CREA Doctoral Program: Interdisciplinary and Transdisciplinary

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Abstract:

The CREA PhD program is taught at the University of Vigo, Pontevedra campus (Spain). It is a doctoral program that promotes inter- and transdisciplinarity between all the areas of knowledge taught on this campus. The doctoral program in Creativity, Social and Sustainable Innovation at the CREA Campus of the University of Vigo is at the forefront of fostering academic interdisciplinarity. At its core, the program emphasizes the importance of aligning doctoral projects with two distinct research lines from different fields or disciplines. These projects are guided by at least two experts who bring their specialized knowledge to enrich the doctoral work. A case of an art and science thesis will be explained in this document.

Keywords: interdisciplinary education, doctoral program, art and science

1. Introduction

Creativity and innovation play a pivotal role in driving growth, fostering sustainable development, and transforming ideas into tangible value. These concepts are fundamental to the success of organizations across all sectors, serving as engines for progress and prosperity. Creativity refers to the ability to generate new ideas, while innovation is the practical application of those ideas, leading to the creation of novel products, services, or processes. Together, they form a powerful duo that fuels organizational and societal advancement, acting as key factors in building competitive advantages and achieving long-term success.

Within the context of the European Union (EU), creativity and innovation are central to many of its policies, with the European Commission emphasizing their significance as essential drivers of economic growth. Innovation is particularly important for enhancing the EU's global competitiveness and ensuring its ability to respond effectively to both current and future challenges. Recognizing this, the EU has consistently placed research and innovation at the heart of its strategic objectives. The Commission has continuously advocated for the promotion and support of innovation, viewing it as a

critical factor not only for economic development but also for societal well-being and prosperity.

The importance of fostering creativity and innovation in Europe cannot be overstated. According to Decision No. 1350/2008/EC of the European Parliament and the Council of 16 December 2008, Europe faces a pressing need to enhance its capacity for creativity and innovation, both for economic and social reasons. The European Council has also underscored that innovation is indispensable for Europe's ability to meet the challenges of globalization. This requires that the population as a whole is equipped with creative skills that allow individuals to recognize change as an opportunity and embrace new ideas. Moreover, these skills are essential for promoting active participation in a diverse, knowledge-based society.

As the EU aims to position itself for success in an increasingly competitive global landscape, it highlights the importance of creativity and innovation in shaping Europe's future. By fostering these capabilities, the EU seeks to stimulate the potential within its citizens to think creatively and innovatively, driving progress in various sectors, from technology and business to the arts and social enterprises. The EU's approach emphasizes that creativity and innovation are not confined to specific fields but are universal traits that can lead to significant advancements across disciplines.

Creativity is inherently human and manifests in numerous ways, spanning the realms of art, design, crafts, scientific discoveries, technological advancements, entrepreneurship, and social innovation. It is a force that transcends traditional boundaries and is essential for tackling complex problems. Innovation, on the other hand, involves the application of creative ideas to produce new solutions, thereby turning abstract concepts into practical outcomes. Both creativity and innovation are deeply interconnected, with creativity providing the foundation for innovative breakthroughs. Together, they contribute to economic, social, and artistic progress, influencing the development of new industries, enhancing quality of life, and driving social change.

Innovation is a social phenomenon, as it involves not only individuals but also organizations, institutions, and society at large. It requires collaboration and a broad, cross-disciplinary approach to address the multifaceted challenges facing contemporary societies. The impact of innovation is felt across all sectors, as it affects how we work, communicate, learn, and interact with the world around us. Therefore, addressing society's complex challenges through innovative solutions requires the integration of diverse knowledge, perspectives, and expertise.

In the realm of academic research, university disciplines have traditionally been separated into distinct silos, each focused on specific areas of study. This strict division has led to a culture of hyper-specialization, where knowledge is developed in-depth but often in isolation. While such specialization has its merits, it can also limit our understanding of complex problems, which often require interdisciplinary insights. Historically, disciplines such as technique (techne), reason (poiesis), theory (theoria), and practice (praxis) were interconnected, as seen in the classical Greek tradition, where knowledge was seen as a holistic entity (Alsina, 2007). However, in modern academia, this integrative approach has been overshadowed by increasing specialization, leading to fragmented knowledge and a narrow perspective on global challenges. Indeed, as other study (Tornero,2016) suggests, the history of science has demonstrated an excess of vigilance at disciplinary borders, hindering the attainment of a panoramic view of the world.

