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**II International Congress of Education in Animal Sciences (ICEAS)**
**June 7-8, 2021 - Murcia**

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# INVITED PRESENTATIONS

## TEACHING ONE HEALTH

S. Savic[1]

[1] Scientific Veterinary Institute "Novi Sad", Serbia

One Health approach is known for the last two decades in some parts of the world, but in the other's it is just starting to be implemented. Why do we need to learn about it and why do we need to teach it...? Many health problems are not only affecting human health but also some animals. Or, the consequence of some change in the ecosystem can lead to the appearance of the disease in humans or animals (or both). Many of the same microbes infect animals and humans, as they share the eco-system they live in. Efforts by just one sector (human medicine or animal medicine) cannot prevent or eliminate the problem. It is essential that the expertise are combined and that way the best results are gained.
Teaching One Health can be the „usual" ex-catedra way, or (m)any other ways. The usual academic teaching is mostly through postgraduate studies, but also through graduate studies in some countries. Universities all over the world offer master or PhD studies or different modules on the topic of One Health approach. The other ways are more diverse and more frequent and also existing in countries that do not have University teaching of One Health. These ways of teaching are through conferences, meetings, projects, webinars, courses and summer schools, associations, journals and books. During Covid time in 2020, these ways of teaching were especially popular, mostly the ones that can be completed online. It is very important to change the way of thinking, especially in young researchers, scientists and experts. The disease will not change, but if we change the way we look at it, we might handle it or prevent much better. Multidisciplinary and transdisciplinary „out of the box" way of thinking is basic for endorsing One Health approach.

**Keywords:** One Health; teaching; approach; multidisciplinary.

## PARTICIPATORY TEACHING METHODOLOGIES FOR A COMMON GOAL. ONE HEALTH AND SUSTAINABLE DEVELOPMENT GOALS AS A POSSIBLE HORIZON FOR THE FUTURE VETERINARIAN

J. Rivera-Gomis[1], M.J. Cubero Pablo[1], M. Carmen Gallego Ruiz[1]

[1] Department of Animal Health, Veterinary Faculty, University of Murcia, Spain.

The competences acquired by veterinary graduates should be aimed at integrating the theoretical knowledge acquired into professional practice from a holistic perspective of reality, as opposed to a static and fragmented vision. With this premise, based on the One Health concept, we set the objective of incorporating the curricular sustainability competences set by the CRUE in 2018, in order to comply with the 2030 Agenda in the compulsory 5th year subject of the Bachelor's Degree in Veterinary Medicine "Preventive Medicine and Health Policy" during two consecutive years (2019-20 and 2020-21).

We used two types of participatory methodologies, "Service Learning" and "Project Based Learning". Students worked in groups on a social problem present in their city, on the relationship between citizens and pets (academic year 2019-20) and on malpractice in the dissemination of health alert news (academic year 2020-21).

The tangible results were the holding of the conference in the 2019-20 academic year "Seventeen Sustainable Development Goals and One Health. Curricular sustainability, through participatory methodologies, in the context of zoonoses transmitted by pets". And in the 2020-21 academic year, a podcast with a radio news item on health alerts was developed and disseminated. Several fictional stakeholders took part in the dissemination to dramatize radio news on a health alert, introducing five hoaxes. All the results were published on different platforms from the University of Murcia freely accessible:

https://tv.um.es/videos?serie=24895
https://digitum.um.es/digitum/handle/10201/94161
https://www.ivoox.com/s_p2_1240656_1.html

The conclusion of both teaching innovation projects was to highlight the motivation and involvement of the students of the Degree in Veterinary Medicine in group work and in the use of tools for real situations, as opposed to traditional theoretical and less interactive teaching.

**Keywords**: One Health; sustainability; participatory methodologies; podcast.

## INTERDISCIPLINARY TEACHING

I. Barranco[1], J. Ribas-Maynou[2]

[1] Department of Veterinary Medical Science, University of Bologna, Italy.
[2] Department of Biology, University of Girona, Spain.

Undergraduate education should be characterized by an integration of content (knowledge, skills, attitudes and values) and by experiences that facilitate a more reflective understanding of reality. In this sense, interdisciplinary teaching (multi-disciplinary, transdisciplinary, thematic teaching, integrated learning...) should be considered as a teaching-learning strategy to improve the knowledge of undergraduate students, tackling a single subject from multiple perspectives. Interdisciplinarity can be defined as the capacity to integrate and exchange knowledge and modes of thinking in two or more disciplines or established areas of expertise to produce a cognitive advancement in ways that would have been impossible or unlikely through single disciplinary means (Boix Mansilla et al., 2000).

It seems obvious that specific knowledge of the topics included in a Science Degree, such as Veterinary Medicine, Biotechnology, Biology or Biomedical Sciences, is required in order for basic subjects to be properly taught in these Degrees. However, teachers reach a wider approach of this basis if they have themselves been able to collaborate in research projects that involve different disciplines. Moreover, the collaboration between specialists from Biomedicine and Veterinary fields, exchanging knowledge and experiences, is a key in this gear that enriches, even more, the capacity to develop innovative educational concepts and has a beneficial learning outcome upon undergraduate education. Therefore, if the daily work of the teacher is specifically based on a multidisciplinary approach (either from a team perspective or from a one based on individual knowledge), undergraduate students should take advantage of that diverse expertise in the educational process along with their undergraduate education.

This presentation will be focused on explaining our experience on teaching in different subjects in Science Degrees, after having acquired a wide range of knowledge and experience on separate areas, as well as collaborated with professionals from different fields of study.

**Keywords**: Interdisciplinary teaching; animal science; medical sciences; veterinary medicine degree.

### References

Boix Mansilla, V., Miller, W. C., & Gardner, H. On disciplinary lenses and interdisciplinary work. In S. Wineburg & P. Grossman (Eds.), Interdisciplinary curriculum: Challenges of implementation. New York: Teachers College Press. 2000.

## ANIMATED VIDEOS: A NEW EXPERIENCE FOR SCIENCES TEACHING

D. Romero[1]

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When we surf the Internet, it is easy to find videos with explanations of several topics, such as history, biology or medicine. Students watch these videos because they can be funny and entertaining, so it can be a powerful tool in teaching-learning systems. However, this tool is not widely extended in the university, maintaining the traditional master class as a way of transmitting knowledge. The European Space of Superior Education promotes changes in teaching methodologies in the learning system, which is a challenge for teachers who try to capture the attention of the student.

A video helps to maintain the visual and auditory attention of the student, but if the video is animated, the creative possibilities increase, being able to generate stories, environments and characters that would not otherwise be possible. This allows us to arrive with a single click to strange, curious and diverse situations, capturing the student's attention and generating a positive feedback, because with one video per topic we create a mini-series that students can follow, helping them achieve the skills of the matter.

In the subject "Food Toxicology", of the Degree in Food Science and Technology (University of Murcia), we have created a character ("Don Toxikón") to tell, in first person, the most relevant of each of the subjects. Thus, with videos of 5-10 minutes in length, this character teaches the key aspects of the subject, introducing some errors for the students to investigate and detect. The error and the correct information must be sent to the teacher individually, who solves the topic some days later, when the topic is explained with the master class. In this way, the student stops being an observer to become an active part of the teaching-learning process.

