L-Università ta' Malta
Faculty of
Medicine & Surgery

Department
of Pharmacy

EAFP
EUROPEAN ASSOCIATION OF
FACULTIES OF PHARMACY

2022 EAFP CONFERENCE

TOWARDS PHARMACY 5.0 EDUCATION

ABSTRACT BOOK

Table of Contents

EAFP EUROPEAN ASSOCIATION OF FACULTIES OF PHARMACY

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Welcome

to the 2022 EAFP ANNUAL CONFERENCE

Meaningful Acceleration of Change in Pharmacy Education

The 2022 Annual Conference for the European Association of Faculties of Pharmacy carries meaningful considerations. It is the return of the face-to-face conference after a hiatus of two years due to the unprecedented COVID-19 pandemic. As we are exploring the new normal with the premise of taking the silver lining from the pandemic, history is converging with the future since this year the Association is celebrating thirty years since its foundation.

With the onset of the pandemic, pharmacy educators handled staggering challenges through leveraging virtual and remote environment for teaching. Notably, there are many examples of advancement of the profession and professional collaborations that were nurtured during this time so as to mitigate the strains of the pandemic on national health systems. The experience demonstrated that innovation and change in pharmacy education can accelerate to support resilience in pharmacy education. Against this background, the relevance of connecting, networking and sharing of experiences, the raison d'etre for the foundation of the Association was exposed. The 2022 Annual Conference is serving as a platform to network, sustain collaborations and spur the momentum that we have witnessed in innovations in pharmacy education.

Against this landscape, the theme of the conference 'Towards Pharmacy 5.0 Education', is very appropriate to reflect the alignment of pharmacy education towards pharmaceutical and healthcare needs and expectations in industry and society 5.0. The pre-conference workshop provides an insight into pharmaceutical industry requirements. Plenary sessions address the digital readiness in education and practice, multidimensional competencies for pharmacy graduates, and teaching methods and innovation in higher education. The scientific submissions provide an overview of good practices and experiences in different pharmaceutical areas covering curriculum development, pedagogy, assessment techniques, quality assessment, digitalisation, and competencies.

This is the second time that the EAFP Annual conference is hosted in collaboration with the Department of Pharmacy of the University of Malta after 17 years. Since that time, the Department of Pharmacy has kept an ongoing re-dimensioning of the pharmacy programme and the five-year pharmacy course is based on a patient-centred education. New programmes have been launched leading to a Bachelor degree in Pharmaceutical Technology, a Master of Science in Pharmaceutical and Regulatory Sciences, and a postgraduate Doctorate in Pharmacy. The Doctorate in Pharmacy programme is offered in collaboration with the College of Pharmacy of the University of Illinois at Chicago, and the course has attracted students from around 20 countries. The Department has various institutional collaborations with Faculties of Pharmacy in different countries and is an active member of EAFP and the Academic Institutional Membership of the International Pharmaceutical Federation.

I augur that you will have a meaningful 2022 EAFP Conference at the professional level, and that you will be able to experience the Maltese history and culture. The conference is being held in the Mediterranean Conference Centre in Valletta. This is a 16th century building built by the Knights of St John and served as a hospital, known as the Sacra Infermeria. The Faculty of Medicine and Surgery, of which the Department of Pharmacy forms part within the University of Malta, was established in the Infermeria in 1676 by Grand Master Nicholas Cotoner. Interestingly for pharmacy, there is documentation that the pharmacist accompanied the physician on ward rounds to discuss patient treatment in the Infermeria, which was considered to be one of the finest hospitals in Europe at the time.

LILIAN M. AZZOPARDI
President, EAFP
Professor and Head, Department of Pharmacy
University of Malta

Mission of EAFP

To lead advancement of pharmacy education and research to reflect developments in pharmacy and the needs of society.

To achieve this, EAFP:

- Facilitates contacts and collaboration between university-level schools of pharmacy
- Supports member faculties in their efforts to develop resources, effective methods of learning and teaching, balanced curricula and quality assurance of education;
- Facilitates exchanges for students and faculty members;
- Collaborates with European authorities and other partners involved in organisation and policy in the fields of pharmacy and health care;
- Promotes collaboration and networking between fields of expertise in teaching and research in pharmacy faculties, schools or institutes throughout Europe;
- Promotes joint research projects between academic institutions and the pharmaceutical industry;
- Keeps members informed of developments in and around the European Union and facilitates the establishment of a common European Area of Higher Pharmacy Education and Research;
- Cooperates with national and international organisations in relevant fields.

Annual Conferences

1992–2022

EAFP Membership

EAFP is very active in driving European-wide reviews to identify practices in pharmacy education and propose models and materials that could be adopted by pharmacy schools to address challenges presented by the developments in pharmacy and in education.

EAFP offers membership in three categories:

INSTITUTIONAL MEMBERSHIP

Open to all institutions of higher education (universities, faculties, schools, departments or institutes) offering courses that confer upon graduates the qualifications required for the recognition as a professional pharmacist as outlined by EC regulations. Each institution is represented by one person with voting rights at the General Assembly.

ASSOCIATE INSTITUTIONAL MEMBERSHIP

Open to all institutions in Europe or elsewhere who do not confer a EU-recognized professional pharmacy degree (i.e. having no access to a regular membership). Non-EU institutions, which confer locally recognized pharmacy degrees, can apply for an associate membership.

INDIVIDUAL MEMBERSHIP

Open to individuals (faculty and other teaching staff), who are or have been employed in Europe or elsewhere by an Institution, which confers a locally recognized professional pharmacy degree.