The limitations of this approach have become increasingly evident, prompting a shift towards interdisciplinary and transdisciplinary methods in research. These approaches emphasize collaboration across different fields of knowledge, combining diverse perspectives to address complex issues in a more comprehensive manner (Haraway, 2019). Interdisciplinary research encourages the blending of insights from multiple disciplines, fostering innovative solutions that may not emerge from a single perspective. By adopting a more integrated approach, researchers can better tackle the interconnected challenges of the modern world, from climate change to social inequality and technological disruptions.

Interdisciplinarity, unlike multidisciplinary approaches that simply juxtapose different disciplines, advocates for a deeper synthesis of knowledge. It is rooted in epistemological plurality, recognizing that each discipline offers valuable insights but that the whole is greater than the sum of its parts (Borrero, 2008). According to scholars, interdisciplinarity entails a relationship between sciences and disciplines that transcends the boundaries of individual fields. This approach not only facilitate theoretical integration but also encourages new ways of thinking that break free from traditional disciplinary constraints.

Transdisciplinarity refers to a research and problem-solving approach that transcends disciplinary boundaries by integrating academic knowledge with non-academic knowledge (e.g., from communities, practitioners, or policymakers). It focuses on co-creating knowledge to address complex societal challenges that cannot be adequately understood or resolved by any single discipline alone. This approach emphasizes collaboration, mutual learning, and the creation of new frameworks that are socially robust and context-specific (Lang, 2012).

One example of embracing this interdisciplinary mindset is CREA Doctoral Program of the University of Vigo in Galicia, Spain. At the Pontevedra campus, the university has adopted in this doctoral program, a hybrid working methodology to foster creativity and innovation through interdisciplinary collaboration. The university offers the CREA Doctoral Program in Creativity and Sustainable Social Innovation, which is specifically designed to encourage interdisciplinary research and training at the doctoral level. By integrating diverse fields of knowledge, this program provides students with the tools they need to engage with complex social and environmental issues, fostering creative solutions that can drive sustainable change.

The CREA Doctoral Program is grounded in the belief that addressing today's global challenges requires not only technical expertise but also the ability to think creatively and collaborate across disciplines. By emphasizing sustainability and social innovation, the program equips students with the skills needed to contribute to societal progress in a meaningful way. It encourages the development of innovative ideas that can lead to tangible solutions for pressing issues such as climate change, social inequality, and economic development.

2. CREA Doctoral Program

The CREA PhD program is taught at the University of Vigo, Pontevedra campus (Spain). It is a doctoral program that promotes inter- and transdisciplinarity between all the areas of knowledge taught on this campus. The doctoral program in Creativity, Social and Sustainable Innovation at the CREA Campus of the University of Vigo is at the forefront of fostering academic interdisciplinarity. The main

objective of this doctoral program is to investigate the key elements for development from creativity and innovation through multidisciplinary research teams and from a transversal approach.

These doctoral studies were published in the DOG on 07/14/2017 and in the BOE on 10/24/2017. They began teaching in the 2017/2018 academic year. The number of admitted students is 20, although for two years now, due to high demand (Table 1), the university has allowed more students to enroll. The average percentage of students who come from other universities is between 30%.

Table 1. Demand CREA Doctoral

Course	Demand	Enroll
2017/2018	32	21
2018/2019	30	20
2019/2020	26	19
2020/2021	24	19
2021/2022	22	19
2022/2023	31	23
2023/2024	47	22
2024/2025	66	26

The program stipulates the specific need to adhere the doctoral work to a minimum of two main thematic lines, to choose from: Health innovation; innovation, sustainability, and communication; social design and innovation; innovation and sustainability of natural resources; governance and innovation; pedagogical innovation in teaching professionalization. Therefore, there must be two work directors who are linked to different fields of knowledge. Each of these lines is open according to the specific needs of the project and advocates for university and research innovation. They bring together experts in different fields of knowledge who, in collaboration and co-direction, must guide and advise the doctoral student towards integrating different perspectives for a specific theme. By fostering interdisciplinary dialogue through the training of specialized doctors in themes rather than disciplines, it allows for a deeper exploration of educational, environmental, and/or cultural issues facing contemporary challenges.

The definitive admission of a doctoral student to the program involves the assignment of a tutor/director of one of the lines of research. This, together with the doctoral student, will look for a second director of another line of research who may be from the university or outside it.

