in a total of four sessions, giving feedback to the students. Additionally, a tour of the António Lobo Antunes Municipal Library was held on the 19th of April 2022, in Nelas.

The weekly tasks were always scheduled according to the facilitator's weekly training. As a result, after each Tuesday training session, the facilitator prepared the team sessions based on the research steps and tasks identified in Fig. 2 below and, then, allowed the students to bring in and share useful, meaningful and dedicated information about the challenge.

These target groups were redefined bearing in mind empirical data, such as the students' observation of the behaviour of library users; the tour of the António Lobo Antunes Library in which the team was told personal stories, namely by the architect who designed the library, Francisco Keil, and other participatory agents, such as the sociocultural animator Carlos Henriques, working in the department of education of the library.

The information gathered was discussed during the weekly sessions and written down on Miro, a collaborative platform. This gathering of information was an important opportunity for students to make inferences or discover key insights. Afterwards, on Miro and on the Demola portal, four empathy maps were created, one per stakeholder. Each empathy map attempted to address the following topics: what the users say, what they do, what they think and what they feel.

Seven insights emerged from the empathy maps, regarding 'The Mission of Libraries', but we debugged each of them and chose five:

1. Communities rely on libraries for freedom of expression, yet libraries have had difficulty attracting audiences of their own
2. Libraries are more important than those in schools. Rethinking the role and mission of libraries is, thus, of utmost importance.
2. Libraries will always be temples of knowledge, democracy and diversity, characterised by silence. It is a safe and comfortable place, but it does not attract everyone.
3. Users recognise the usefulness and relevance of libraries, but they demand changes, such as improving the quality of access to internet services, digital content and even to other learning materials such as board games, as well as books in different languages and cultural activities. This seems to enhance conviviality in all the spaces of a library: it would be enhanced for recreation and leisure.
4. The quality of the information in the repository is ensured by the librarian and archivist, but also by the schoolteacher librarians. However, the massive publication of books and publishing projects does not seem to leave much room for libraries to be their custodians. It seems that books, from a material point of view, can be a problem. There just isn't room for so many. There is a need to select and bring, to the library services, people who have books, and who can lend them to others, without the book residing in the library, but circulating through communities of avid readers.
5. The quality of the information in the repository is ensured by the librarian and archivist, but also by the schoolteacher librarians. How can librarians be helped?

These inferential readings anticipated the future design but required reflection on the whole process, which, in turn, culminated in gathering information in the 'Present Report'. As the tasks were to be carried out weekly and submitted on Sundays, this report allowed the students to synthesise the whole process, but not always with enough time for proper reflection. Throughout this process, the students carried out research and tried to find signs of change, collaboratively, paying attention to megatrends and target needs.

This attention allowed them to select news, films, stories, images, reports and events that may be connected to this challenge, even if in a tenuous or implicit way, i.e., with repercussions for this challenge. For example, the report about robots in a library in Finland and the paradigm shift of the librarian's function when robots are part of the tasks; or the welcoming speech of the President of the Portuguese Parliament, Augusto Santos Silva, during the participation of the President of Ukraine, in which he highlighted the universality and importance of the Portuguese language and its cosmopolitan, rich, historical and dialogical use, with a large *acquis* (a collection that is still not represented in all libraries); or the British Council's projects to stimulate libraries in the most diverse communities were also analysed. This allowed us to ask questions about the future, in a task that was named 'What if...?' and 'How might we...?', depicted below, in Fig. 3:



Figure 3 – 'What if...?' task developed collaboratively (Source: 'The Mission of Libraries' team on Miro, week 7)