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WEDNESDAY 11 MAY

09:30 — **Registration**

10:30 – 12:30 — **PRE-CONFERENCE WORKSHOP**

Factories of the Future and the Pharmaceutical Industry

Chairperson: Anthony Serracino-Inglott (Malta)

Industry 4.0 in the Real Life of Pharmaceutical Operations: The Triumphs and Perils of an Adventurous Transition

Spyros Kintzios | Director of Corporate Development, Uni-Pharma Pharmaceutical Laboratories S.A., Greece

Pre-Fabrication for Providing Biocapacity to Support the Facility of the Future for Biologics Manufacturing

Thomas Hauser | Business Development Manager, G-CON Manufacturing

14:00 – 14:45 — **Opening Ceremony**

Welcome on behalf of EAFP

Professor Lilian M. Azzopardi | EAFP President

Welcome on behalf of Faculty of Medicine & Surgery, University of Malta

Professor Godfrey LaFerla | Dean

Welcome on behalf of University of Malta

Professor Simon Fabri | Pro-Rector for Research and Knowledge Transfer

1ST SESSION

14:45 – 15:30 — **PLENARY I: Digital Readiness in Education and Practice**

Chairpersons: Dimitrios Rekkas (Greece), Anthony Serracino-Inglott (Malta)

Digital Health for Digital Education: Aiming at Holistic Patient-Centredness

Janusz Janczukowicz | Medical University of Lodz, Poland

Error 404 – The Gap in Digital Readiness in the Pharmaceutical World, from the Auditorium to the Shopfloor and How to Fix It

Spyros Kintzios | Uni-Pharma Pharmaceutical Laboratories S.A., Greece

15:30 – 16:00 — **EAFP GRANT AWARDS**

Chairperson: Patrizia Santi (Italy)

EAFP Partnership for Education Development Grant Awardee

Providing Cross-Border Healthcare

Martina Šutorová | University of Veterinary Medicine and Pharmacy, Košice, Slovakia

EAFP Partnership for Research Development Grant Awardee

Introduction of Pharmacist-led Medication Reviews in Eastern-Europe: Factor Analysis and First Steps

Anita Tuula | University of Tartu, Estonia

16:00 – 16:45

ORAL COMMUNICATIONS

Chairpersons: Kristien De Paepe (Belgium), Francesca Wirth (Malta)

Connecting Older Adults with Students Through Interprofessional Telecare
Ralph Altiere | University of Colorado Skaggs School of Pharmacy & Pharmaceutical Sciences, USA

Collaborative Online International Learning (COIL) Program: Your Career Opportunities Worldwide: Learning from the Experience and Personal View of Professionals in the Sector
Paola Otero | Universidad San Pablo-CEU, Madrid, Spain

Interprofessional Education and Competencies: Development of an Assessment Tool for Pharmacy Practice
Alessandro Zaccomer | University of Malta

THURSDAY 12 MAY

2ND SESSION

09:00 – 09:45

PLENARY II: Multidimensional competencies for 5.0 Pharmacists

Chairpersons: Lilian M. Azzopardi (Malta), Robert G. Xuereb (Malta)

Leading the Change in Education and Health: Transformational Leadership as the Core Competence of the Contemporary Health Workforce
Janusz Janczukowicz | Medical University of Lodz, Poland

A Focus on Regulatory Sciences in Pharmacy Studies
Robert Nisticò | Tor Vergata University, Rome, Italy

09:45 – 10:30

ORAL COMMUNICATIONS

Chairpersons: Christian Cavé (France), Maresca Attard Pizzuto (Malta)

Student Conferences: Integrating and Contextualizing Learning in Practice
Nicola Ward | De Montfort University, Leicester, UK

Team-Based Learning in Social Pharmacy
Lone Holst | University of Bergen, Norway

Impact of Simulation in Pharmacy Practice on Student's Perception of Learning, Knowledge and Skill Acquisition
María Álvarez de Sotomayor | University of Seville, Spain

10:30 – 11:00

Coffee Break and Poster Presentations

3RD SESSION

11:00 – 12:15

PARALLEL WORKSHOPS

Chairpersons: Dimitrios Rekkas (Greece), Anthony Serracino-Inglott (Malta)

1. Designing Integrated Courses
Andries Koster | University of Utrecht, The Netherlands

2. Integrating Digital Health into Pharmaceutical Education: Knowledge, Skills and Policy Aspects
in collaboration with the International Pharmaceutical Federation (FIP)
Ozge Ozer (The Netherlands), **Ralph J. Altiere** (USA), **Lilian M. Azzopardi** (Malta)

12:15 – 13:15 *Lunch and Poster Presentations*

4TH SESSION

13:15 – 13:45

ORAL PREVIEWS

Chairpersons: Jouni Hirvonen (Finland), Janis Vella Szijj (Malta)

The Development and Validation of a Globally Applicable Pharmaceutical Development Framework
Diala Koudmani | University College London, UK

Supporting Our Teaching Staff: Aligning Educational Scholarship and Teacher Development
Tamara Koehler | Utrecht University, The Netherlands

Incorporating Case-Based Discussions within a Medicines Information Advanced ExperientiaL Placement
Denise Sammut Alessi | University of Malta

Multimedia Resources in Pharmacy Education: A Lab Experience
Rita Oliveira | University Fernando Pessoa, Porto, Portugal

University Garden of Medicinal Plants and Missions of Higher Education Institutions
Zita Faixova | University of Veterinary Medicine and Pharmacy, Košice, Slovakia

13:45 – 14:15 **Breakthrough Session**

EU Curriculum Mapping Exercise: An Update

14:15 – 14:45 **General Assembly**

14:45 – 15:45

DEAN'S FORUM

Chairpersons: Lilian M. Azzopardi (President EAFP), Dimitrios Rekkas (Vice-President EAFP)

Stakeholders Round-Table Discussion
Andras Sulas | EAHP President
Jurate Svarcaite | AESGP Director General
Mary Ann Sant Fournier | PGEU Representative

15:45 – 16:30

ORAL PREVIEWS

Chairpersons: Andries Koster (The Netherlands), Nicolette Sammut Bartolo (Malta)

Views and Perceptions of Pharmacy Students about Online Learning and Teaching in the COVID-19 Era – A Quantitative Study of the University of Nicosia
Aliki Peletidi | University of Nicosia, Cyprus

