Universitat Autònoma de Barcelona

2021/2022

Laboratory and Virtuality in Primary Education

Code: 102088
ECTS Credits: 6

Degree	Type	Year	Semester
2500798 Primary Education	OT	4	0

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Bernat Rios Rubiras

Prerequisites

Students should have already passed the two previous courses "*Ensenyament i Aprenentatge del Coneixement del Medi Natural, Social i Cultural*" in 2nd year and "*Didàctica de les ciències experimentals*" in 3rd year.

Objectives and Contextualisation

The course "Laboratori i Virtualitat" aims that participants, at the end of the course, will be able to:

1. Know and know how to use the different existing ICT for science teaching and learning (virtual tools, digital devices, mobile technology, etc.).
2. Understand the characteristics of the experimental work in primary education and how this can be supported by various ICT.
3. Incorporate ICT in science education, integrating them across all the educational planning.
4. Identify positive and negative aspects of each teaching ICT.
5. Provide reflections on the educational changes that implies introducing ICT in school.
6. Acquire criteria for selecting, using and designing virtual environments that foster scientific skills (exploration, observation, classification, prediction, variables control, etc.).
7. Familiarize with creative technologies as resources to work from technology to primary content

Competences

- Design and regulate learning spaces in contexts of diversity that take into account gender equality, equity and respect for human rights and observe the values of public education.
- Design, plan and evaluate education and learning processes, both individually and in collaboration with other teachers and professionals at the centre.

- Develop the functions of tutoring and guidance of pupils and their families, attending to the pupils own needs. Understand that a teachers functions must be perfected and adapted in a lifelong manner to scientific, pedagogical and social changes.
- Foster reading and critical analysis of the texts in different scientific fields and cultural contents in the school curriculum.
- Know and apply information and communication technologies to classrooms.
- Know the curricular areas of Primary Education, the interdisciplinary relation between them, the evaluation criteria and the body of didactic knowledge regarding the respective procedures of education and learning.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Reflect on classroom experiences in order to innovate and improve teaching work. Acquire skills and habits for autonomous and cooperative learning and promote it among pupils.
- Work in teams and with teams (in the same field or interdisciplinary).

Learning Outcomes

1. Analyse a situation and identify its points for improvement.
2. Identify situations in which a change or improvement is needed.
3. Identifying aspects common to all the experimental sciences and examining them in depth.
4. Identifying the difficulties in the teaching and learning of experimental sciences, and designing activities that respond to the diversity of students learning experiences.
5. Identifying, describing, and analysing the characteristics pertaining to management of the area of experimental sciences in the classroom, and the implementation of activities involving experimentation and the use of CLTs.
6. Knowing how to communicate and present an argument in science lessons.
7. Planning for scientific learning situations in contexts outside of the school.
8. Produce and apply resources related to the teaching and learning of experimental sciences.
9. Propose new methods or well-founded alternative solutions.
10. Propose new ways for measuring success or failure on implementing innovative proposals or ideas.
11. Relating science with its technological applications, with its social impact on the didactic situations pertaining to the school.
12. Weigh up the risks and opportunities of both ones own and other peoples proposals for improvement.

Content

Section 1: ICT and scientific practice in classroom. Which ICT shoud we use, when, how and why?

Section 2: Digital tools for enriching the experimental activities in school: mobilephones, digital sensors, digital lenses and videos.

Section 3: Digital tools for working with virtual models in the classroom: animations, simulations, video games and virtual laboratories.

Section 4: Digital tools to communicate scientifically: interactive whiteboard and Scratch language.
Section 5: Digital tools to address the content of technology in the primary classroom (creative technologies)

Methodology

The course "Laboratori i Virtualitat" combines different kind of work: laboratory experimental activities, experimental field activities and computer room activities. Is particularly important work in small groups and whole-class discussions.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Section 1	5	0.2	8, 5, 7, 11, 6
Section 2	15	0.6	8, 5, 7, 11, 6
Section 3	15	0.6	8, 3, 4, 5, 7, 11, 6
Section 4	10	0.4	8, 5, 7, 11, 6
Section 5	5	0.2	3, 7
Type: Supervised			
Project and final reflections preparation tutorials	11	0.44	
Tutories Section 5	4	0.16	
Tutoring Section 2	5	0.2	
Tutoring Section 3	5	0.2	
Tutoring Section 4	5	0.2	
Type: Autonomous			
Autonomous work for elaboration of deliberables	60	2.4	8, 5, 7, 11, 6
Preparation of final project	10	0.4	8, 4, 5, 7, 11, 6

Assessment

The evaluation of the subject Laboratory and Virtuality will be based on continuous evaluation and will have different sections:

- Class participation: 10% (single)
- Individual deliveries (2 in total along the course): 10% each; 20% in total (18/11/20 i 20/01/21) (single)
- Preparation of a classroom activity with ICT and TAC: 20% (microteaching throughout the course) 10% presentation (group) and 10% reflection (single)
- Initial and final reflection: 10% (09/09/2020 i 27/01/2021) (single)
- Digitization project of a school space: 20% (13/01/2021)
- Research project in the field of science with ICT tools and TAC: 20%. (27/01/2021)

It must be kept in mind that:

- According to the UAB regulations, plagiarism or copying of any work will be penalized with a 0 as a note of this work, losing the possibility of recovering it, whether it is an individual or group work (in this case, all members of the group will have a 0).
- Class attendance is mandatory: the student must attend all classes to be evaluated (20% of incidents are contemplated), otherwise it will be considered non-evaluable.
- Our teaching approach and assessment procedures may be altered if public health authorities impose new restrictions on public gatherings for COVID-19

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Activity with ICT 1	20%	0	0	8, 5, 7, 10, 11, 6
Clasroom participation	10%	0	0	12, 9, 11
Delivery of individual tasks	20%	0	0	8, 5, 7, 11, 6
Digitization project	20%	0	0	1, 8, 2, 5
Final project	20%	0	0	8, 3, 4, 5, 7, 11, 6
Pre-Post Reflection	10%	0	0	8, 3, 4, 5, 7, 11, 6

Bibliography

Chivite, J. (2010). Com influencia la temperatura en el creixement de les hortalisses en un hivernacle. *Ciències. Revista del Professorat de Ciències d'Infantil, Primària i Secundària,* 17, 2-6.

Colette Murphy (2003). *Literature Review in Primary Science and ICT*. A NESTA Futurelab Series - report 5.

Demkanin, P., Kibble, B., Lavonen, J. Josefa Guitart Mas, Jozefina Turlo (2008). *Effective use of ICT in Science Education*. University of Edinburg.

Hennessy, S., Wishart, J., Whitelock, D., Deaney, R., Brawn, R., la Velle, L., McFarlane, A., Ruthven, K. and Winterbottom, M. (2007). Pedagogical approaches for technology-integrated science teaching. *Computers and Education*, 48 (1), 137-152.

López, V. i Hernández, M.I. (2013). El Scratch com a eina de modelització computacional. *Ciències. Revista del Professorat de Ciències d'Infantil, Primària i Secundària,* 26, 28-33.

Osborne, J., Hennessy, S. (2003). *Literature Review in Science Education and the Role of ICT: Promise, Problems and Future Directions*. A NESTA Futurelab Research report - report 6.

Pintó, R., Couso, D., Hernández, M.I. (2010) An inquiry-oriented approach for making the best use of ICT in the science classroom. *e-Learning papers,* 20, 1-14.

Software

Microbit