Once this questioning was finished, the 'persona of the future' was created, which led to the question: *who and how will the stakeholders be in 20 years?* Aligned with the path traced considering the different tasks, and reading the different signs, the team created the *persona* of the future. This persona would look for a new library identity, with different leisure and outdoor areas, perhaps even including a *local bistrôt*, with *books a la carte*. Additionally, they proposed different methods of cataloguing books in a more appealing, intuitive, and visually oriented manner, as well as using visual software to enhance search accuracy, and connecting robots to ensure the users' needs are met efficiently. This challenge brought to the surface the role of librarians, what they do, and what they represent in a local community. There is more complexity in their functions and purposes than students could think of. Being aware of that and the research conducted allowed the team to identify and interpret the information they had gathered by communicating and being open to alternative perspectives. Even when they were looking for a direction and being afraid to step up, their different cultural backgrounds, personal values and opinions were discussed among all the team members, partner entity included. At the time when the final pitch took place, the team was able to redefine a library, giving it a whole new appearance and dimension, and especially a new identity, so-called 'A library beyond books' in the short video presentation which was completed in June/22, when the project ended. Besides that, in the concluding pages of their final report, the team of students reflected on the invaluable skills garnered through their immersive co-creation experience. Some referred to the soft skills they acquired, such as collaboration, communication, and adaptability, whereas others mentioned that the

project's dynamic nature required them to face and overcome challenges, fostering problem-solving abilities and resilience. Moreover, they all considered that the collaborative environment encouraged creativity, allowing them to explore innovative solutions and think critically about real-world issues, as the following testimonial attests, in Fig. 4.

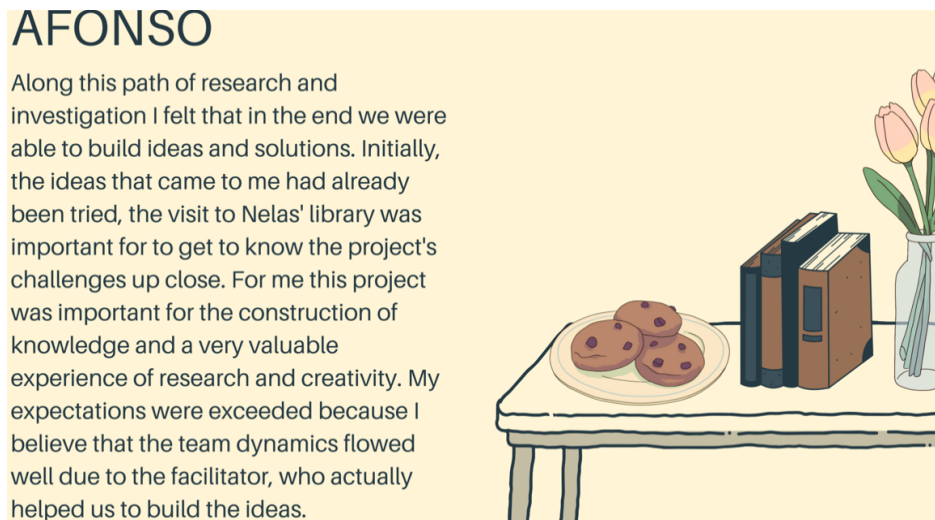


Figure 4. A student's reflection on the challenge (Source: The Mission of Libraries' students' report)

These ideas culminated in a pitch later that month, competing with the 15 other challenges of the third and fourth joint editions, among them 'Born to Save', which we will describe below.

Born to Save

While the reflection on the challenge above discussed active methodologies that a trainee in the pedagogical innovation training course carried out with her multidisciplinary and multicultural team of students, in the field of Humanities and Social Sciences, the 'Born to Save' challenge enables us to notice how students of Plastic Arts and Multimedia engaged in the collaborative exploration of solutions to a health-related case tailored for children to handle.

'Born to Save' presented a challenge that empowered children to make a difference, offering them the opportunity and space to perform first aid techniques, participate in the so-called chain of survival and, who knows, potentially save lives. This challenge had as its target children aged between 5 and 10 or 12 years old. Recognising the adventurous, critical and curious nature of the younger generations, this challenge aimed to develop tools so that a child alone could be able to correctly perform first aid procedures as specific as placing a victim on his/her side in a safe lateral position or initiating CPR manoeuvres.