Pharmacy Students' Perspective on Online Lectures during the COVID-19 Pandemic: Case Study from the University of Belgrade
Anđelija Malenović | University of Belgrade, Serbia

Moving Forward from the COVID-19 Pandemic: Do Students See eLearning as an Integral Part of their Future Learning Environment?
Berglind Eva Benediktsdóttir | University of Iceland, Reykjavik, Iceland

How to Maintain Students' Activity in Gaining Knowledge and Practical Skills during Online Education Era?
Mateusz Kurek | Jagiellonian University Medical College, Kraków, Poland

Simulation-Based Training in Professional Competences and Skills in Pharmacy Education
Bisera Pilicheva | Medical University of Plovdiv, Bulgaria

The Implementation and Development of a New Master Program in a Faculty of Pharmacy from Romania
Cristina Mogosan | Iuliu Haţieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

Developing Interactive Augmented Reality Platform for Learning Laboratory Skills in Pharmacy
Mia Sivén | University of Helsinki, Finland

Pharmaceutical Marketing Education with Online Serious Game for Students Across Europe
Dorine Bonte | University Paris-Saclay, France

FRIDAY 13 MAY

5TH SESSION

09:00 – 09:45

PLENARY III: Teaching Methods and Innovation
Chairpersons: Borut Božič (Slovenia), Ray Galea (Malta)

Teaching Methods and Innovation in Higher Education: The Demand for Fast Changing Skills and Qualifications
Giuseppe Ronsisvalle | University of Catania, Italy

Innovation in Teaching from Pharmaceutical Students' Perspective
Max Willie Georgi | Training Coordinator, EPSA

09:45 – 10:45

ORAL COMMUNICATIONS
Chairpersons: Daisy Volmer (Estonia), Louise Grech (Malta)

Factors Influencing Pharmacy Technician Students' Motivation to Learn from Students' Perspective
Aurimas Galkontas | Kaunas University of Applied Sciences, Lithuania

Innovative Use of a Mock-Trial as a Teaching/Learning/Assessment Strategy in Pharmacy Education over Four Years
Hoai-An Truong | University of Maryland Eastern Shore, USA

Chemotheca-Based Innovative Didactic Tool for Medicinal Chemistry Courses
Stefano Alcaro | Università "Magna Græcia" di Catanzaro, Italy

MOOC About Medicines – A Perspective Tool for Lifelong Learning
Urve Paaver | University of Tartu, Estonia

10:45 – 11:15

Coffee Break and Poster Presentations

11:15 – 13:00

Closing and Future Perspectives
Chairperson: Patrizia Santi (Italy)

Workshops Roundup
Andries Koster | The Netherlands
Ralph J. Altiere | USA

Social Programme

Welcome Reception

Wednesday 11 May 18:30

MUŻA, Auberge D'Italie, Merchants Street, Valletta

The Welcome Reception will be held within the historic Auberge D'Italie in Valletta. The building hosts the MUŻA Museum, a National Community Art Museum. Participants will enjoy the Mediterranean Courtyard which is the MUŻA agora or public space with a prominent arch crowning a well at the centre of the courtyard.

Conference Dinner

Thursday 12 May 18:30

Bacchus, Triq Inguanez, Mdina

Situated in the heart of Mdina, one's first encounter into Bacchus restaurant is a delightful dining area behind an iron 'Portcullis'. Bacchus is housed in two separate chambers built by Grand Master Fra Martino De Redin in between 1657 and 1660, initially serving as gunpowder magazines for the main fortified bastion built by him to fortify the Old City of Mdina. These aristocratic chambers have been transformed into the perfect environment for enjoying a first-class meal and reception with a warm service.

PRE-CONFERENCE WORKSHOP

Factories of the Future and the Pharmaceutical Industry

Industry 4.0 in the Real Life of Pharmaceutical Operations: The Triumphs and Perils of an Adventurous Transition

Spyros Kintzios | Director of Corporate Development, Uni-Pharma Pharmaceutical Laboratories S.A., Greece

The concept of Industry 4.0 finds a wide range of applications in the realm of Pharmaceutical Industry Operations and all value chain stakeholders (shareholders, top and senior management, engineers, operators, R&D scientists, regulatory affairs executives, supply chain executives, marketers) display a highly asymmetrical level of awareness and drive for engagement in either the technological context or the systemic organizational transformation required in order to harness the promised benefits of digital connectivity within the context of the physical world.

This presentation discusses the key organisational aspects that must be taken into consideration for designing and implementing a successful transition from the current modus operandi to a paradigm of high digital maturity, fully integrated value chains and innovative business models of smart products and services, while navigating challenges and mitigating risks.

Biography

Spyros Kintzios has received a Diploma from the School of Pharmacy of the National & Kapodistrian University of Athens and a Master's degree in Business Administration from the Athens University of Economics & Business, majoring in Marketing & Finance and currently holds the role of the Corporate Development Director of Uni Pharma S.A. while he also serves in the Board of Directors of INTERMED S.A. His responsibilities include engaging key business partners in strategic alliances, coordinating the strategic planning of the OFET Group of Companies, while also managing Corporate Affairs with Regulatory Authorities & other Institutional Stakeholders, worldwide. In this capacity, Spyros Kintzios is leading numerous projects pertaining to the digital transformation of OFET both on an operational as well as market level. Prior to this role, Spyros Kintzios has pivoted through multiple roles in the pharmaceutical industry in his 15 years of experience in the sector, including R&D, Process Engineering, Production Management, Regulatory Affairs and Business Development.

Pre-Fabrication for Providing Biocapacity to Support the Facility of the Future for Biologics Manufacturing

Thomas Hauser | Business Development Manager, G-CON Manufacturing

The industry landscape is evolving rapidly and requires new and innovative approaches to address more rapidly the growing global demand for drug products as well as the challenges of unpredictability and inflexibility that have historically burdened the industry. Over the past two years, the industry's herculean response to the COVID-19 pandemic has proven that with the proper focus, investment, science, and manufacturing technologies, these historic challenges can be overcome as well as establishing new benchmarks for how the industry can perform in the future to ensure availability of drug products and therapies to the global patient base.

