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SEMINÁRIO

ABSTRACT BOOK / LIVRO DE RESUMOS

**EDUCAÇÃO
EM CIÊNCIAS
DA SAÚDE**



SPFis Seminar Learning and Teaching in Physiology

November 14, 2023

Faculty of Medicine of the University of Porto (FMUP)

9:00 – 9:45 Register and Welcome

Director of FMUP and SPFis

9:45 - 11:00 Keynote Lectures

Moderator: Cristina Sena (FMUC)

- Programs and Curricula development - comparing realities - Carmen Brás da Silva, Telmo Pereira, and L M Rodrigues, SPFis
- Teaching and Research in Physiology at HEIs in Portugal - a current vision Joao Gregorio, CBIOS ULL
- Remote / online teaching versus masterful teaching - lessons learned (after the pandemic) Diogo Ferreira (FMUP)

11:30 - 13:00 Discussion Panel – The same *Physiology* for all?

Moderators: Carlos Filipe (NMS) L M Rodrigues (ULL)

P. Castro Chaves (FMUP); Almeida Dias (CESPU); Ricardo Afonso (NMS); Daniel Gonçalves (FCDUP) ; Arménio Cruz (ESEC_IPC); Carmen Brás da Silva (FCNAUP); Paulo Matafome (ESTEC IPC)

14:30 – 15:45 New Perspectives and Resources

Moderators: A Moreira-Leite (FMUP) and J Correia Pinto (UM)

- AI and Machine-learning to teach Physiology Hugo Silva (IT UL)
- New teaching approaches through Metacognition Jorge Ascensão Oliveira (FFUP)
- Digital Table for physiology applications Filippo Rossi, ANATOMAGE Milan, Italy

16:15-17:00 Short Course

- High structure course design to improve student engagement and learning Justin Shaffer PhD, Recombinant Education, USA

Programs and Curricula development - comparing realities

Carmen Brás da Silva¹, Telmo Pereira² &
L M Rodrigues³

SPFis -Sociedade Portuguesa de Fisiologia



¹Cardiovascular R&D Centre-UnIC@RISE, Department of Surgery and Physiology, Faculty of Medicine, University of Porto

²Polytechnic University of Coimbra, Coimbra Health School

³CBIOS Research Center for Biosciences & Health Technologies, Universidade Lusófona (Campus Lisboa)

Abstract

Physiology education has seen significant evolution in recent years, with diverse programs and curricula tailored to meet the demands of modern healthcare. Traditional models primarily focused on rote memorization, while contemporary approaches emphasize a deeper understanding of physiological principles and their clinical applications.

In many established programs, a shift towards problem-based learning and hands-on laboratory experiences has become prevalent. This interactive approach cultivates critical thinking and practical skills crucial for healthcare professionals. Additionally, integrative modules that bridge physiological concepts with other disciplines like pharmacology and pathology enhance holistic comprehension.

However, global variances in curricula are evident. Some institutions prioritize specialized areas such as exercise physiology or neurophysiology, catering to specific career paths. Others adopt a comprehensive curriculum, providing a broad foundation for future healthcare practitioners.

Ultimately, while advances in physiology education are commendable, the varying realities underscore the need for continued collaboration and resource allocation to ensure equitable access and quality instruction worldwide

Speaker Biographies Next Page



Speaker Biographies

Carmen Brás Silva is an Assistant Professor at the Faculty of Medicine, University of Porto (FMUP). She holds a degree in Nutritional Sciences from the Faculty of Nutrition and Food Sciences, University of Porto (FCNAUP, 1998) and a PhD in Human Biology (FMUP, 2007). Her teaching encompasses physiology, nutrition, and cardiopulmonary fields at FMUP and FCNAUP. She is a member of the Associated Laboratory RISE - Health Research Network and the UnIC - Cardiovascular R&D Centre. Her current research centers on integrative cardiovascular physiology, with a focus on the impact of pharmacological and nutritional interventions on cardiopulmonary pathophysiology.



Telmo Pereira is the Vice-President of the Coimbra Health School – Polytechnic University of Coimbra, and Associate Professor and Researcher in Physiology. With a Ph.D. in Neurosciences, granted by the University of Coimbra, has developed research in the areas of Cardiovascular Physiology and Neuroscience, and has collaborated in the development of new non-invasive technology options for the assessment of vascular function. The current research output comprises above 100 scientific articles published in impactful journals, with several research awards. Invited reviewer of prestigious International Journals.