The challenge was facilitated by an IPV teacher working in Communication and Information Sciences and also a volunteer firefighter, and it was developed in partnership with a creative agency of communication and advertising, headquartered in the district of Viseu, ARTIDERCA – Agência Criativa. In order to respond to the mission of social responsibility which companies should be sensitive to, the facilitator and the partner entity challenged the 'Born to Save' team to think of a digital tool that children could consult and use, and from there develop knowledge for learning first aid. To form the team, the process was similar to that described when presenting the challenge entitled 'The Mission of Libraries'. Despite a different focus, the tasks and tools used were the same, as the facilitators of both challenges were

participating in the same projects within the Demola Portugal Initiative. Besides that, they shared the understanding that, as Sánchez and Gutiérrez-Esteban (2023, p. 2) point out,

... education becomes an open activity that cannot be limited to closed spaces, which recognizes the individual differences of each person when acquiring learning and tries to respond to each of them. In addition, education has a physical and, increasingly, a virtual structure to respond to educational demands and is committed to innovation as a driver of evolution...

The use of the Miro tool as a virtual platform for developing and building the team's ideas enabled and largely promoted collaborative work. The whole team could edit and change what they considered fundamental in the various boards, and they could do it collectively and synchronously. Each member, wherever they were, could move around the boards and at the same time see what other members were adding and/or changing.

The Miro platform allowed for very creative and even fun interactions: the use of colourful frames, the insertion of pictures that were suggestive of the theme being dealt with, and the possibility of adding arrows to create the idea of a flowchart were fundamental to adapting the procedures to the target audience for which they were working, as we notice below, in Figure 5.



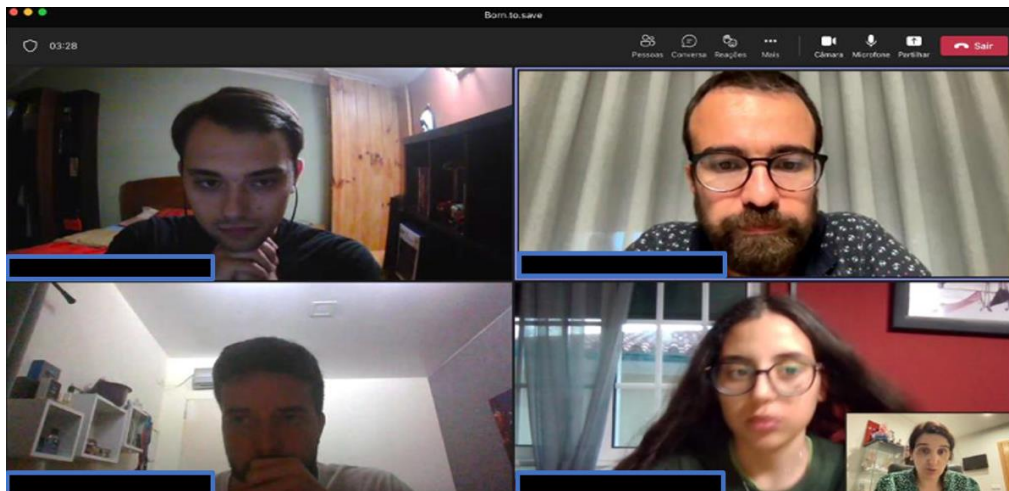
Figure 5. ‘Future Solution Ideas’ task developed collaboratively (Source: ‘Born to Save’ team on a Miro board, week 9)

Another tool that was used a lot was the Zoom platform, through which several meetings were scheduled and held among the members of the team and between the team and the partner, as shown in Fig. 6 below.

The working dynamics implemented had very positive outcomes, contributing to the exchange of ideas and to start drawing the final purpose of the students’ participation in this process – to provide children with tools so that they can be part of the solution in an emergency.

Every week the team had tasks assigned to them by the facilitator, who had previously received them from Demola trainers, just like the facilitator of the ‘The Mission of Libraries’ challenge. These tasks were aimed at evaluating and questioning the problems being analysed. Despite much effort and time being put into the tasks, the team showed great interest and commitment, that is, the students were motivated and always came up with contributions and suggestions that added value to the challenge.