Prefabricated modular construction of cleanrooms, utilities, and facility structures is an innovative approach to building new manufacturing facilities that the industry has benefited from and is currently being utilised in many time and quality critical projects. Prefabricated and modular facilities have been utilsed in many industries such as food, chemical, and consumer products in the past, and have started to see significant adoption within the pharma and biopharma industries over the past ten years. This has largely been driven by the need to reduce project timelines, improve capability and flexibility, and minimize the risks associated with traditional construction for manufacturing facilities. It has helped as well to make Biopharma manufacturing more accessible to emerging regions, where in the past biomanufacturing was too complex to establish.

For a drug manufacturer to shift its strategy for designing and building its new manufacturing facilities using a prefabricated approach, it typically must perform its own comparative assessment of prefabricated modular construction to traditional construction which will include critical factors such as capital investment, speed to market, schedule, return on investment, flexibility for new products and network capacity, cost of ownership through facility lifecycle, etc. Multiple stakeholders including but not limited to the C-Suite executives, engineering, operations, quality, regulatory, and EHS should all have their input considered as part of the evaluation.

The presentation will include a summary of the current requirements of the pharmaceutical industry in the context of Pharma 4.0, typical performance requirements for cleanrooms and an overview of the different types for cleanroom construction. We will then evaluate the impact of using prefabricated cleanroom construction. The project drivers and influences which will help determine the best construction approach to meet the overall project goals and achieve the manufacturing objectives will be discussed. A short introduction to G-CON and its modular POD cleanroom technology will also be provided as well as the benefits of implementing the prefabricated approach for cleanroom construction.

Biography

Thomas Hauser (*1967) is working for G-CON Manufacturing in a Business Development assignment in the EMEA region to educate the market for offsite prefabricated and prequalified factory and clean-room solutions in a drive to bring forward the pharmaceutical facility of the future concept. On the other hand, he is supporting companies in the life science segment mainly for expansion strategies, strategical facility implementation, start-up support and pharmaceutical packaging supply and technologies. Before 2020, Thomas worked in various leading global positions in Business Development, Strategic Implementation and Sales in the Pharmaceutical Packaging field, namely in injectables, semi solid and oral solid packaging. He has more than 25 years of experience dealing with the global Lifescience Industry and their market and manufacturing requirements. Thomas holds an International MBA from the University of Ottawa / Canada, and a BA for European Business from the ESB Reutlingen and the ESC Reims.

PLENARY SESSION I

Digital Readiness in Education and Practice

Digital Health for Digital Education: Aiming at Holistic Patient-Centredness

Janusz Janczukowicz | Medical University of Lodz, Poland

Empowerment through Digital Health is a WHO's strategic initiative supporting Member States in the European Region. Additionally, the recent pandemic has highlighted a vital need for effective digital tools, caused by an unprecedented acceleration in the implementation of eHealth services, including telemedicine consultations. At the same time, the rapid transformation towards digital education added new complexity to the health workforce under- and postgraduate education, and CPD. During this paradigmatic, shift special attention should be focused on training the health professionals to work in a digital environment while remaining empathetic, sensitive and responsive to complex, individual needs of patients, often hidden behind the big data.

This presentation aims at raising the discussion how new curricula should respond to the above complexities, to assure that equity, inclusiveness and human rights remain the core professional values of the new, digital health care systems.

Biography

For his Alma Mater- Medical University of Lodz, Janusz Janczukowicz is the Head of Centre for Medical Education and the Vice-Dean for Development of Education. Internationally, he is the Chair of the WHO Academy Quality Committee and the consultant for the WHO Europe Pan-European Leadership Academy (ELA). He is also the International Association for Medical Education- AMEE Executive Committee member, with special responsibility for developing cooperation with all health professions and international organisations. He is a European Institute of Women's Health Board of Directors member, also working with the Association for Medical Schools in Europe. Janusz Janczukowicz is the ASPIRE to Excellence panel member, the expert for Diku - Norwegian Agency for International Cooperation and Quality Enhancement in Higher Education, and for EKKA- Estonian Quality Agency for Higher and Vocational Education. He is the Editorial Board member of Medical Teacher Journal. His special areas of expertise include interprofessional education, intercultural competence, diversity, inclusiveness, leadership in education, and medical professionalism.

Error 404 – The Gap in Digital Readiness in the Pharmaceutical World, from the Auditorium to the Shopfloor and How to Fix It

Spyros Kintzios | Uni-Pharma Pharmaceutical Laboratories S.A., Greece

A digital skillset and deployment of digital assets are basic drivers for an effective transformation of organisations, be it academic institutions or commercial industries in the industry 4.0 framework. This is of course also true in the pharmaceutical world and the digital readiness gaps identified in professionals are undoubtedly rooted in a not so "enabled" academic background.

Digital transformation, however, requires not only technological assets (hardware and software applications) and advanced computing or modelling skills, but also and perhaps most importantly, achievement of digital maturity in the data transformation journey by first establishing the right strategic mindset concerning real-time access to data and intelligence, being driven by the continuous and cyclical flow of information and actions between the physical and digital worlds and the value created from this digital integration.

The presentation discusses the thread connecting Education and Practice with regards to digital readiness, in parallel with the prevailing status quo in each field and highlights the key success factors for accelerating not only digital competencies across this thread, but also the cultivation of a holistic, systemic view of digitally integrated ecosystems.

