COMPETENCIAS TRANSVERSALES DE COMUNICACIÓN EN INGENIERÍA QUÍMICA: CONTRIBUCIONES DE LOS PROYECTOS YOIQINNOVO Y COM4SCIENCENG


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**IDIQ-YOIQINNOVO**: Development of innovation, creativity and technological entrepreneurship by means of project-based learning and flipped classroom, with reference UV-SFPIE_RMD16-415615

**IDIQ-COM4SCIENCENG** – Gamification and development of skills of technological watching and scientific communication in chemical engineering with reference UV-SPFIE_RMD17-589254
CONTENTS

- Aim
- Framework
- Methodology
- Results
- Conclusions
1. AIM

- Entrepreneurship skills
- Critical thinking skills
- Communication skills
- Innovation in chemical engineering
CONTENTS

- Aim
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2. FRAMEWORK

- Master Chemical Engineering
- University of València
- Subject: Integral Management of Quality, Security and Innovation, 4,5 ECTS.
- Section: Innovation: 1,5 ECTS
- 18-24 students/intake
CONTENTS

- Aim
- Framework
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3. METHODOLOGY

- DESIGN OF SUBJECT ➔ LEARNING OUTCOMES / ACTIVITIES / CONTENTS / ASSESSMENT

Badia, JD, Martínez-Soria, V. 
Creative Project-based learning to boost technology innovation. @TIC: Revista d’ Innovació Educativa. Primavera (Enero-Junio 2017) Número 18. Págs. 10

CONSTRUCTIVE ALIGNMENT
3. METHODOLOGY

DESIGN OF WORKSHOPS ➔ COMMUNICATION SKILLS

P. San-Valero, A. Robles, M.V. Ruano, N. Martí, A. Cháfer, J.D. Badia
Workshops of innovation in chemical engineering to train communication skills in science and technology. Education for Chemical Engineers. In press
3. METHODOLOGY

- Entrepreneurship skills
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- Innovation in chemical engineering

LEARNING BY DOING

PROJECT-BASED LEARNING

COOPERATIVE LEARNING

TECHNIQUES - TOOLS

ENTREPRENEURSHIP ECOSYSTEM
3. METHODOLOGY

- Entrepreneurship skills
- Critical thinking skills
- Communication skills
- Innovation in chemical engineering

LEARNING BY ASKING

ANALYSIS OF OPTIONS

TECHNIQUES – TOOLS – ANALYSIS
3. METHODOLOGY

- Entrepreneurship skills
- Critical thinking skills
- Communication skills
- Innovation in chemical engineering

POSTER  VIDEO
ORAL DEFENCE
WRITTEN
GRAPHICAL
VERBAL
NON-VERBAL
3. METHODOLOGY

- Entrepreneurship skills
- Critical thinking skills
- Communication skills
- Innovation in chemical engineering

NEEDS ANALYSIS
3. METHODOLOGY

- Info pills
- Contact points
- FAQs-Forum

- Scientific communication
- Scientific style
- IMRDC structure
- Referencing and citations
- Figures
- Tables
- Posters
- ...

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3. METHODOLOGY

- Entrepreneurship skills
- Critical thinking skills
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PROJECT-BASED LEARNING

PROJECTS:
15/16 - BIOECONOMY
16/17 - FOOD WASTE
17/18 - COFFEE WASTE

FLIPPED TEACHING

S1. INNOVATION SYSTEMS
- Innovation scheme and strategies
- Creative generation of ideas
- Empowerment and implementation

S2. TECHNOLOGICAL WATCHING
- Public RDI financial programmes at regional, national and international level
- The European RDI framework
- Structure of a H2020 Project

S3. RDI FINANCING
- Private funding

S4. PROTECTION AND EXPLOITATION OF RESULTS
- Intellectual property
- Industrial property
- Rules of patentability
- Contractual exploitation of RDI results
- Societal exploitation of RDI results
3. METHODOLOGY

- WORKSHOP INSTEAD OF A PWP

PROFESSIONAL POSTER SESSION

EVALUATION BOARD

DIALOGUE - REPHRAISING

RECORDS
4. RESULTS

EVALUATION BOARD MARKS

[Box plot diagram showing mark distribution for different categories: Poster (40%), Video (10%), Defence (50%).]

- Structure/coherence: 50%
- Scientific content: 50%
- Design quality: 40%
- Message impact: 60%
- Performance: 40%
- Outfit: 10%
- Enthusiasm: 50%

TOTAL MARKS
4. RESULTS

IMPROVEMENT COMMUNICATION SKILLS

[Graph showing improvement in communication skills across different types: Written, Graphical, Verbal, Non-Verbal, and Use of ICT Tools. Comparison between Lecturers and Students.]

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4. RESULTS

SATISFACTION STUDENTS

SKILLS
4. RESULTS

SATISFACTION STUDENTS

- Participation
- Motivation

Likert scale:
- 1: 2% ( Participation: 2%  Motivation: 0%)
- 2: 4% ( Participation: 0%  Motivation: 4%)
- 3: 10% ( Participation: 9%  Motivation: 1%)
- 4: 30% ( Participation: 30%  Motivation: 10%)
- 5: 55% ( Participation: 55%  Motivation: 51%)
4. RESULTS

SATISFACTION STUDENTS

ENTREPRENEURSHIP

Cumulative counts

Likert scale

- Professional roles
- General satisfaction
- Recommend methodology
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5. CONCLUSIONS

- **WORKSHOPS** to boost communication skills, critical thinking and entrepreneurship

- **SCHEME OF WORKSHOP**: poster/video students, evaluation board, sounding info to community, recognition and celebration.

- **SATISFACTION** of students is relevant in terms of motivation, cooperation and foreseeable professional skills.

- **FUTURE** designs will implement more specific rubrics of evaluation of the different transversal skills, with focus on communication skills.