ACCtic Master Programme on STEAM + SciArt

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ABSTRACT

A new master university programme on STEAM + SciArt is presented. It will be taught in University of Seville (Spain).

Its objectives, structure and subjects are further described.

CCS CONCEPTS

• **Education**; • **Media Arts**; • **Human computer interaction**;

KEYWORDS

SciArt, STEAM-STEAM-STEAM+A, Computational thinking, Educational programming

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1 MASTER PROGRAMME ON "LEARNING, CREATION AND SCIENTIFIC-ARTISTIC COMMUNICATION: PROMOTING STEAM + SCIART PROJECTS"

The main objective of that master programme is to foster transdisciplinary practices among Science an Art knowledge areas. Students are promoted to create, disseminate and educate in the 21st century with a STEAM + SciArt approach, using advanced ICT (Information and Communication Technologies).

It is a master made up of two independent and complementary university degrees of specialization (30 ECTS x 2 + 6 ECTS Final thesis). It will allow the student to develop the skills to innovate in the educational, creative and communication fields through ICT (Computer Programming, Videogames, Apps, Artificial Intelligence - AI, Free Hardware, Robotics, Internet of Things - IoT, Narratives -textual, oral and audiovisual, etc.)

Society demands this type of interdisciplinary competences in order to apply them to areas such as pre-university education (Primary, Secondary, Highschool mainly), scientific museums, art / cultural institutions, social centers, etc.

The master programme has the following focus:

1- The first university degree of specialization has an educational approach oriented to STEAM (Science-Technology-Engineering-Arts-Maths).

2- The second university degree of specialization has a scientific-creative approach to promote trans-disciplinary synergy. It includes a view to disseminating science through technological art, and another approach for developing innovating artistic productions based on scientific findings and technologies. It is what is internationally known as SciArt.

Further information about the master is published at: master.us.es/masteracctic/ [1] and [2]

2 UNIVERSITY DEGREE ON "STEAM LEARNING THROUGH THE DEVELOPMENT OF COMPUTATIONAL THINKING"

In the context of educational innovation in EU countries, the inclusion of programming and robotics in teaching practices has been promoted in recent years, especially in the DigCompEdu [3] and EntreComp [4] frameworks fostered by the European Commission.

Additionally, in Andalusia the curricula of four new subjects has been published in the Extraordinary BOJA number 7 of 01/18/2021 [5].

The teachings of this training degree offered by the University of Seville are intended to cover the skills that teachers must have to teach these subjects, in addition to providing training to address them in different educational stages (Preschool, Primary, Secondary and Highschool).

The didactic approach will promote experimentation, creativity and an entrepreneurial spirit in the educational community, so that they can project new approaches and ways of doing their day-to-day in the classroom.

Likewise, new technologies are intended to promote the incorporation of Social Learning (SL) in classrooms. For this, learning processes and community services will be combined in a well-articulated project, where participants learn by working on real needs of the environment/community in order to improve it.

On the other hand, it is intended to make the world of ICTs attractive to girls and teenagers, so as to contribute to reducing the digital gender gap, and promote scientific-technological vocations among all the students. Employability in Information Technology sector is growing rapidly, therefore young people will have the opportunity to guide their future work.

All this focused in a transversal way, both to areas of knowledge in Social Sciences, Arts and Humanities, as well as Scientific-Technological, emphasizing the fruitful possibilities of interdisciplinary synergies, channeled through creativity based on ICT and the development of Computational Thinking competence.

In this context, professionals who could be especially interested in these studies include:

1- Engineering and STEM degrees: graduates with technical training, to whom this degree will allow them to take advantage of their skills to know how to develop projects adapted to different educational levels.

2- Education Sciences and Communication Sciences: graduates with pedagogical training, to whom these studies would allow them to develop technical skills for educational innovation projects, by using advanced ICT in the classroom.

3- Fine Arts and Architecture: graduates with a technical-aesthetic training, to which this title would allow them to consider new ways of doing in their creative fields, and with a projection focused on educational, cultural and social innovation.

Subjects:

1- STEAM: Didactic Approaches, Service Learning and Social Entrepreneurship

2- Gamification and collaborative processes to promote Computational and Emotional Intelligence in children and teenagers

3- Creative Programming with a Gender Focus

4- Educational programming of simple Videogames

5- Artificial Intelligence

6- 3D Design and Printing

7- Physical Interface Programming

8- Educational programming of Apps for Mobile devices

9- Robotics in the Classroom

10-IoT and Smart-cities in the classroom

3 UNIVERSITY DEGREE ON "ART TO COMMUNICATE SCIENCE & SCIENCE TO CREATE ART: DEVELOPING

We live in an inter / multi / trans-disciplinary scenario, in which Science, Technology and Art are producing very fruitful synergy. On one hand, this synergy could be valuable to communicate scientific content to society in an aesthetic, sensory and didactic way. On the other hand, science offers very interesting and attractive themes and tools to inspire creative people.

Likewise, creativity would be reinforced by working in mixed teams, between scientists / technologists, communicators and creators, serving as a setting to experiment with new interdisciplinary methodologies that serve to stimulate thinking in a transversal way.

Additionally, in the current knowledge society the proliferation of information is overwhelming, and this synergy could generate a more fluid and meaningful social communication on topics of interest and social significance (artificial intelligence, climate change, biotechnology, food, ethics, etc.).

In principle, this degree is aimed at university graduates from any area of knowledge, interested in art-science-technology synergy, with a scientific, informative, educational and creative approach.

In this context, professionals who could be especially interested in these studies include:

1- Engineering and STEM degrees: graduates with technical training, to whom this degree will allow them to take advantage of their skills to know how to develop artistic projects and / or scientific dissemination.

2- Education Sciences and Communication Sciences: graduates with pedagogical and communicative training, to whom these studies would allow them to develop technical skills, in order to apply them in artistic innovation projects, as well as scientific-artistic dissemination. For that purpose, they will learn how ICT tools of various kinds, (some of them related to the development of Computational Thinking, both software and hardware programming), as well as narratives (literature, oral, video, social networks) will be also used.

3- Fine Arts and Architecture: graduates with a technical-aesthetic training, to whom these studies would allow them to consider new ways of doing in their creative fields, and with a projection focused on artistic, cultural and social innovation.

Subjects:

1- Art-Science-Technology-Society Synergy

2- Techniques for Creativity

3- Communicating Science through Art

4- Art and Science under the umbrella of culture: Museology and Heritage

5- Multimodal Digital Creation

6- Creative Video Game Programming

7- Stylistic Resources for Scientific Dissemination

8- Creation through Interpretation and Oral Communication

9- Audiovisual Creation

10- Creation of Installations using Free Hardware

11- Communication of Science in Social Networks

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REFERENCES

[1] http://master.us.es/masteracctic/
[2] https://cfp.us.es/cursos/mu/aprendizaje-creacion-y-comunicacion-cientifico-artistica-mediante-las-tic-promoviendo-proyectos-steam-+-sciart/6353/
[3] DigCompEdu: https://ec.europa.eu/jrc/en/digcompedu
[4] EntreComp: https://ec.europa.eu/social/main.jsp?catId=1317&langId=en
[5] New official curricula in Secondary an Highschool education in Andalucia: https://www.juntadeandalucia.es/boja/2021/507/index.html): "Computing and Robotics "(1st, 2nd and 3rd ESO), and" Digital Creation and Computational Thinking "(1st High School).