Biography

Spyros Kintzios has received a Diploma from the School of Pharmacy of the National & Kapodistrian University of Athens and a Master's degree in Business Administration from the Athens University of Economics & Business, majoring in Marketing & Finance and currently holds the role of the Corporate Development Director of Uni Pharma S.A. while he also serves in the Board of Directors of INTERMED S.A. His responsibilities include engaging key business partners in strategic alliances, coordinating the strategic planning of the OFET Group of Companies, while also managing Corporate Affairs with Regulatory Authorities & other Institutional Stakeholders, worldwide. In this capacity, Spyros Kintzios is leading numerous projects pertaining to the digital transformation of OFET both on an operational as well as market level. Prior to this role, Spyros Kintzios has pivoted through multiple roles in the pharmaceutical industry in his 15 years of experience in the sector, including R&D, Process Engineering, Production Management, Regulatory Affairs and Business Development.

PLENARY SESSION II

Multidimensional Competencies for 5.0 Pharmacists

Leading the Change in Education and Health: Transformational Leadership as the Core Competence of the Contemporary Health Workforce

Janusz Janczukowicz | Medical University of Lodz, Poland

To respond effectively to local and global social processes, and to provide patients with the high quality and safe care, both the contemporary education and the contemporary health care require implementing and sustaining continuous processes of transformation. This continuous change should be embedded in institutional cultures, and to achieve this goal all health professionals should be equipped with transformational leadership competence. Moreover, this is important to see such competence as necessary not only for institutional, national or international champions but for all frontline health workforce at all levels of their professional development.

In this presentation, the WHO Europe Pan-European Leadership Academy (ELA) will be presented as the good practice case study to promote the discussion on bringing the leadership competence to modern curricula.

Biography

For his Alma Mater- Medical University of Lodz, Janusz Janczukowicz is the Head of Centre for Medical Education and the Vice-Dean for Development of Education. Internationally, he is the Chair of the WHO Academy Quality Committee and the consultant for the WHO Europe Pan-European Leadership Academy (ELA). He is also the International Association for Medical Education- AMEE Executive Committee member, with special responsibility for developing cooperation with all health professions and international organisations. He is a European Institute of Women's Health Board of Directors member, also working with the Association for Medical Schools in Europe. Janusz Janczukowicz is the ASPIRE to Excellence panel member, the expert for Diku - Norwegian Agency for International Cooperation and Quality Enhancement in Higher Education, and for EKKA- Estonian Quality Agency for Higher and Vocational Education. He is the Editorial Board member of Medical Teacher Journal. His special areas of expertise include interprofessional education, intercultural competence, diversity, inclusiveness, leadership in education, and medical professionalism.

A Focus on Regulatory Sciences in Pharmacy Studies

Robert Nisticò | Tor Vergata University, Rome, Italy

Regulatory science is a modern scientific discipline which can be defined as the application of the scientific method to improve the development, review, and oversight of new drugs, biologics, and devices that require regulatory approval prior to dissemination (Coller, 2012). Considering the broad and increasingly career opportunities in this evolving field, current didactic tables in Pharmacy studies should be modernized by integrating classical core competencies with innovative regulatory sciences disciplines. From its birth in 2008, the Degree Course in Pharmacy at the University of Rome Tor Vergata, which I presently coordinate, has followed this approach. In this talk, I will present our revised didactic table and the network of professionals with diverse backgrounds (from the academia, the different pharmaceutical sectors, and national and international regulatory agencies) affiliated to our Pharmacy program. Building on the experience gained over the past 15 years, we strongly believe that implementing new didactic tables focusing on regulatory sciences in the Pharmacy courses within the EU is of utmost importance so as to offer our students further professional development and career prospects.

Biography

Robert Nisticò was born in London and grew up in Italy. He obtained his degree in Medicine and Surgery and Specialization in Psychiatry from the Università Cattolica del Sacro Cuore. He then moved as a post-doctoral fellow to the University of Bristol (UK) where he investigated the mechanisms underlying synaptic plasticity, learning and memory in healthy and pathological conditions. He is full Professor of Pharmacology and Coordinator of the degree course in Pharmacy at the University of Rome "Tor Vergata". He also served as Honorary Lecturer at the School of Pharmacy at the University of Nottingham (UK). He is currently a Group Leader at the Laboratory of Synaptic Plasticity at the EBRI Rita Levi Montalcini Foundation. More recently, he joined the regulatory network and is currently a Member of the Committee for Orphan Medicinal Products (COMP) at the European Medicines Agency. Robert is author or co-author of approximately 170 papers in international scientific journals.

PARALLEL WORKSHOPS

WORKSHOP 1

How to Design Integrated Courses

Andries Koster | University of Utrecht, The Netherlands

Educational integration of content from different disciplines (e.g., medicinal chemistry, analytical chemistry, biopharmacy, pharmacology, therapeutics) and inclusion of practical skills training in one-and-the-same course is considered to be important for preparing students for their professional life. Designing an integrated course, however, is considered a challenging task by most teachers and curriculum developers. In this workshop, Andries Koster will illustrate the process of designing an integrated course, based on education theory (constructivism) and illustrated by an example from the master curriculum of Utrecht University.

During the workshop the participants will be asked to make a first design for a 5-week full-time course around the theme 'diabetes type-2 care', which integrates biopharmaceutical, pharmacological and therapeutic knowledge with individual patient care skills. At the end of the workshop participants will be acquainted with the design process and have some experience with the use of different educational and training formats in an integrated course.

Biography

Andries Koster obtained a Ph.D. in Pharmacology in 1985, supervised PhD projects in the area of drug biotransformation, molecular toxicology and intestinal inflammation and taught statistics, physiology, pharmacology and pharmacokinetics during more than 35 years. After 1998 he became involved in developing new curricula for the biomedical and pharmaceutical sciences. At the moment he is involved in supervising several PhD students in the field of medical and pharmaceutical education, in collaboration with the Amsterdam University Medical Centre. He was vice-dean for Education (2004-2018) and is director of Educational Research (since 2014) of the department of Pharmaceutical Sciences, Utrecht University. Andries Koster is an alumnus of the Centre of Excellence in University Teaching (CEUT) and co-authored approximately 110 scientific publications.