Figure 6. A Zoom meeting among the members of the ‘Born to Save’ team (Source: ‘Born to Save’ trainee and facilitator, week 4)



Students started their work with a literature review to get acquainted with the topic and strategise how to go ahead. The members of the team were students of Plastic Arts and Multimedia, all of them studying at the School of Education of the Polytechnic Institute of Viseu, in Portugal, and none of them had any knowledge in this area, so the challenge was intense, but, as they claimed, “very rewarding”.

The team conducted interviews with kindergarten educators, firefighters, parents, and nurses. The information gathered allowed for a better understanding of the context of those who live and know the reality of children both at home and at school. On the other hand, the nurse specialists and the firemen contributed in terms of giving insights into techniques that the children could learn in an easier and even quicker way. As a significant input, these exchanges made it possible to outline the general conditions for achieving the intended goal.

Parents claimed that children are interested in multimedia products with some interactive features that challenge them. This idea was also emphasized by preschool educators, who acknowledged that children are very curious and open to new discoveries and that their willingness to learn allows them to be interested in something new. As far as the firefighters were concerned, they shared that children are interested in the activities they routinely perform and that dozens of children who say they want to be firefighters in the future visit them on a daily basis, which allows them to “learn how to act and behave in the same manner firefighters do”. On the other hand, the nurses provided a more technical contribution regarding the practices and techniques that can be performed by children if they are trained and become aware of them.

During the meetings with the partner entity, the team was able to clear up doubts at the most practical level, trying to understand what kind of digital resources they could develop, which software to use, whether it was possible to think of more than one solution, and how they could present it to the target users: the children. Taking advantage of the partner’s experience in this area of work, the team had all their concerns addressed, gained new insights and ideas, and became aware of whether or not they were on the right track.

There were two hypotheses on the table: 1) the development of colourful and animated information leaflets, with a QR code for older people, giving them access to some video/animation/music; and 2) the development of an animated book with first aid exercises to be used on the child's favourite cuddly toy, with stickers as a bonus for the mission accomplished.

The biggest advantage of participation in this co-creation process is that the team had the opportunity to step out of their comfort zone. They got a taste of the responsibility that comes with the opportunity to create and develop an idea that delivers solutions to the labour market. They developed activities to solve challenges of a more societal nature and directed towards specific problems that require tangible solutions.

All these activities focused on the dynamics of finding the best solutions for what the project wanted to achieve, allowing children to feel prepared to react and act in emergency situations, correctly applying techniques and procedures learned.

Understanding the interests and preferences of the team, a solution was sought to meet the areas that each member wanted to develop. The partner also gave his tips and guidelines so that the final product would be as creative, original, fun, and also didactic as possible.

Thus, the team chose to focus all their energy on the development of an interactive television series for children. The objective was to allow young people to co-construct knowledge and, by watching the TV series, they would be led to make decisions in emergency/risk situations, also assessing the importance of memory. Each episode of the series would follow a chronological line: presentation of knowledge on the theme – problem/event – interaction/decision. Each time the child made a wrong decision, they would be encouraged to continue by giving them the chance to repeat the wrong step and move forward in the series towards the main purpose: saving a life.

The team of students developed the whole workflow in a framework designed in the Miro platform, so that it was easier to understand where the child could make a mistake, and which path the series would have to follow (cf. Figure 7)¹⁰.

Feedback from all those involved in the process was highly positive. The team was praised for the idea and the audacity to have chosen this societal challenge and to have come to the scenario of an interactive TV show as a possible solution. The team members showed concern for others and, consequently, deserved the recognition of all, especially the partner who was very pleased with the proposal presented and the details with which they built all the dynamics of the TV series. In the final pages of their report, the students added a section entitled “Personal interpretations”, where they claimed that participating in the challenged-based project was a unique experience. In one of the student’s words, “After these two short months, I see that all those fears are behind me, and that at the end I take with me new skills, values, knowledge and an incredible experience...” (R.A.).