**Keywords**: "Don Toxikón"; learning; story; toxicology; video.

## USING ANIMALS IN LABORATORY ANIMALS EDUCATION AND TRAINING

A. Pastor Campos[1]

[1] Responsible Research Office, Miguel Hernandez University, Spain.

Article 23 of Directive 2010/63/EU4 states that laboratory animal staff shall be adequately educated and trained before they perform any of the following functions: (a) carrying out procedures on animals; (b) designing procedures and projects; (c) taking care of animals; or (d) killing animals. The use of live animals for education and training purposes may cause the animals pain, suffering and distress or lasting harm, and this is why training is needed. However, training alone does not deliver competence. Competence is gained overcoming a work under supervision period after ending these training courses. Education and training is divided in learning modules for each function and there are theoretical and practical learning outcomes. Education could be interpreted principally to refer to the imparting of general principles to gain knowledge (e.g. in surgery principles) whereas training could refer mainly to the teaching of practical skills. We can agree that is possible to educate without using animals but it is not so clear for learning practical skills. In fact, there is much debate on whether live animals should be used for training on these courses or if the first contact with the animals should be done in this work under supervision period. This is the reason why the approach to how the training in practical skills should be carried out varies within the countries of the European Union, and even within the same country. Our training experience of more than 10 years has taught us that there are certain skills that are not learned online, and our conclusions are similar to those defended by Gyger et al. (2018), and at least handling and restraint of live animals (EU Module 3.2) should be mandatory. A tiered approach should be used using non-animal alternatives and/or cadaver work and finally live animals.

**Keywords**: Training; animals; replacement; reduction; refinement.

### References

Gyger M, Berdoy M, Kolf-Clauw M, Santos AI, Sjo¨quist M. FELASA accreditation of education and training courses in laboratory animal science according to the Directive 2010/63/EU. Lab Anim. 2018, Vol. 53(2) 137–147.

## THE IMPORTANCE OF SCIENTIFIC DISSEMINATION FROM THE UNIVERSITY

D. Roca[1]

[1] Department of Information and Documentation, Faculty of Communication and Documentation, University of Murcia, Murcia, Spain.

The university is the contemporary institution in charge of disseminating the science which is generated within the institution. Since 2007, a group of Scientific Culture Units (UCC+i) has been established under the Spanish Foundation for Science and Technology, belonging to the Ministry of Science and Innovation. This foundation is one of the major agents in the dissemination of science and innovation in Spain (FECYT, 2012).

Today, many universities on the national scene have joined this trend of creating a service in the academic field to improve and increase scientific culture among citizens and overcome the traditional barriers that have existed between science and society (Roca, 2017).

The case study of the UCC+i of the University of Murcia (UMU) outlines an overview of the advantages of managing scientific dissemination from specialized university offices. The results show that effective and professionalized management within universities brings a whole range of benefits that are essential to stimulate progress and seek greater social well-being.

Currently, UCC+i are the most efficient means of bringing the work of research staff closer to society that finally needs to know where the funds invested in science will go. That's because, although Spanish people recognize that science brings to society greater benefits than harm (FECYT, 2015), there are few well-informed citizens in scientific matters. This is an urgent task which can not be postponed, especially at a time like this when we are facing a global pandemic.

**Keywords**: Dissemination; Science; Scientific Culture and Innovation Unit; Society; University.

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FECYT: Fundación Española para la Ciencia y la Tecnología. Libro blanco de las Unidades de Cultura Científica y de la Innovación [Internet]. Madrid: FECYT; 2012 [cited 2021 april 14]. Available from https://www.fecyt.es/es/publicacion/libro-blanco-de-las-unidades-de-cultura-cientifica-y-de-la-innovacion-ucci.

Roca, D. La divulgación científica en la universidad desde su contextualización histór-ca: estudio de caso y propuesta de un modelo de divulgación para la Universidad de Murcia. [dissertation]. Murcia: University of Murcia; 2017.

FECYT: Fundación Española para la Ciencia y la Tecnología [Internet]. Madrid: FECYT; c2015 [cited 2021 april 14]. VII Encuesta de Percepción Social de la Ciencia. Dossier informativo [about 1 screen]. Available from: https://icono.fecyt.es/sites/default/files/filepublicaciones/20/epscyt2018_informe.pdf.

## FELASA Accreditation: Ensuring Quality Education and Training in Laboratory Animals Science

N. Linklater[1,2], C. Van Ginneken[1,3], M. Berdoy[1,4], I. Dontas[1,5], M. Gyger[1,6], M. Sjöquist[1,7], J. Steidl[1,8]

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[2] LAS-Interactive, Germany.
[3] Faculty of Biomedical, Pharmaceutical and Veterinary, Antwerpen University, Belgium.
[4] BMS, Oxford University, UK.
[5] School of Medicine, National & Kapodistrian University of Athens, Greece.
[6] School of Life Sciences, Swiss Federal Polytechnic School of Lausanne, Switzerland.
[7] Swedish Centre for Animal Welfare, University of Agricultural Sciences, Uppsala, Sweden.
[8] TARC, Universitätsmedizin der Johannes Gutenberg, Universität Mainz, Germany.

The well-being of animals used for scientific purposes and the validity of research results depend, amongst others, on the professional competence of all personnel involved. For this reason, any person involved in animal research needs to be adequately educated, competent and continuously trained (Directive 2010/63/EU). The Federation of European Laboratory Animal Science Association (FELASA) has long been involved in fostering high quality training in Laboratory Animal Science (LAS) by providing recommendations on the establishment of LAS courses (1) and since 2006, ensuring course quality by accrediting LAS courses. The accreditation process involves a review of the course set up, its target audience, annual reporting as well as regular course audits.

In 2015 FELASA has adapted its accreditation scheme (2) to be in line with Directive 2010/63 and a modular education and training framework laid down by an expert working group (3). One central aspect of the adapted accreditation is to facilitate that the suggested learning outcomes (LO) for the different modules (3) are being met. While the approach to reach the LOs can differ, this review process supports harmonization between LAS courses and their mutual recognition.

Another important aspect of any LAS teaching program involves practical training with live animals, to lay the foundation for the humane and welfare conform treatment of laboratory animals. A multi-tiered approach and skill assessment to address such training is highly recommended, where working with live animals is the last step. In some instances, national regulations may prevent this final step to be part of a training program. In those cases, training on the job may be implemented, requiring a different teaching approach to achieve the LOs. Against this background, the FELASA accreditation helps course organisers to ensure their training programs fit with the Directive and EWG framework.

**Keywords:** Directive 2010/63/EU; Laboratory animal science; Accreditation; Learning outcomes.

## References

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3. European Commission guidance document. National Competent Authorities for the implementation of Directive 2010/63/EU on the protection of animals used for scientific purposes. A working document on the development of a common education and training framework to fulfil the requirements under the Directive. Brussels, http://ec.europa.eu/environment/chemicals/lab_animals/pdf/guidance/education_training/en.pdf.