WORKSHOP 2

Integrating Digital Health into Pharmaceutical education: Knowledge, Skills and Policy Aspects

in collaboration with the International Pharmaceutical Federation (FIP)

Ozge Ozer | FIP Educational Partnership Manager, The Netherlands

Ralph J. Altiere | FIPEd Chair, University of Colorado, USA

Lilian M. Azzopardi | FIP AIM Advisory Committee member, University of Malta, Malta

In October 2021, FIP organised the FIP-UNITWIN Regional Workshop for the European Region, with the support of EAFP, to identify needs and priorities in pharmaceutical education across Europe aligned with the FIP Development Goals (FIP DGs). The workshop resulted in a regional roadmap specific for the European Region, and FIP Development Goal 5 – Competency Development, FIP Development Goal-13 Policy Development and FIP Development Goal-20 Digital Health were identified as priority FIP DGs.

This workshop will aim to deliver the roadmap, covering priority FIP DGs and will support academic institutions, professional organisations, policymakers and key pharmaceutical stakeholders across the region to identify essential knowledge and skills that pharmacists should gain to be digitally-enabled. Particularly, the workshop will include a focused discussion on policy aspects required to integrate digital health into pharmaceutical education. The outcomes of the workshop will be published by FIP, through the FIP-UNESCO UNITWIN programme, in collaboration with EAFP, as a follow-up to the FIP-UNITWIN Regional roadmap for the European Region.

At the end of this workshop, participants will be able to:

1. Describe basic digital health knowledge and skills required for a pharmacy graduate to become digitally enabled.
2. Explore case studies on digital health in pharmacy education from academic institutions across the region.
3. Identify supporting policy approaches in integrating digital health into pharmacy curricula within their institution and country.

Biographies

Ozge Ozer

Ozge Ozer is a pharmacist who holds a PhD degree on Social and Administrative Pharmacy. She is the Educational Partnership Manager at the International Pharmaceutical Federation (FIP). Dr Ozge is leading academic projects on pharmacy and pharmaceutical sciences for education advancement and leadership development. She has extensive experience and knowledge on pharmaceutical policies, communications and media relations, professional pharmacy associations.

Ralph J. Altiere

Professor Ralph J. Altiere is Dean of the University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences in the USA. His academic career began as a scientist/researcher and educator and served as Associate Dean for Academic Affairs prior to his appointment as CEO Dean. Within FIP, he is the Chair of FIP Education (FIPEd) and he has served in leadership roles as President of the Academic Pharmacy Section, member of the FIP Congress Program Committee, AIM Advisory Committee and Global Academic Leaders Fellows Program task force. He currently serves as Director of the FIP UNESCO UNITWIN program and its centre for excellence in Africa. He has delivered invited presentations on pharmacy education to academic pharmacy organizations including IPSF in every WHO region of the world.

Lilian M. Azzopardi

Lilian M. Azzopardi is a Professor of Pharmacy, Head of Department of Pharmacy, and Chairperson of the Doctoral Committee of the Faculty of Medicine and Surgery at the University of Malta. Professor Azzopardi is acknowledged for leading innovations in pharmacy education. She has authored publications related to quality systems, pharmacist interventions, and pharmacy education and has received research awards by the International Pharmaceutical Federation (FIP) and the European Society of Clinical Pharmacy. Professor Azzopardi was co-chair of the working group of the FIP Nanjing Statements on Pharmacy and Pharmaceutical Sciences Education, and a member of the core team for the FIP Digital Health in Pharmacy Education. Professor Azzopardi is a member of the advisory group of the Academic Institutional Membership within FIP and serves as President of the European Association of Faculties of Pharmacy.

PLENARY SESSION III

Teaching Methods and Innovation

Teaching Methods and Innovation in Higher Education: The Demand for Fast Changing Skills and Qualifications

Giuseppe Ronsisvalle, Simone Ronsisvalle

Department of Pharmaceutical and Health Sciences, University of Catania, Italy

The innovative teaching methods in general increase the performance of university students and make the learning process more flexible and supportive, while stimulating students' creativity and continuous updating of teaching. The dissemination of curricula based also on the microcredential system (MCs) allows the development of professional degrees by facilitating access to the most diverse and innovative career opportunities, including those of advanced research, access to an academic career and the training of specialised trainers to operate in lifelong learning and CPD, up-grading and up-skilling paths of professional figures, including intermediate ones (ISCED 5 and 6), operating in the territory (university local responsibility). Both the European Commission and the main university associations (EUA) see MCs as a necessary innovative complement to the traditional offer, especially in the health professions sector. The development of MCs in the university context is however linked to the development of appropriate learning environments, of professional structures of the university centralised for the use of information and communications technology and strategically to the identification of the right and effective method of administration for the specific discipline and for transversal skills that you want to convey. In this regard, the European Commission intends to carry out in 2023, together with International Intergovernmental Organizations, studies aimed at encouraging, giving value for academic careers, the involvement of university teachers in innovative Teaching and Learning processes.

Biography

Giuseppe Ronsisvalle was professor and Dean of the University's Faculty of Pharmacy of the University of Catania. Today he teaches Environmental Toxicological Chemistry under contract. Giuseppe Ronsisvalle is currently vice chair of the OECD committee of national university experts (GNE HE) and academic member of the CD-EDU Bureau of the Council of Europe and of its sub-group for Higher Education. Giuseppe Ronsisvalle is a system expert of the ANVUR Italian national agency for the evaluation of the university system.

Innovation in Teaching from Pharmaceutical Students' Perspective

Max Willie Georgi | EPSA Training Coordinator

Education plays an important role in the modern world, being considered as the basis for the prolongation of culture, instruction of individuals and evolution of society. The digital transformation and the pandemic lead to significant changes in education, raising the question on what the future of education looks like. Policymakers acknowledged the importance of taking a closer look at improvements that can be made in the education area. The Portuguese and Slovenian Presidencies of the European Council (2021) put a special emphasis in their programme on lifelong learning, innovative teaching methods and digital education. Education, training and transversal skills will play a key role in helping the EU recover from the COVID-19 crisis and creating a greener, digital and more resilient Europe.