¹⁰ For a comprehensive view of this workflow, cf. https://miro.com/app/board/uXjVNz7oico=/?share_link_id=206096914438

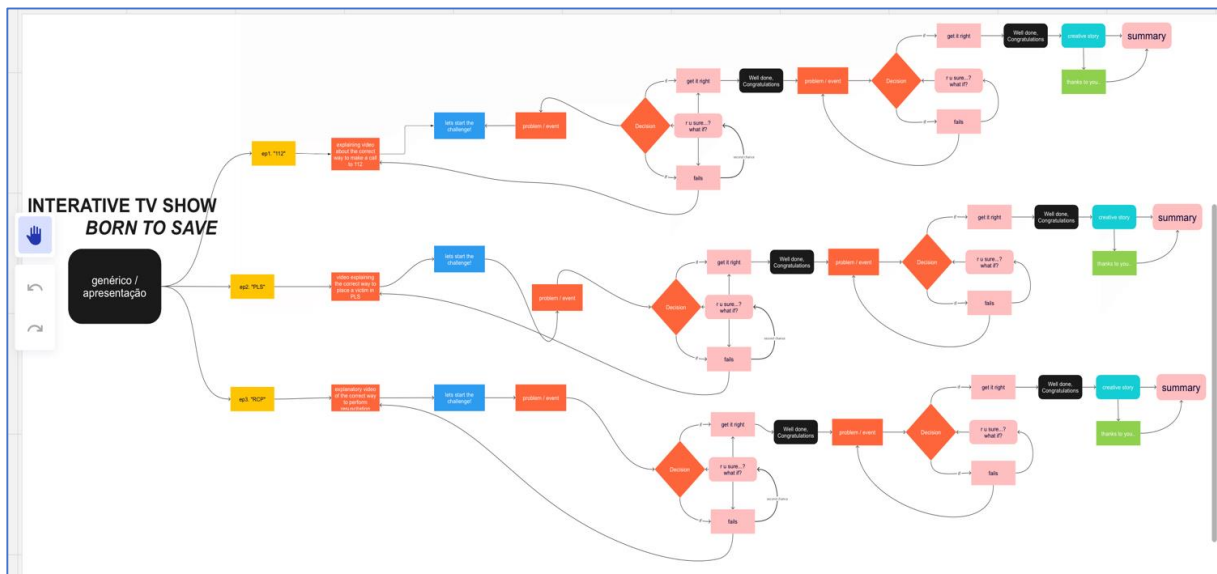


Figure 7: Workflow of a TV series designed on Miro (Source: ‘Born to Save’ team, week 10)

CONCLUSIONS

In conclusion, this study unveils the impact of the co-creation process facilitated by the Demola Portugal Initiative, particularly evident in the experiences of the teams participating in the third and fourth joint editions. By engaging with companies and organisations to tackle societal challenges collaboratively, participants transcended traditional roles as mere teachers or students, embracing new identities as innovation facilitators and professional talents. Reflecting on the accounts of the two trainees who also acted as facilitators, it becomes clear that this initiative propelled the participants to respond adeptly to the demands of the labour market and society at large. This adaptive stance aligns with Velu’s observations (2023, p. 2) which claim that “[t]eachers must, therefore, adapt their pedagogical practices and beliefs to the new ideas. In this way, educators are tasked with aligning newly developed concepts with long-established pedagogical beliefs and practices.” This transformative shift also resonates with the evolving pedagogical paradigm described by Rijnsoever, Sitzler, and Baggen (2023) in their scholarly article, echoing the need for alignment with rapidly changing societal dynamics.

Every week the teams were tasked with providing innovative solutions to challenges posed by Demola Global, leveraging dynamic collaborative tools like Miro and employing data analysis techniques such as empathy maps to generate insights. The consistent weekly follow-up ensured thorough monitoring of the process and provided a platform for clarifying doubts and uncertainties, facilitated by the contribution of the partner organisations who proved to be fundamental throughout this whole endeavour. While the ‘Link Me Up’ project primarily aimed to enhance students’ problem-solving abilities, the participation of teachers as both trainees and facilitators of the ‘Learning based on co-creation processes’ project significantly enriched their pedagogical repertoire. This sentiment, echoed by other programme participants (Amante, 2023), underscores the importance of exposure to innovative teaching and learning techniques that promote active student engagement and collaborative knowledge construction.