## ADDRESSING THE TEACHING OF ETHICS IN MODULE 2

M. Jennings[1,2], M. Berdoy[1,3,4], A.M. Farmer[1,5], P. Hawkins[2], E. Lilley [1,2], A. Kerton[1,6], B. Law[1,7], J.L. Tremoleda[1,8], C.S. Stanford[1,9], L. Whitfield[1,10], K. Ryder[11]

[1] LASA Education, Training and Ethics Section
[2] RSPCA Animals in Science Department
[3] Oxford University
[4] FELASA
[5] Cambridge University
[6] The Learning Curve (Development) Ltd
[7] Leeds University
[8] Queen Mary University of London
[9] University College London
[10] Agenda Veterinary Services
[11] Home Office observer

Arguably, everything that we do is steeped in ethics. But teaching about it is hard. The EC document (1) helps trainers by listing a number of learning outcomes in two specific modules for researchers carrying out experiments (Function A, Module 2) or designing them (Function B, Module 9). These modules are part of all FELASA accredited courses and it is agreed that delivering these learning outcomes is a central component of animal researcher training. Experience, however, shows that trainers often feel restricted by time, resources or ideas on how to go about it. This is augmented by the fact that the teaching of "Ethics" in this case is not meant to be a course on moral philosophy or just implementing the 3Rs.

I report on the published output of our joint LASA UK and RSPCA initiative (2) based on a range of discussions and workshops with trainers in the UK focusing on the relevant learning outcomes of Module 2. The resulting Guiding Principles discuss how the learning outcomes could be delivered, the key points to get across, as well as suggesting some useful resources and opportunities for CPD.

Addressing Ethics in this context is still challenging, but we hope this document will make it easier to achieve lasting and positive learning outcomes.

**Keywords**: Ethics, education; learning outcomes; animal research.

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1. European Commission. National Competent Authorities for the implementation of Directive 2010/63/EU on the protection of animals used for scientific purposes - A working document on the development of a common education and training framework to fulfil the requirements under the Directive. Brussels: European Commission, 2014.
2. LASA and RSPCA, 2020. Guiding principles to help deliver the ethics learning outcomes of Module 2 training for personal licensees. A report by the LASA Education, Training and Ethics Section and the RSPCA Research Animals Department. (M. Jennings and M. B

# ORAL PRESENTATIONS

## OP1. "Critical Thinking for Successful Jobs": Establishing a University-Business Collaboration to foster graduates' Critical Thinking

D. Pnevmatikos[1], P. Christodoulou[1], T. Georgiadou[1], A. Lithoxoidou[1]

[1] Department of Primary education, University of Western Macedonia, Greece.

Scholars and policymakers highlight that graduates lack soft skills and dispositions that would enhance their employability. Concurrently, these soft skills would render them equipped to deal with work-based problems. Moreover, the literature underlines a lack of Higher Education curricula enhancing graduates soft skills. Critical Thinking (CT) is considered among the soft skills associated with higher levels of employment. The European funded project "Critical Thinking for Successful Jobs" (Thinks4Jobs), currently in progress, aims at strengthening the collaboration between Higher Education Institutions (HEIs) and Labor Market Organizations (LMOs) to design, develop, implement and evaluate CT blended apprenticeships' curricula in four disciplines (i.e., Veterinary Medicine, Teacher Education, Business and Economics, Business Informatics). The curricula will be implemented in apprenticeships as the latter is deemed a relative interface that links HEIs and LMOs in establishing a sustainable collaboration and eventually providing a work-based context for the development of graduates' CT.

So far, Think4Jobs is at an exploration phase, where multiple focus groups have been carried out with HE instructors and students as well as LMO human resources tutors, employers and employees to form a shared understanding of the context and map the needs of the stakeholders regarding the instruction of CT in HEI apprenticeships and LMO internships. Additionally, observation of stakeholders' instruction of CT at HEIs and LMOs has been carried out along with documental analysis of the exploited materials aiming to gain new insights on the development of CT in HEIs and LMOs. The exploration phase will conclude at a bottom-up well-established design of the CT apprenticeships curricula.

Preliminary results reveal not necessarily a "gap" between HEIs and LMOs regarding CT instruction, rather a different understanding and a need to develop a common language between the stakeholders, which will facilitate the design and development of the CT apprenticeships curricula.

**Keywords**: Critical Thinking; Stakeholders; Apprenticeships; Higher Education; Labor Market.

## OP2. Fostering Critical Thinking: Veterinary Medicine Student's Perspectives

R. Payan-Carreira[1], L. Sebastião[2], H. Rebelo[2]

[1] Dept de Medicina Veterinária, Universidade de Évora, Portugal.
[2] Research Center in Education and Psychology, University of Évora, Portugal.

Today's society places all individuals in the face of the undeniable need to constantly adapt to increasing degrees of demand and complexity. The labor market requires the newly graduated and intern students' adaptability and a multitude of tools, skills, and qualities to smooth this transition and make them better professionals. In this sense, the development of critical thinking (CrT) becomes a key objective in the academic trajectory of all students and at the focus of the European Project "Critical Thinking for Successful Jobs" (Thinks4Jobs).

In this study, we aim to comprehend the opinion of young interns and recent graduates on how CrT is promoted or not during their curricular traineeship. Two interviews were conducted, in a focus group, to six trainee students and five recent graduates. Content analysis technique was applied, and the results indicate that the participants strongly associate critical thinking with reasoning and clinical practice. There is also a strong association with the practical component of the course, mainly in the resolution of clinical cases. Both groups report that not all teachers encourage critical thinking. When they do, it is mainly through debate and active questioning. Participants further confess being unable to identify resources and materials that have been explicitly used in this regard. They also state that critical thinking is fundamental for their integration into the labor market but that there are still many aspects to improve to feel equipped with all the necessary skills.

To conclude, we are in the presence of a polysemic concept, associated mainly with the practical component and decision-making in the participants. Even though there is a concern with this theme, there are still many aspects to develop before feeling empowered for the challenges of the 21st century.

**Keywords**: critical thinking; student's perspectives; transition to labor market; empowering; veterinary medicine.

## OP3. EVIEDVET - Promoting Education and Training for Evidence-Based Veterinary Medicine

M. Magalhães-Sant'Ana[1], I. Rodrigues[2,3], G. Stilwell[1], N. Henrique Franco[4,5]

[1] CIISA, Faculdade de Medicina Veterinária, Universidade de Lisboa, Portugal.
[2] UTAD – Universidade de Trás-os-Montes e Alto Douro, Vila Real, Portugal.
[3] CIIE - Faculdade de Psicologia e de Ciências da Educação, Universidade do Porto, Portugal.
[4] IBMC - Instituto de Biologia Molecular e Celular, Universidade do Porto, Portugal.
[5] i3S - Instituto de Investigação e Inovação em Saúde, Universidade do Porto, Portugal.

The ability to practise evidence-based medicine (EBM) is among the most important competences for a veterinarian (1). EBM refers to the "conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research" (2). Implementing EBM in veterinary practice is arguably more challenging than in human medicine, as it is harder to find credible, high-quality, evidence-based information (3), thus demanding from veterinarians critical thinking skills for appraising the credibility of published research or even empirical principles and practices (4).

The ability to access and interpret reliable and accurate information has been paramount in the current COVID-19 pandemic, as veterinarians need to answer such questions as the role of animals in spreading the disease or decide on the need for quarantining pets from infected humans (5). There is, however, insufficient evidence that veterinarians are competent in collecting, interpreting and assessing the quality of scientific information.