The doctorate will have to carry out mandatory general training activities (100 hours) and will have the option of carrying out other electives seminars (Table 2).

Table 2. Doctoral Training Activities

Name Activity	Time	Mandatory
Present research lines seminar.	5h	Yes
Research methodology seminar.	20 h	Yes
Research Seminar: search, ethical use, dissemination and publication of scientific information.	32 h	Yes
Researchers seminar: academic career, research projects and scientific publications.	16 h	Yes
Written communication in English seminar	12 h	Yes
Public communication seminar	12 h	Yes
Defense of the research plan and evaluation of activities	3 h	Yes
Qualitative Research Methodology Seminar	4 h	No
Seminar on normative databases and instrumental political approach for the thesis	4 h	No
Seminar: The comparative method in the preparation of doctoral theses	4 h	No

Training activities since the pandemic have moved to a mixed format, online or in person, depending on the student's wishes.

Annually, the program's academic committee will evaluate the research plan and the record of activities along with the reports. This report must be prepared every year by the director. The positive evaluation will be an essential requirement to continue in the program. The negative evaluation when it occurs must be duly motivated. The doctoral student must be evaluated again within six months. To do this, you must develop a new Research Plan. If there is a new negative evaluation, the doctoral student will cause permanent withdrawal in the program.

In addition to the training activities, Students must participate in at least two national or international scientific conferences throughout their training period, in which they will present a scientific contribution in the form of a paper or poster.

The estimated duration from the beginning to the reading of the thesis is three years full-time and five part-time, with the possibility of 1 extension. After starting its journey in 2017, within the doctoral program have been defended 17 doctoral theses that show that interdisciplinary is possible in different fields, especially between areas of knowledge that initially seem very distant, such as textile design and forestry; health and education; communication and sports; education and communication; governance and education, art and chemical engineering, etc...

3. Practical Case of Art and Science Thesis

In the context of the CREA program, a doctoral thesis was proposed that explores the complex issue of exotic-invasive species through ecological, conceptual, and artistic lenses. This research aims to

unravel the multifaceted nature of the problem, focusing particularly on the intricate relationship between humans and the environment. Additionally, it examines the possibilities for reusing secondary materials in the creation of art, thus highlighting sustainable practices alongside artistic and ecological inquiry. By blending these diverse perspectives, the thesis seeks to deepen our understanding of the environmental challenges posed by invasive species and explore new avenues for addressing them creatively and practically.

The project initially focused on cataloging and conducting both artistic and scientific analyses of the biodiversity quality within the riparian forest of the Umia River in Ribadumia, Galicia. The aim was to identify the exotic-invasive species with the highest prevalence, as well as those actively being removed from the area. Following this, the project proposed laboratory-based research using an experimental methodology to investigate potential material applications for the residues collected from Arundo donax, Tradescantia fluminensis, Eucalyptus globulus, and Phytolacca americana.

Specifically, the research aimed to explore the production of cellulose-based materials (paper) and pictorial mediums (dyes and pigments) derived from these species.

The research "Graphic Ecosystems: A Scientific-Artistic Research on the Evolution of the Vegetal Residue of Exotic [Invasive] Species," conducted by Antía Iglesias exemplifies this approach. The goal of this study is not only to highlight the artistic and material potential of vegetal waste, but also to demonstrate the conceptual and communicative power of interdisciplinary art and science projects. By doing so, it aims to raise environmental awareness and visually illustrate a critical ecological situation. Through integrating various methodologies, the research enabled not only material but also conceptual and technological innovation. It emphasized the potential for dialogue between a scientific (figure 1) and artistic disciplines (figure 2) and the fruitful outcomes of such collaboration.

Figure 1. Papers during Drying Process

Figure 2. Antía Iglesias. Artwork "Deconstruccion Vegetal Especulativa: Tradescantia Fluminensis" 2023

4. Conclusion

In conclusion, creativity and innovation are indispensable drivers of societal progress, offering solutions to some of the most pressing challenges of our time. By fostering a culture of creativity and supporting interdisciplinary approaches, the EU and institutions like the University of Vigo are helping to create a more innovative and sustainable future for all. The CREA campus, along with its interdisciplinary doctoral program, provides a platform for methodological innovation aimed at addressing complex issues that necessitate deeper exploration.

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