Drawing from these insights, policymakers are urged to recognise the pivotal role of initiatives like the Demola Portugal Initiative in fostering synergistic collaboration between academia, industry, and society. Strategic support for such projects is paramount to cultivating an ecosystem conducive to

innovation, addressing real-world challenges, and equipping individuals with the skills necessary to navigate and thrive in a rapidly evolving landscape. By championing initiatives that bridge the gap between theory and practice, policymakers can catalyse transformative change and cultivate a culture of innovation that drives sustainable societal progress.

REFERENCES

- Amante, F.S. (2023). ‘Now Open for Action!’ – A Real-World Challenge Project Developed at the Polytechnic Institute of Viseu. *Social Sciences Humanities Open* 8(1). <https://doi.org/10.1016/j.ssaho.2023.100729>
- Amante, S., & Fernandes, R. (2023). Aligning HE Pedagogical Innovation with VET, Industry, and Research Partnerships: Insights on the Demola Portugal Initiative. *Education Sciences* 13, no. 1: 93. <https://doi.org/10.3390/educsci13010093>
- Amante, S. & Fernandes, R. (2022). Learning based on co-creation processes: a glimpse of the (Demola) Pedagogical Innovation Training course at IPV. In Sklias, P., & Apostolopoulos, N. (Eds.). *Proceedings of the 17th European Conference on Innovation and Entrepreneurship*, 17(1), pp. 15-21. <https://doi.org/10.34190/ecie.17.1.306>
- Babbie, E., & Mouton, J. (2001). *The Practice of Social Research*. Cape Town: Oxford University Press.
- Brevis-Yéber, M., Mas-Torelló, Ó., & Ruiz Bueno, C. (2022). Práctica docente reflexiva como estrategia para el fomento de las innovaciones en los centros escolares. *Logos: Revista de Lingüística, Filosofía y Literatura*, 32(2), pp. 269-287. <http://doi.org/10.15443/RL3216>
- Carlos, V., Reses, G., & Soares, S. (2023). Active learning spaces design and assessment: a qualitative systematic literature review. *Interactive Learning Environments*. <https://doi.org/10.1080/10494820.2022.2163263>
- Catalá-Perez, D., Rask, M. & Miguel-Molina, M. (2020). The Demola model as a public tool boosting collaboration in innovation: a comparative study between Finland and Spain. *Technology in Society*, 63, 101358. <https://doi.org/10.1016/j.techsoc.2020.101358>
- Costa, C., Pereira, F., Barbedo, I., Almeida, J., Almeida-de-Souza, J., Cabo, P., Rodrigues, P., Ferreira, R., Ferro-Lebres, V., & Kairamo, V. (2021). Demola co-creation approach: The students’ perspective. *7th International Conference on Higher Education Advances, HEAd 2021*, Universidad Politecnica de Valencia, pp. 873-880. <https://doi.org/10.4995/HEAd21.2021.13090>
- Demola Global. (2023a). Available online at <https://portugal.demola.net>. Accessed on 10 January 2023
- Demola Global. (2023b). Available online at <https://portal.portugal.demola.net>. Accessed on 13 January 2023
- Demola Global. (2023c). Portugal implements modern co-creation methodology in cooperation with Demola Global. Available online at https://www.demola.net/stories/portugal-implements-modern-co-creation-methodology-in-cooperation-with-demola-global?_gl=1*1pj9imn*_ga*MTIxNDc3NDQ4My4xNjg5MDc2NzE2*_ga_LNRF4PNPWW*MTY4OTA3NjcxNS4xLjAuMTY4OTA3NjcxNS4wLjAuMA. Accessed on 10 July 2023.
- Fernandes, R., Amante, S. (2022). From Teachers’ Innovative Practices to Students’ Co-Creation: A Glimpse of the Project “Link Me Up – 1000 Ideias. In Sklias, P., & Apostolopoulos, N. (Eds.). *Proceedings of the 17th European Conference on Innovation and Entrepreneurship*, 17(1), pp. 226-231. <https://doi.org/10.34190/ecie.17.1.396>
- Flick, U. (2023). *An Introduction to Qualitative Research* (7th ed.). London: Sage Publications Ltd.
- Guerra, C., & Costa, N. (2021). Can Pedagogical innovations be Sustainable? One Evaluation Outlook for Research Developed in Portuguese Higher Education. *Education Sciences* 11(11). <https://doi.org/10.3390/educsci11110725>
- IPV. (2023). Available online at https://site.ipv.pt/cocriacao_proj.htm. Accessed on 10 January 2023