This presentation aims to introduce FCT-funded project "EVIEDVET – Promoting education and training for evidence-based veterinary medicine" (PTDC/CED-EDG/0187/2020). EVIEDVET aims to, firstly, comprehensively map and critically evaluate how EBVM is currently being taught to veterinary students and practitioners in Portugal, and compare the Portuguese landscape with examples from selected European veterinary schools (namely Austria, Ireland and Finland). EVIEDVET will also be actively involved in promoting education in EBM, by elaborating, road-testing, evaluating, and disseminating free educational resources, on a dedicated website, all of which will be bilingual (Portuguese and English). These will serve as basis for a final deliverable of a full-fledged e-learning curriculum on scientific reasoning and critical thinking applied to veterinary practice.

**Keywords**: Evidence-based medicine; distance education; veterinary medicine; clinical practice.

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## OP4. Improving Mobility of Researchers Through Harmonization of Education and Training Across Europe – The Contribution of ETPLAS and the Road Ahead

N. Henrique Franco[1], I. Dontas[1], M. Gyger[1], D. Smith[1], H. Voipio[1], P. Vergara[1]

[1] ETPLAS - Education & Training Platform for Laboratory Animal Science.

One of the main challenges of Directive 2010/63/EU, regulating animal use for scientific and educational purposes was how to harmonize education and training (E&T) standards for both scientists and laboratory animal science (LAS) professionals, such as caretakers, technicians, and veterinarians. The European Commission's E&T Framework Guidance Document proposed establishing a European Platform for information sharing and communication between Approval/Accrediting Bodies, Course Providers, and Member State authorities. The platform should gather key European stakeholders and should not add bureaucracy or control approval/accrediting processes, but rather facilitate and inform (European Commission, 2014). The Education & Training Platform for Laboratory Animal Science (ETPLAS) was thus founded (www.etplas.eu), to improve both animal welfare and scientific quality, by establishing and harmonizing standards for E&T in LAS.

This talk will present the outputs from the European Parliament Pilot Project 'Promoting Alternatives to Animal Testing through Accessible and Harmonized Education and Training'. These include the ETPLAS on-line portal, which harbours information for course organizers, approval/accrediting bodies, and Member-State authorities; a list of courses in Europe, guidelines on Learning outcomes for E&T for carrying out procedures on animals (Dontas et al 2020), and e-learning courses on EU-function modules, namely on experimental design (EU-10+11), severity assessment (EU-12), project evaluation (EU-25), searching non-animal alternatives (EU-52) and developing non-animal alternatives for regulatory use (EU-60). A resource library for third-party educational resources will soon be available, along with an online exam platform for course providers, with questions developed by LAS specialists for EU-function A courses.

By providing these and other upcoming resources, ETPLAS aims to be a one-stop-shop for LAS E&T. The road ahead for ETPLAS' ultimate goal of contributing to mutual recognition and quality assurance of E&T programmes (Smith 2016) will also be discussed.

**Keywords**: Laboratory Animal Science; Education & Training; Harmonization; E-learning; Assessment.

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## OP5. Evaluation of the Jigsaw Technique in Veterinary Osteology Teaching

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The jigsaw technique is a cooperative learning strategy that encourages students to practice communication, teamwork, and critical thinking, bringing out a positive interaction with structured peer-teaching (Oakes et al., 2019). Some authors have reported positive outcomes in anatomy students' performance and motivation (Salomäki et al., 2014). Since communication, teamwork, and critical thinking are core competences in veterinary medicine (Gaida et al., 2018), the aim of this study was to analyze the impact of the jigsaw technique in veterinary students' training of bone anatomy.

First-year students (n=124) were randomly assigned to "expert" groups, to learn about one of following topics: anatomy of the cervical, thoracic, lumbar, and sacral vertebrae, and ribcage bones. "Expert" groups were provided with bones, images, and detailed anatomical descriptions. Next, "new" groups were formed, comprising at least one "expert" student in the different topics. In the "new" group, each "expert" student taught the other group members, so that finally, every student had learned about all topics. A five-point Likert scale questionnaire was completed after obtaining written consent (n=42), and feedback was rated on a 1–100 satisfaction index.

Our results indicate that students improved their average test scores in 2020/21 (mean=14.88 of 20) compared to 2019/20 (mean=11.43 of 20;n=99). According to satisfaction index, most students described the jigsaw as a positive and motivating experience (90.0) and found it useful in comprehending the topic (93.2) at a deeper level (86.8). Students also considered that this activity enhanced their communication and teamwork skills (87.2), critical and analytical abilities (87.9), and helped to overcome their shyness (83.5) and to develop competences needed as a veterinarian practitioner (89.4).

This study shows that the jigsaw technique promotes an active and motivating conduct in students, which ultimately improves knowledge gain of the skeletal system, while facilitating communication, teamwork, and critical thinking.

**Keywords**: Jigsaw technique; cooperative learning; core competences; veterinary anatomy.

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## OP6. GUIDANCE ON THE DEVELOPMENT OF ASSESSMENT CRITERIA FOR THEORETICAL LABORATORY ANIMAL SCIENCE COURSES - AN ETPLAS WORKING GROUP REPORT

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The aim of this Education & Training Platform for Laboratory Animal Science (ETPLAS) Working Group was to develop guidance, further to the European Commission (EC) Framework document (1), to clarify the levels of knowledge and understanding to be acquired by trainees of laboratory animal science (LAS) courses, and to provide criteria by which the Learning Outcomes should be assessed objectively. This would further promote harmonization of education & training (E&T) assessment and free movement of personnel within Europe.

Using the EC Framework document as a basis, assessment criteria for each Learning Outcome of the modules required for Function A persons (carrying out procedures on animals) for rats, mice and zebrafish were created with sufficient detail to enable trainees, training providers and assessors to appreciate the level of knowledge, understanding and skills required to pass each module (2). These criteria are capable of assessing individual elements of a composite Learning Outcome. Their marking can be conducted electronically, provided exam questions are designed appropriately. Examples of question formats that test both knowledge and understanding are also provided, ensuring that electronic, and therefore objective, marking can be undertaken by assessors. Thus, marking does not discriminate against those being examined in their non-native language or students with learning challenges, and is therefore more robust and less open to bias. Additional testing options are considered, such as the use of resources or closed book examinations, or the presence of supervisors.

Adoption and utilization of these assessment criteria by training providers and accrediting or approving bodies will harmonize introductory E&T for those involved in the care and use of animals for scientific purposes within the European Union. It will also promote mutual recognition of E&T within and between Member States and therefore free movement of personnels.

**Keywords**: Assessment criteria; education; learning outcomes; objective assessment.

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## OP7. Usefulness of Three-Dimensional Models in Teaching of Congenital and Acquired Malformations in Small Animals

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There is a wide range of studies describing the use of 3Dp for educational purposes in the human medicine field1. However, only a few teaching studies had been done for veterinary education2,3, despite it has been shown in various studies that content is learned faster through the manipulation of tangible objects4.

The aim of this work was analyze the assessment of learning by students of two types of congenital malformations through three-dimensional models or conventional radiology.