Professor of Physiology and Mechanisms of Disease / Pathophysiology at Universidade Lusófona, Luís Monteiro Rodrigues is the Dean of the School of Health and the executive director of CBIOS, where he also acts as Principal Investigator. Much of his research is centered around skin circulation and cardiovascular adaptive mechanisms, where he has authored / co-authored numerous works, and he has an active interest in Physiology education. As a senior academic, he also acts as consultant for national and European authorities in different settings related to higher education and health professions.



Teaching and research in Physiology In HEIs in Portugal – a current vision

Luis Monteiro Rodrigues, Iris Guerreiro, Vera Isca & João Gregório

CBIOS – Universidade Lusófona's Research Center for Biosciences & Health Technologies, Lisboa, Portugal



Abstract

This study addresses the evolving discourse surrounding the future of Physiology, a subject of increasing concern for global Physiology organizations. Focusing on Portugal, we present a descriptive mixed-methods analysis of Physiology education and research. Data from the government agency DGES (September to November 2022) was analyzed to identify curricula featuring human Physiology-related disciplines. This led to the compilation of a comprehensive database, encompassing 365 courses/degrees and 764 Physiology subjects, alongside an examination of lecturers' scientific output from 2017-2022 via Web of Science and PUBMED.

While Physiology is integral to human health education across all professional curricula, substantial disparities were uncovered in offerings and faculty composition, notably between universities and technical colleges. Traditional medical schools exhibited the most comprehensive curriculum. Bibliometric analysis revealed a predominant focus on two key research realms, termed Medical Physiology and Lifestyle Physiology.

The study underscores the critical role of Physiology in European Higher Education Area (EHEA) health programs. An enhanced understanding of its nuances will undoubtedly facilitate more effective future planning and consolidation efforts.

Speaker Biography

João Gregório has a PhD in International Health by the Institute of Hygiene and Tropical Medicine (IHMT) of NOVA University Lisbon. Currently, he is an Assistant Researcher working at CBIOS - Research Center in Biosciences and Health Technologies of Lusófona University. With a broad perspective of health issues due to his academic path, João's research interests include the potential of data-driven research in understanding the associations between blood flow asymmetries and obesity. His contributions have been published in scientific journals in the field of Physiology, displaying his multidisciplinary skills and the ability to work with data science to advance our understanding of blood flow asymmetries and obesity-related health issues.

Remote / online teaching versus masterful teaching – lessons learned (after the pandemic)

Diogo Santos-Ferreira

Cardiology Department, Centro Hospitalar Vila Nova de Gaia / Espinho, Porto, Portugal

Department of Surgery and Physiology,
Cardiovascular R&D Centre

UnIC@RISE, Faculty of Medicine of the University of Porto,
Porto, Portugal



Abstract

The current higher education pedagogical context is characterized by an increasing number of enrolling students which is not being followed by a proportional rise in university assistants, which further aggravates the pupil-tutor ratios and, consequently, overall students' satisfaction. The use of new digital tools and remote teaching serve as potential solutions to (partially) overcome these challenges, and their incorporation in the educational environment was accelerated during the pandemic lockdown. There is evidence suggesting that remote teaching is associated with higher academic performance, as well as more class attendance, and students are overall satisfied with remote teaching policies.

Several tools are progressively being used in physiology teaching at FMUP, including interactive audience inquiry platforms, introductory (briefing) videos to practical lessons, digital flashcards, collaborative question models and use of simulation models.

Regarding final approval and results, courses including medical physiology (cardiovascular morphophysiology, respiratory and urinary morphophysiology) had a global approval rate and results during the pandemic comparable (or even numerically higher) to pre-pandemic years.

Although physiology teaching cannot go fully remote, it is recognized that distant lecturing overcomes some of the current pedagogical challenges, while allowing a more profound interaction during contact hours.

Speaker Biography

Master's degree in medicine (2011-2017 – FMUP)

Doctoral program student in Cardiovascular Sciences (2019- , FMUP)

Cardiology resident (2019- , CHVNG/E)

Invited assistant of Physiology (2018- , FMUP)

AI and Machine-learning to teach Physiology

Hugo Plácido da Silva

IT – Instituto de Telecomunicações

IST – Instituto Superior Técnico



Abstract

Education has seen significant and fast-paced changes over the past decade. Currently, cloud-based services and mobile devices (such as smartphones and/or tablets) are perfectly widespread within the academic community. Artificial intelligence (AI) has created a turmoil (in particular, with the advent of large language models). In this seminar we will review the origins and current landscape of tools applicable to physiology teaching. We will also explore how to harness their potential for enriching the teaching experience. Special emphasis is given to AI and Machine Learning (ML) systems, although an end-to-end perspective will be provided, encompassing also new approaches to laboratory journaling and distributed collaboration. The content builds upon previous experiences from our team in the field of biomedical engineering education, reason for which multiple practical case studies will also be presented.