- Lidolf, S., & Pasco, D. (2020). Educational technology professional development in higher education: A systematic literature review of empirical research. *Frontiers in Education*, 5, <https://doi.org/10.3389/feduc.2020.00035>
- Martini, E. (2023). A Quintuple Helix Model for Foresight: Analyzing the Developments of Digital Technologies in order to Outline Possible Future Scenarios. *Frontiers in Society* 7. <https://doi.org/10.3389/fsoc.2022.1102815>
- Mironova, D., Kumar, V., & Murugesan, R. (2019). Demola international project as an instrument of students involvement in science - business integration. *International Journal of Innovative Technology and Exploring Engineering*, 8(7C2), pp. 239-247.
- Kämpfi, R. (2019). *Demola in Japan: A New Gateway to Asia*. Available online at <https://www.demola.net/stories/japan-cases-up-and-running>. Accessed on 11 December 2023.
- Rijnsoever, F., Sitzler, S., & Baggen, Y. (2023). The change agent teaching model: Educating entrepreneurial leaders to help solve grand societal challenges. *The International Journal of Management Education* 21(3). <https://doi.org/10.1016/j.ijme.2023.100893>
- Sampieri, R., Collado, C., & Lucio, M.d.P. (2006). *Metodologia de la Investigacion*, Mexico City: McGraw-Hill Interamericana Editores.
- Sánchez, V., & Gutiérrez-Esteban, P. (2023). Challenges and enablers in the advancement of educational innovation. The forces at work in the transformation of education. *Teaching and Teacher Education* 135. <https://doi.org/10.1016/j.tate.2023.104359>
- Sargento, A., Ferreira, V. (2023). Evolution and Structure of Innovation Co-Creation Networks between Universities and Industry: The Case of the Polytechnic of Leiria (Portugal). In Rodrigues, S., & Mourato, J. (Eds). *The impact of HEIs on Regional Development: Facts and practices of collaborative work with SMEs*. IGI-Global. <https://doi.org/10.4018/978-1-6684-6701-5.ch010>
- van Aduard de Macedo-Soares, T., Turano, L., Esteves, F., & Breviglieri Porto, C. (2016). International Alliance Portfolios and Innovation: A Proposal for an Analytical Model Based on Bibliographic and Bibliometric Research. *Journal of Global Business and Technology*, 12(1), pp. 1-22.
- Vely, S.R. (2023). Design Thinking Approach for Increasing Innovative Action in Universities: ICT's Mediating Effect. *Sustainability*, 15(24). <https://doi.org/10.3390/su15010024>

ACKNOWLEDGEMENTS

We would like to thank the Centre for Studies in Education and Innovation (CI&DEI) and the Polytechnic Institute of Viseu for their support. We would also like to extend our gratitude to the partner entities that participated in this study: the António Lobo Antunes Municipal Library and ARTIDERCA – Agência Criativa, as well as the funding agency that supported the training project at IPV (reference no. POCH-04-5267-FSE-000818).

COMMITTEE ON PUBLICATION ETHICS

Regarding our manuscript having passed an Ethics Committee, the application for this project dates back to December 2019 (call no. POCH-67-2019-12, available online at <https://www.poch.portugal2020.pt/pt-pt/Candidaturas/Documents/Aviso%20n%C2%BA%20%20POCH-67-2019-12.pdf>). A consortium comprising 14 Polytechnic Institutes in Portugal, including the Polytechnic Institute of Viseu, underwent a rigorous evaluation by an external Jury, ensuring full compliance with both external and internal ethical standards. This project, approved on 18/06/2020, was financially supported by POCH, Portugal 2020, and the European Social Fund. Its overarching objective was to enhance the quality and innovation within the educational and training systems in Portugal.