Twenty students from the lasted three years of the Veterinary degree participated in this research, who analyzed two models of congenital malformations, an atlantoaxial dislocation and an angular deformity in dogs. These models were built with a 3D printer from computerized tomography images of two clinical cases treated in our hospital. In order to analyze their learning, they were given a questionnaire in which they answered the same 7 questions in both cases, with the three-dimensional model and with the traditional radiological model. Finally, the same procedure was performed with the second pathology.

Once the data extracted from the questionnaires (Chi square) had analyzed, it was observed that, despite not have obtained statistically significant differences in five questions for none of the two pathologies, in general a slightly higher percentage of students respond correctly in the 3D model. However, a statistically significant increase is observed in questions 1 (of identification of the species) and 7 (of the assessment of learning through these models) correctly answered.

Therefore, the conclusion of this study is that learning through three-dimensional models constitutes an improvement for teaching in clinical subjects of the Veterinary degree.

**Keywords**: three-dimensional models; radiological models; veterinary education; congenital/acquired malformations.

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## OP8. USE OF VETERINARY VIRTUAL PATIENT LEARNING IN VETERINARY CLINICAL PATHOLOGY

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Opposing traditional teacher-centered passive learning, student-centered learning activities (1) increase student motivation and participation by actively involving them in the whole learning process (2). Virtual patients have been defined as "an interactive computer simulation of real-life clinical scenarios for the purpose of medical training, education, or assessment" and increase retention of knowledge while enhanced clinical reasoning (3). In 2012, the VetVIP (Veterinary Virtual Patients)-project was launched to improving teaching and learning of basic sciences in veterinary education (4).

This study evaluated the opinion of the University of Murcia's veterinary students about their experience using VetVIP. For this, a total of 49 students attending "Veterinary Clinical Pathology" classes during school years 2019/20 (n=23) and 2020/21 (n=26) were enrolled. Students had to complete six cases from the VetVIP platform (sweet blood, the really fat cat, hemostasis, Addison disease, hepatic encephalopathy, and beneficial or deleterious cortisol) during the following three weeks. Afterwards, students were asked to complete an online questionnaire (Google Forms) to assess their opinion about the activity.

The questionnaires revealed that 75.5% of students enjoyed the activity, being qualified as useful by 93.9%. All participants considered that VetVIP complemented the face-to-face lectures and 83% indicated that it helped them increase understanding of the subject. When the disadvantages of the use of VetVIP were asked, the most common were related to [1] specific terminology and the use of foreign language, [2] cases length, and [3] impossibility to resolve doubts in real-time. Besides this, the experience was recommended in the Veterinary Degree by 89.8%, and 77.5% would like to have more virtual cases as complementary material of the subject.

In conclusion, the VetVIP activity was considered useful by the students to increase their knowledge in clinical pathology, and its inclusion in future courses was encouraged.

**Keywords:** Active learning; Clinical cases; Surveys; Teaching; Virtual Patients.

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## OP9. A Comparative Study of Online Education And Traditional Off-Line Education Physiology Of Domestic Animals

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Summer semester lecturing at Faculty of Veterinary Medicine University of Zagreb, Croatia, in the academic year 2019/2020 was held online due to COVID-19. The teaching staff of Physiology of domestic animals II adapted to the new conditions by preparing online materials for teaching and assessment. The study aimed to conduct a comparative analysis of points achieved from lecture, seminars and practical class attending, seminars and practical class activity, two tests and oral final exam between online live teaching (the academic year 2019/2020) and traditional off-line teaching (the academic year 2018/2019) in students in Croatian program and international students studying in English. The study was performed on 125 (academic year 2018/2019) and 121 (academic year 2019/2020) students in the Croatian program and 11 (academic year 2018/2019), and 23 (the academic year 2019/2020) English program students. The number of points of tests and points of active participation in seminars and practicals and the total number of points was higher during online teaching than classroom teaching ($p<0.05$) in students in the Croatian program. At the same time, the take and retake of the exam and the finishing grade did not differ ($p>0.05$). English program students had a higher number of points only in active participation in seminars and practicals ($p<0.05$) during online teaching. Comparing results of students studying in different programs in the academic year 2018/2019, English program students achieved a higher number of points of active participation in seminars and practicals ($p<0.05$). In the academic year 2019/2020, students in Croatian program gained more points of tests and total number of points compared to English program students ($p<0.05$). Regardless academic year and studying program, exam grades did not differ significantly ($p>0.05$). Based on the grades of the exam, we can conclude the theoretical knowledge was approximately at the same level, and since it is a matter of acquiring skills in practical classes, online materials cannot replace work in the practical room.

**Keywords**: Online teaching; off-line teaching; points obtained in seminars and practicals; grade on the exam.

## OP10. HAS COVID19 PANDEMIC AFFECTED THE PERCEPTION OF MASTER´S DEGREE STUDENTS ABOUT ON-SITE TEACHING?

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On-site teaching has been traditionally considered a successful educational method in the University (1,2), but the Covid19 pandemic has caused the reduction or suspension of face-to-face teaching in most universities (2). This study analyzes the perception of Master's degree students about the on-site teaching before and during the Covid19 pandemic.

A total of 20 and 18 students of the subject "Conservation of endangered species" in the Master in Wildlife Management (University of Murcia) were surveyed in 2019/2020 (pre-pandemic) and 2020/2021 (during pandemic) academic courses, respectively. On-site teaching was employed in this subject in both academic courses. The survey consisted of 18 opinion-type questions classified in 3 categories: 1) Study plan structure and teaching organization (questions Q1-Q12); 2) Facilities and infrastructure during training process (Q13-Q15); and 3) General evaluation of the subject (Q16-Q18). Each item was rated from 1 (low satisfaction) to 5 (highest satisfaction) points. Median values were compared by Mann Whitney U test. Statistical significance was considered when p value < 0.05.

Students attending to 2020/2021 academic course had a significantly better perception of several items: practical lessons planning (Q6), the proper development of the practical lessons (Q10), the classroom space and environment (Q13) and the adequacy of other study spaces such as laboratories and computer classroom (Q14). No other significant differences were detected.

In general, the subject got a similar acceptance by students from before and during pandemic courses, and they apparently did not perceive any decline in teaching conditions due to the Covid19 pandemic. However, post-pandemic students gave a higher evaluation to the practical lessons and study spaces, which are basic aspects of on-site teaching. The fact that, at the University of Murcia, most of the university courses had reduced their on-site teaching during that academic year, has possibly influenced the students to value more highly the benefits of on-site teaching.