During a survey conducted by EPSA between the 4th of October 2020 until the 28th of February 2021 amongst the pharmaceutical students across Europe, the respondents showcased their preference for student-centred education that include active listening and problem-based concepts. Those approaches are said to improve student learning, critical thinking and active citizenship, preparing the students better for their future professional lives. During this presentation, the key outcomes of the survey report will be presented.

Biography

Max Willie Georgi is a pharmacist from Berlin. He studied from 2014 to 2019 in Jena in Germany. Since 2016 he has been active in student organisations on a local and national level advocating for a change and modernisation in the German pharmacy curriculum. In 2018 he became a Trainer for the German Medical Students Association. Since then he has given over 200 hours of Training on Soft Skills to pharmacy and medicine students in Germany and Europe. He currently holds the position of Training Coordinator in the EPSA Team.

EAFP Grant Awards

EAFP PARTNERSHIP FOR EDUCATION DEVELOPMENT GRANT AWARDEE

Providing Cross-Border Healthcare

M. Šutorová | University of Veterinary Medicine and Pharmacy, Košice, Slovakia

EAFP PARTNERSHIP FOR RESEARCH DEVELOPMENT GRANT AWARDEE

Introduction of Pharmacist-Led Medication Reviews in Eastern-Europe: Factor Analysis and First Steps

A. Tuula | University of Tartu, Estonia

EAFP PARTNERSHIP FOR EDUCATION DEVELOPMENT GRANT AWARDEE

Providing Cross-Border Healthcare

M. Šutorová[1,3], S. Kurhajec[2], J. Kolář[3]

[1] University of Veterinary Medicine and Pharmacy in Košice, Department of Pharmacy and Social Pharmacy, Košice, Slovak Republic
[2] University of Veterinary Medicine and Pharmacy in Košice, Department of Pharmaceutical Technology, Pharmacognosy and Botany, Košice, Slovak Republic
[3] Masaryk University, Faculty of Pharmacy, Department of Applied Pharmacy, Czech Republic

Introduction: The Cross-Border Healthcare Directive is applicable in all European Union (EU) Member States. Medical prescription is an important resource for the provision of health care and efficient pharmaceutical care for the patient. The EU countries gradually replace existing paper medical prescriptions with electronic prescriptions. The EU aims to have a cross-border electronic healthcare system that will enable EU citizens to obtain e-Prescriptions anywhere in Europe.

Method: Medical prescription templates and national rules for prescription medication were collected from selected EU countries between June and December 2020. The most common prescription forms were obtained mainly by contacting National Contact Points for cross-border healthcare and members of the Pharmaceutical Group of EU. It was not possible to identify patients, prescribers, or places of issue.

Results: Every country has its own rules for prescription medication and at least two types of prescriptions - paper prescription and e-Prescription. National prescription forms in EU countries differ formally and visually. The common differences are the various content of the form, the validity of the prescription and the number of available forms.

Conclusions: Even though the ongoing COVID-19 pandemic speeded up the process of introducing electronic prescriptions significantly, it is still required to either have a paper medical prescription or a paper copy of the electronic prescription to collect the medicine from the pharmacy in the majority of the EU countries.

EAFP PARTNERSHIP FOR RESEARCH DEVELOPMENT GRANT AWARDEE

Introduction of Pharmacist-Led Medication Reviews in Eastern-Europe: Factor Analysis and First Steps

A. Tuula, D. Volmer, International MR network

Institute of Pharmacy, University of Tartu, Tartu, Estonia

Introduction: Inappropriate polypharmacy, medication non-adherence and other drug-related problems are common concerns in elderly multimorbid patients. Medication review (MR) is a structured evaluation of a patient's medicines and a globally accepted method for ensuring medication safety in polypharmacy. The aim of this project was to map factors facilitating and hindering the implementation of the community pharmacist-led MR and introduce the service in Eastern-Europe.

Method: In September 2019, 11 MR network countries performed document analysis and qualitative interviews with key stakeholders to identify factors encouraging and hindering an MR service in their country. From January 2019 until March 2021, the MR standard adapted from Pharmaceutical Care Network Europe 2013 statement[1] and amended in Estonia was piloted in MR network countries.

Results: Main facilitators for the implementation of MRs were increase in polypharmacotherapy and access to patients' health data by pharmacists. Most often identified barriers were MRs being unfamiliar among physicians, pharmacists and patients, financing of MRs and lack of private consultation rooms at some community pharmacies.[2] By 2021, the pharmacist-led MR had been introduced in 8 out of 11 MR countries (Estonia, Latvia, Poland, Croatia, Bosnia and Herzegovina, Hungary, Romania and Bulgaria). Altogether, 383 mainly elderly multimorbid polypharmacy patients participated in the study.

Conclusions: As polypharmacy is an increasing concern in Eastern-Europe, routine MRs are needed to ensure safe and effective use of medicines. Barriers on organizational and healthcare policy level must be overcome for successful implementation of MRs. First steps in the introduction of MRs in Eastern Europe have been made.

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1. PCNE statement on medication review. 2013. Available from: https://www.pcne.org/upload/files/150_20160504_PCNE_MedRevtypes.pdf

2. Tuula A, Volmer D, Jõhvik L, Rutkovska I, Trečiokienė I, Merks P, et al. Factors Facilitating and Hindering Development of a Medication Use Review Service in Eastern Europe and Iran-Cross-Sectional Exploratory Study. Healthcare (Basel). 2021;9 (9): 1207. doi: 10.3390/healthcare9091207.