Speaker Biography

Hugo Plácido da Silva is a biomedical researcher, inventor, and entrepreneur. Ph.D. in Electrical and Computers Engineering from Instituto Superior Técnico (IST) – University of Lisbon (UL), he is a researcher at Instituto de Telecomunicações (IT) since 2004, and a professor at IST-UL since 2019. His work has been widely recognized internationally, some of which even resulting in multiple technology-based companies in the field of biomedical engineering that Hugo co-founded. His current interests include biosignal acquisition, biomedical instrumentation, signal processing, and artificial intelligence, areas in which he holds seven patents and performed pioneering theoretical, methodological, and technical contributions.

New teaching approaches through metacognition

Jorge Ascensão Oliveira

University of Porto – Faculty of Pharmacy



Abstract

Metacognition, the awareness and understanding of one's thought processes, is essential in education. This cognitive ability empowers individuals to self-assess, monitor their learning, and improve through self-regulation. In this presentation, we'll highlight the significance of metacognition in the teaching and learning of human physiology, advocating for its integration in the pedagogical strategy. We conducted a proof-of-concept study for such integration, which comprised two key phases: A survey on a priori student's study strategies and weekly formative tests, supplemented by counselling on effective study techniques. Students' metacognitive growth was assessed through self-score predictions and adaptive study strategies, while incentives were provided for accurate exam score predictions. Data analysis showed a considerable advancement in students' metacognitive abilities over time. Machine learning with formative tests data predicted student performance with remarkable accuracy, offering the potential for early intervention. To promote physiological skills, however, one must ensure authentic assessment methods. In summary, our proposal emphasizes the value of metacognition in the educational process and provides a structured framework to nurture this cognitive ability in the context of human physiology education. By integrating metacognitive development in the pedagogical strategy, we aim to empower students and improve the overall educational experience.

Speaker Biography

Jorge Ascensão Oliveira (PharmD, PhD) coordinates Human Physiology and Neuroscience units at the Faculty of Pharmacy, University of Porto, where he Presides the Pedagogical Council. He leads the Mitochondria and Neurobiology Lab at UCIBIO - Applied Molecular Biosciences Unit. Jorge is an European Certified Pharmacologist and a trained Data Scientist. He was distinguished with several Pedagogical Awards from the U.Porto (Excellence in e-learning, Pedagogical Excellence, and Pedagogical Innovation).

Digital Table for physiology applications

Filippo Rossi
ANATOMAGE s.r.l
Milan, Italy



Abstract

Digital technologies are becoming more and more relevant in the education field: the segmented anatomy datasets and clinical renderings of the Anatomage Table make it an extremely powerful tool to be used in physiology applications.

Speaker Biography

Filippo obtained a Master degree in Biomedical Engineering at Politecnico of Turin in 2022. He then joined Anatomage as Application specialist of the European Application Team.

High structure course design to improve student engagement and learning

Justin Shaffer

Recombinant Education /

Colorado School of Mines

USA



Abstract

Calls for using evidence-based pedagogies have been expanding so as to improve student learning and outcomes. High structure courses are designed to do just that as they prepare students to be actively engaged in the learning process via pre-class content acquisition and assessment, in-class active learning and problem solving, after-class review and assessment, and frequent summative exams or quizzes. Significant literature has showed high structure courses in a variety of STEM disciplines to be efficacious over traditional didactic courses as students show increased performance, achievement gaps are narrowed or closed, and students feel more belonging. Attendees will leave this workshop with the knowledge, skills, and resources necessary to begin to apply principles of high structure design into their own courses.

Speaker Biography

Dr. Justin Shaffer is a Teaching Professor in the Chemical and Biological Engineering department and in the Quantitative Biosciences and Engineering program at the Colorado School of Mines. He has been a STEM faculty member for 11+ years and teaches introductory biology, anatomy and physiology, introductory thermodynamics, and other chemical engineering courses. Dr. Shaffer studies the impacts of course structure on student performance and attitudes, promotes the spread of evidence-based teaching practices via faculty professional development, and has been on the editorial staff of several DBER journals.

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