**Keywords**: On-site teaching; Covid19 pandemic; Students surveys.

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## OP11. Urgent Educative Strategies for the Anatomy Lab During Covid Confinement

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And now what? Probably this was the most common question that arose in many teacher's mind that rely on their expertise and self–in-present action during a regular time of teaching /learning process. But then SARS COV–19 spread around the world and lab classes were allocated to any place but the lab. Educators had to rethink other options that had to exclude the hands-on work but that can somehow keep students understanding as much as possible the important stuff beneath. Acquisition techniques for the Anatomy knowledge can differ. Many anatomy-learning tools pop-up on the Web. Those with accuracy and self-learning evaluation are generally under a fee licence according to the number of users. Anatomy teachers insist in the maintenance of dissection activities in order obtain the anatomical tridimensional reasoning that allow students to design in their minds how the body works, and relation of anatomical structures. Again, labs were closed and we could not be stuck. By that time, we had to deal with splanchnology and myology. Beyond the proper names, we needed to provide clear ideas concerning how muscles modify angles between bones, or geratrice's references. Relations among internal structures in the body must become clear in a student's mind as a propaedeutic issue for surgery, clinics and imaging diagnosis. With all these idiosyncratic needs we decided to perform integrative presentations (3D images, corrosion casts and detailed explanation of muscles actions were introduced). Small videos about the relationship among organs were performed and released in YouTube. After the confinement period, those students had another anatomy unit during this year and experiencing the hands-on anatomy lab. Teachers had also the opportunity of evaluate and validate their efforts during the confinement period, what students had learned and what was missing, which was mainly how to access structures.

**Keywords**: integrative presentations; anatomical videos; YouTube; covid confinement; educative strategies.

## OP12. Learning Histology: Veterinary Medicine Student Preferences In The Digital Era

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The aim of this study was to share experiences and evaluate veterinary student preferences with regards to Histology learning.

Due to the covid-19 pandemics, several teaching strategies were adopted. Alongside to the traditional teaching methods (textbooks, histology websites, slide observation under optical microscope [real slides]) two additional digital resources were created, namely: in-class tutored observation of digitalized histology slides (virtual slides) using NDPview2, and narrated videos explaining virtual slides using NDPview2 and LOOM. Veterinary students of the second semester of Histology were asked to answer surveys about their learning preferences.

Survey-1: When questioned about different teaching methods, 52.8% (n=56/106) preferred exclusively presential classes and 32.7% (n=35/107) preferred a mixed e-learning/presential system. Furthermore, 70.1% (n=75/107) and 16.8% (n=18/107) of students considered that practical classes were “very important” or “important” to the understanding of this subject, respectively. Considering the different parts of practical classes, 67.6% (n=73/108), 88.0% (n=95/108), 41.7% (n=45/108) of students rated the initial lecture, the in-class tutored visualization of virtual slides and the individual visualization of real slides under the MO as “very important”/”important”, respectively. The teacher’s presentation (88,8% n=95/107) and the narrated videos (82,2% n=88/107) were the preferred study materials for most students. Survey-2: Sixty three percent (n=56/89) of students still use printed study materials. Regarding the use of technology and digital resources, 98.9% (n=88/89), 31.4% (28/89) and 32.6% (29/89) of students use a computer, tablet and cell phone, respectively. Interestingly, 56.3% (n=49/87) of students enjoy studying practical histology in groups.

The use electronic learning resources, such as virtual slides and narrated videos, was much appreciated by veterinary students. Therefore, these resources are considered advantageous in teaching Histology. Furthermore, the use of electronic devices, including tablets and cell phones, is frequent among veterinary students and therefore, learning resources should be optimized for these devices.

**Keywords**: Histology; Digital; Veterinary, Survey.

# POSTER PRESENTATIONS

## P1. Implementation of the Flipped Classroom Dynamic and Evaluation Using Kahoot in Seminars on Cardiovascular Physiology for the Degree in Veterinary Medicine

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Recently, there has been considerable progress in educational science to encourage active learning, and an approach that combines online resources and in-person classes. The purpose of this study was to assess the student experience in a *flipped classroom* model (FC) and compare with the master class methodology (MC).

During this academic year, the system of teaching cardiovascular physiology was changed from MC to FC model. Before class, students were asked to watch video tutorials. The class began with a 10-minute session to answer specific questions from the students about the videos. Then, for the next 15 ', the tutor opened the discussion to clarify the matter of issue. The remaining time was then used to test what had been learned using Kahoot.

The performance of the FC model assessed ranged from “very good” to “good” in 63.9% of answers, while only 6.4% considered it to be “very poor”. The quality assessment for the videos provided was from “very good” to “good” in 77.9% of cases. The usefulness of MC was considered by 66.2% of students to be “good” to “very good”. The exam results for this subject in the previous academic year were 43.3% passes, while for this academic year this number increased to 50.3%. Regarding the open-ended questions, we received comments about the system and the development of in-person classes, how to organise prior preparation and how to increase the time available for testing the knowledge acquired. This is in line with the little published literature available to date (1,2,3).

The FC methodology is accepted by the majority of students and results have improved, although there a multiple possible reasons for this. It is now necessary to profile the in-person course classes and how to manage motivation in order to encourage proactive learning.

**Keywords**: google form; video tutorials; independent working; rubric; teaching.

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## P2. Active Learning - Differential Diagnosis of Wasting Diseases/Conditions During Meat Inspection of Small Ruminants

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Veterinary Food Inspectors are important players in Public Health. They provide quality assurance and guarantee the safety of food, by participating in an integrated assurance system throughout the chain from the farm to the table (Garcia, 2006). Besides, inspection of slaughtered animals can provide a valuable contribution to surveillance for zoonotic diseases (Wegener, 2010). Ante-mortem and post-mortem inspection are critical sentinel tools for important animal diseases. The official Veterinary Inspector must be aware of the risks and putative causes for meat or carcass compromise to decide on the carcass approval for human consumption, as well as the final destiny of meat by-products.
Nowadays, faculties defend a student-centered learning approaches to reinforce critical thinking skills and support the students decision-making abilities, in a way to reduce the gap between the academy and the labor needs and facilitating the students entering the workforce (Payan-Carreira et al., 2019).
In Veterinary Medicine, Sanitary Inspection (SI) courses locate in the last year of the Programme, grounded in previous acquired knowledge on animal health and welfare. To meet a sough competency-based learning, it is important to train with students the inspection procedures that support informed sanitary decisions. This may be achieved by short activities were students experience real life situations.
This presentation intends to discuss the construction of a scenario designed to support the development of students´ reasoning skills and the rational decision-making process typical of sanitary inspectors. The scenario is retrieved from real work situations and in a step-wised approach drives the student to reason the best decision regarding the quality and safety of meat (whether the carcass meets the criteria for safe consumption and a quality product) and the destination for the meat by-products, in a way to avoid human, animals and environment contamination meat by-products, as do an Official Veterinary in slaughterhouses.

**Keywords**: Learning activity; Meat Inspection; One Health; Slaughterhouse; Sanitary decision.

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## P3. Engaging Students Through a Trivial Pursuit-Like Activity – a Tool for an Active Learning Environment

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Basic scientific disciplines, such as Cell Biology, are perceived by many Veterinary Medicine students as less interesting and more tedious to study. A further difficulty in engaging students arises from the fact that most students fail to realize the essential role of basic science in their progress toward independence as their responsibilities move from understanding into action. Thus, implementing innovative approaches in the classroom that encourage student involvement and enthusiasm on the subject are definitely necessary. Regarding this, our objective was to apply an active learning activity to engage students and consolidate the syllabus content.

Students were equally divided into groups and were asked to elaborate creative questions and short answers that reflected the Cell Biology syllabus content to create *a trivial pursuit*-like activity, where they would run against each other's in a competition for the best score and consequently the best grade. Students were encouraged to think outside the box, as the objective was also appealing to a creative manner of studying, while consolidating Cell Biology contents.

Given that this active learning activity was implemented in the current semester, it was not yet possible to formally assess the students' perceptions. Nevertheless, several goals were positively acknowledged:

- Visible enthusiasm in the participation of the activity and in the healthy "competition" during the activity;
- Interest and motivation in the study of Cell Biology;
- Students consolidate the contents taught along the semester and conduct self-assessment;
- Stimulation of group spirit and communication, since all the group members had to discuss and reach together the final answer.

**Keywords**: active learning environment; creative thinking; student engagement; Cell Biology; Veterinary Medicine.

## P4. GAMIFICATION TO SUPPORT TEACHING IN THE DEGREE IN VETERINARY MEDICINE

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Technology and digital media have rapidly evolved during the last few years, allowing us to improve teaching at different education levels, including the University. The high interest on the use of Information and Communication Technologies (ICTs) based on gamification for teaching has been evidenced with the development of new digital applications (Apps) that might be useful in an education system of permanent changes. In this context, the aim of the present study was to implement gamification-based ICT tools to enhance the self-learning in different subjects and courses of the Degree in Veterinary Medicine at the University of Cordoba. During the academic course 2019-2020, two Apps (Socrative© and Plickers©) were included in the practical teaching of core and optative subjects of the Degree in Veterinary Medicine, including seminars and resolution of clinical cases sessions. A total of 196 students participated in these activities. The overall assessment carried out by the students was very positive (average: 9.0 and 8.8 out of 10 for Plickers and Socrative, respectively). Undergraduates considered both Apps of great interest to support teaching at the University with a score of 4.8 out of 5. In addition, with a rate of 4.4 and 4.8 out of 5, the students would recommend Plickers and Socrative, respectively, to evaluate the gained knowledge in seminars and training sessions of other subjects in the upcoming years and would repeat this activity (mean score ≥ 4.5 out of 5). The results obtained in the present study evidenced a high level of satisfaction of the undergraduates that used these Apps.

**Keywords**: Gamification; Plickers; Socrative; Veterinary; Teaching.

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## P5. The Use of Anatomy Videos as a Learning Tool in Online Osteology Classes

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The use of dissection videos has become a recurrent resource in anatomy education, although evidence suggests that they can not fully substitute cadaver dissection in achieving learning goals (Mahmud et al., 2011; Greene, 2019).

With COVID-19 pandemic, universities were forced to adapt practical lessons into an online format. For that purpose, video demonstrations of bone anatomy were included as an alternative learning approach for osteology. To the best of our knowledge, the learning impact of using osteology videos was never evaluated in veterinary students. The aim of our study was to understand how osteology videos influence the learning outcome of the student, when compared with traditional lectures.

To evaluate the learning outcome, second year students (n=63) were randomly allocated to three groups during an online lesson on jaw osteology and were exposed to: i) classic lecture using PowerPoint presentation with bone images (n=13); ii) video of the teacher explaining the anatomy using jaw bones (n=18); iii) combined method of PowerPoint lecture and video (n=32). At the end of the lesson, all students were subjected to the same quiz, with a score ranging from 0 to 5.

The video group presented significant lower quiz results when compared with the other two groups (mean score 1.6; p=0.029). No statistical differences (p=0.5) were found between the lecture group (mean score 3.1) and the combined method group (mean score 2.7).

This study evaluates the contribution of osteology videos in online anatomy lessons and shows that it does not improve the scores of students in correctly identifying bone structures. Despite this, the authors considered that videos may be useful as a complementary learning resource to online lectures. Further studies are required to investigate student satisfaction, motivation, and possible advantages in other learning contexts.

**Keywords**: Veterinary anatomy; teaching methods; osteology videos; e-learning.

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## P6. Case-based Teaching Techniques in Equine Internal Medicine

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Equine Internal Medicine is based on diagnoses assessment1. The students' knowledge acquisition is achieved through theoretical subjects but they don't receive tools regarding how to interpret the information from the owner2,3. For these reasons this research has been performed using 3 different models to favour the students' learning in equine internal medicine (ophthalmology):

- **Model 1**: Simulation of clinical cases with the owner. The students had to get a list of differential diagnoses just with the clinical history from the owner and through the clinical examination of the patient.
- **Model 2**: Lectures based on presentations of clinical cases to be solved by the students.
- **Model 3**: Traditional magistral lectures based on books, articles and the own experience of the clinician.

Forty-two students participated in the study and all of them received the 3 model tests. After that, anonymous surveys were sent asking for their personal learning experience. Moreover, the final exam consisted of three questions regarding clinical cases seen during the experiment. The first question was based on the clinical case solved with the owner, a second one was based on the clinical case presentation and the last one concerned the traditional lectures.

The results from the survey were similar to those from the exam. All students considered an overall greater knowledge acquisition from the clinical simulation, followed by the clinical cases, and lastly from the traditional lectures.

Conclusion: the new teaching techniques in Equine Internal Medicine should be included in the University programs. The interaction with the owner not only provides information to solve clinical cases but can also help in to improving the confidence of future veterinarians placed in difficult situations if they have received the training previously described.

**Keywords**: Equine; Medicine; Owner; Learning.

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## P7. Learning from Captive Care

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The aim of this work was to share experiences related to teaching on integrated under-graduate and graduate courses in veterinary medicine, in elective course Physiology of Amphibians and Reptiles. For academic year 2020/2021 we redistributed three hours of lectures to three hours of practical work for the purpose of improving the subject. We introduced new teaching unit regarding captive care and feeding of reptiles that include observation of live animals in their terrariums. Proper captive care can prevent the onset of many diseases and is often used for conservation of endangered species. Reptiles used were: bearded dragon (*Pogona vitticeps*), common musk turtle (*Sternotherus odoratus*), Cuvier's dwarf caiman (*Paleosuchus palpebrosu*), leopard gecko (*Eublepharis macularius*) and veiled chameleon (*Chameleon calyptratus*). We divided students into five groups. Each group had a task to study materials regarding captive care for one of five reptile's species and to make a research regarding feeding of a particular species. Then each group of students observed terrariums and checked the following: terrarium dimensions, humidity (day time, night time), temperature (day time, night time, basking), water, lighting and hydration cycle, UV index, terrarium substrate, percentage of water and dry surface, environment enrichment. Students made a report regarding observed condition and captive care of animals with emphasis to positive and negative keeping conditions plus possible suggestions in condition approvement. Student reports showed that Cuvier's dwarf caiman did not have appropriate terrarium dimension and substrate for bearded dragon had to be replaced with more suitable one. As a result, Cuvier's dwarf caiman was moved to bigger enclosure. Students expressed satisfaction by being able to see and observe live animals as well as by contribution to better captive conditions. In conclusion, having live animals in preclinical courses is obligatory for students to become familiar with animal's physiology and to collect more knowledge that will be of use in clinics.

**Keywords**: Live animals; students; integrated under-graduate and graduate courses; veterinary medicine.

## P8. The Education can Minimize Errors in Preanalitical Phase Of Laboratory Diagnostics

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Preanalytical phase, the most vulnerable part of laboratory diagnostics influences the laboratory results. The main errors in preanalytical phase could be avoided if education process is harmonized with diagnostic facilities. The aim of the study was to assess the level of knowledge on preanalytical phase in two groups of students volunteering in Internal Diseases Clinic (IC) and Surgery, Orthopedics and Ophthalmology Clinic (SC), Faculty of Veterinary Medicine, University of Zagreb. The study was performed using an anonymous questionnaire with 13 statements related to preanalytical phase. The questionnaire was completed by 15 volunteers in IC and 9 volunteers in SC. Although analysis showed that there were no significant differences, volunteers in IC had higher proportion of correct answers (82%) compared to volunteers in SC (66%). If our questionnaire would be treated as a test, 27% of IC students and 33% of SC students have had less than 60% of correct answers, and therefore would have failed the test. Students from IC have better results according to handling blood samples (100%) compare with students from SC (67%) but both groups are unaware of importance of proper sample storage (13% IC; 22% SC). Results showed that students understand relevance of blood and anticoagulant ratio (100% correct answers in both groups) but experience of laboratory staff indicate that clinicians do not apply it. Although volunteers know that hemolysis and lipemia are the most frequently encountered interferences in serum (87% IC; 100% SC), 60% students from IC and 44% students from SC understand that creatine kinase activity is not reliable in hemolytic serum. Urine protein and creatinine ratio is relevant parameter of kidney damage but only 27% volunteers in IC and 11% in SC understand that urine total protein concentration is not reliable in hematuria. In conclusion, although it is expected that level of knowledge in volunteers is higher than in general veterinary medicine student population, more than 25% of student included in survey did not answer correctly. The results showed that preanalytical protocols should be implemented in education programs of veterinary medicine students.

**Keywords**: Preanalytical phase; volunteers; questionnaire.

## P9. First Approach to the Use of the eBook as a Teaching Tool in the Degree in Veterinary Medicine

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The interactive eBook is shown as an emerging technology that can serve as an effective tool for teachers to introduce Information and Communication Technologies (ICT) in the teaching-learning process at the University. Thus, the eBook preserves the main characteristics of traditional books, but also encourage the interest of the "digital native" students by including different ways of presenting and organizing information. The goal of this teaching innovation project was to use the eBook to promote the motivation, in terms of focused attention, deep processing and persistence in the learning process of the students in the Degree in Veterinary Medicine of the University of Cordoba. During the current academic year, an eBook, developed using the software Kotobee author® designer, has been provided to the third-year veterinary students of the Infectious diseases subject. The book summarizes the main equine diseases covered in the theoretical and practical sessions of the course, and includes texts, videos, interactive images, clinical cases and self-assessment test, and was accessible through a mobile app and different eBook formats. Key strengths and weaknesses of the eBook as a teaching tool will be evaluated by the students through a satisfaction survey at the end of the academic year in order to find improvement opportunities.

**Keywords**: New Technologies; eBook; Veterinary Medicine; learning process.

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## P10. Use of Canine Patient Simulators in Cardiopulmonary Resuscitation (CPR) Training for Veterinary Students

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Human patient simulators have been used for decades in medical education for students to practice and improve their technical skills, diagnostic and therapeutic planning and communication skills in a safe environment during the performance of cardiopulmonary resuscitation (CPR). However, their use in veterinary education is scarce, mainly due to the high cost of these canine simulators.

This practical teaching, introduced in our faculty with 3rd year veterinary students, is based on a guided step-by-step cardiopulmonary resuscitation (CPR). The first part is based on students viewing a previously recorded video available online before coming to the practical session (Flipped learning). In this video, basic aspects of CPR (cardiac compressions, orotracheal intubation, breaths per minutes, drugs, and monitoring) are explained. The second part consists of a hands-on session where students acquire different roles (group leader, manual ventilation, cardiac compressions, etc). These skills are practised on a canine dummy, which allows students to practise orotracheal intubation, artificial ventilation, and external cardiac compressions. At the same time, the supervisor (lecturer in Veterinary Anaesthesia) projects a series of videos with frequent patterns of cardiac arrest (asystole, ventricular tachycardia, ventricular fibrillation, etc) to help the students decide the best treatment in different scenarios (adrenaline, defibrillation, etc).

In our experience, the use of these simulators in veterinary teaching is an efficient educational methodology highly valued by the student. It increases their knowledge and skills of CPR manoeuvres and could be superior to traditional learning based on theoretical teaching or viewing videos.

**Keywords**: Canine; Simulator; Veterinary; Training, CPR.

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## P11. Virtual Teaching of Animal Reproduction Diseases in the Time of The COVID-19 in the Veterinary Department, University of Life Sciences, Lublin, Poland

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Covid-19 has had a huge impact on students teaching worldwide. The 100% teaching in class was substituted by 100% virtual teaching. In the same line, academic teachers of Department and Clinic of Animal Reproduction Faculty of Veterinary Medicine University of Life Sciences in Lublin Poland had to bring a range of resources, support and guidance to help student of IVth and Vth courses to deliver effective teaching and learning. Teachers developed creative initiatives that help overcome the limitations of virtual teaching. Moreover, teachers have been forced to work and actively collaborate with each other at the department level to improve online teaching methods. Students were divided into 5 groups and classes have been conducted weekly. For this, the virtual teaching was performer using Microsoft Teams programme. During classes, different videos about daily clinical activities were shown and discussed in details with the students. Furthermore, live videos have been executed that permitted to show students practical points of how to e.g. prepare of fetotomy in mares, solve dystocia, or how to perform and evaluate cytology in the course of oestrus phase in female dogs.

Importantly, although preparation of the new materials and change from face-to-face to virtual classes supposes a huge effort, virtual teaching should provide the opportunity for students to acquire knowledge and especially during pandemics when other teaching models are not possible.

**Keywords**: On-line teaching; New teaching methods; COVID-19; Teacher education; Academics

## P12. Students' Perception on the Use of Animals for Teaching and the Impact of the COVID19 Pandemic

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The use of animals in undergraduate education presents an ethical dilemma that concerns society, teachers/staff, and the students themselves. While the interest and educational value of animal uses is globally recognized, especially for students in biomedical or biological degrees, one must consider if educational goals can be met with non-animal alternatives. Opinions on whether the use of animals in undergraduate teaching is justifiable are widespread, but discussions often don't consider the students' perspective (1). The COVID19 pandemic has created a unique scenario to evaluate this issue, as a significant percentage of teaching has had to be adapted to virtual means, therefore reducing, or suppressing practical teaching with animals during most of 2020. This study explores student perspectives on the use of animals in teaching and learning, reporting on a survey of students carried out at a Spanish university, regarding the use of laboratory animals for teaching purposes. Interviewed students were enrolled in Natural Sciences degrees at Universitat Autònoma de Barcelona. Results show that most students view the use of animals in teaching as necessary, although their perception is influenced by the type of manipulation that these animals have undergone. The survey shows a potential contradiction between learning and ethics, as, although a majority of students think that increasing the use of animals would be beneficial for their education, most of them agree that a reduction in animal procedures would be justified. In this line, they point that the use of virtual material has not been as illustrative as in person sessions with animals, but there are content with a slight decrease in the quality of education in exchange for a reduction in animal use. The students' opinion is divided on whether COVID19 has globally affected their education due to the reduction in practical session with animals.

**Keywords**: Animal welfare; teaching; COVID19.

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