Oral Communications

Connecting Older Adults with Students through Interprofessional Telecare
R. Altiere | University of Colorado Skaggs School of Pharmacy & Pharmaceutical Sciences, USA

Collaborative Online International Learning (COIL) Program: Your CAREER Opportunities Worldwide – Learning from the Experience and Personal View of Professionals in the Sector
P. Otero | Universidad San Pablo-CEU, Madrid, Spain

Interprofessional Education and Competencies: Development of an Assessment Tool for Pharmacy Practice
A. Zaccomer | University of Malta

Student Conferences: Integrating and Contextualising Learning in Practice
N. Ward | De Montfort University, Leicester, UK

Team-based Learning in Social Pharmacy
L. Holst | University of Bergen, Norway

Impact of Simulation in Pharmacy Practice on Student's Perception of Learning, Knowledge and Skill Acquisition
M. Álvarez de Sotomayor | University of Seville, Spain

Factors Influencing Pharmacy Technician Students' Motivation to Learn from Students' Perspective
A. Galkontas | Kaunas University of Applied Sciences, Lithuania

Innovative Use of a Mock-Trial as a Teaching/Learning/Assessment Strategy in Pharmacy Education over Four Years
H. A. Truong | University of Maryland Eastern Shore, USA

Chemotheca-based Innovative Didactic Tool for Medicinal Chemistry Courses
S. Alcaro | Università "Magna Græcia" di Catanzaro, Italy

MOOC about Medicines – A Perspective Tool for Lifelong Learning
U. Paaver | University of Tartu, Estonia

OC1: Connecting Older Adults with Students through Interprofessional Telecare

D. Hammer, M. Thompson, T. Brock, R. Altiere

University of Colorado Skaggs School of Pharmacy & Pharmaceutical Sciences, Aurora, Colorado, USA

Introduction: US academic pharmacy accreditation standards require experiential learning that enhances the formal curriculum through activities termed co-curriculum, which can be developed by the school, student organisations, community partners, or local or state pharmacy associations. Co-curriculum activities are meant to promote student achievement of problem-solving, patient advocacy, interprofessional collaboration, cultural sensitivity, communication, self-awareness, leadership, innovation/entrepreneurship and professionalism. Of the many activities in our program, we chose to exemplify one that meets many of these intended outcomes using a telehealth approach. When pandemic-related restrictions limited our usual in person community-based education activities, we created a community support program called Connecting Older Adults with Students Through Interprofessional Telecare (COAST-IT). The goals of the program are to: (1) reduce social isolation and loneliness of older adults, (2) improve student conversation skills with older adults, and (3) increase student awareness of geriatric challenges.

Method: Pharmacy, dental, advanced nursing and medical students are paired with older adults in 10 different US states, all of whom have experienced social isolation. Students contact their partners via phone twice monthly and participate in monthly educational geriatric expert sessions via Zoom. Outcomes were measured via call tracking and pre-/post-program surveys.

Results: To date, COAST-IT has resulted in >350 student/partner pairs and >5000 calls over 16 months. Over ¾ students (77.75%) reported being fairly/very confident in their ability to talk with older adults after the program, up from 52.15% at the start. Some older adults and students reported reduced feelings of loneliness and isolation. Students became more comfortable using telehealth to provide care to older adults.

Conclusions: Pharmacy students can contribute to community health outcomes by reducing social isolation and loneliness while practicing communication and empathy. The COAST-IT program has been a beneficial and safe telecare replacement for in-person community activities.

OC2: Collaborative Online International Learning (COIL) Program: Your CAREER Opportunities Worldwide – Learning from the Experience and Personal View of Professionals in the Sector

P. Otero[1], C. Pérez-García[1], C. Hurtado[1], F. Spyrakis[2], G. Caron[2], S. Visentin[2], C. Bertea[2], R. Davies[3], P. Gharanei[3], M. Babba[3], E. Alonso[1], M. Achón[1], M.P. Ramos-Álvarez[1]

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[2] Università Degli Studi di Torino, Torino, Italy

[3] Coventry University, Coventry, United Kingdom

Introduction: The degrees in Pharmacy, Biotechnology and Nutrition & Dietetics offer a wide range of career opportunities but many students are unaware of these and feel disorientated when deciding their professional future. In a global context, employers demand qualities such as intercultural communication skills, team-working, networking abilities and international collaborative experience. The COVID-19 pandemic has limited access to global mobility. Collaborative Online International Learning (COIL) programs enable students to gain an international experience without travelling abroad. In this COIL project, students from Torino, Coventry and CEU-San Pablo Universities worked collaboratively to research the worldwide professional opportunities related to their degrees.

Method: This COIL included: *Introductory session* with icebreaker and intercultural activities; *Teams' online meetings*, where professors from the 3 Universities guided and supervised the students work; *Interviews of the students' teams* with 2 to 3 professionals of Pharmacy, Biotechnology or Nutrition & Dietetics; *Conferences* by relevant professionals; and *International Congress* with information gathered by the students an oral communication was prepared and presented. It also included plenary conferences and a workshop on LinkedIn.

Results: This COIL involved 3 Universities, 38 professors, 111 students and 76 professionals (from 11 countries working in 60 institutions). More than 400 people from 40 different countries and 60 Universities were registered at the Congress. We organized 41 interviews with professionals, 12 conferences by 32 speakers and one International Congress. More than 80% of the students agreed that the COIL allowed them to improve their soft and intercultural skills, made them more employable and increased their motivation to work abroad. 90% of the students considered this COIL to be useful for their professional future.

Conclusions: These excellent results highlight the benefit of COIL programs for students and their careers. This led us to organise in 2022 a second edition of the COIL with a possible international visit included.

OC3: Interprofessional Education and Competencies: Development of an Assessment Tool for Pharmacy Practice

A. Zaccomer[1], F. Wirth[1], L. Camilleri[2], L.M. Azzopardi[1]

[1] Department of Pharmacy, Faculty of Medicine and Surgery, University of Malta

[2] Department of Statistics and Operations Research, Faculty of Science, University of Malta

Introduction: Interprofessional education (IPE) activities have an impact on the development of healthcare students' competencies. Best practices for assessing the impact of IPE have not yet been identified. The aim was to design outcome assessment methodologies capable of evaluating IPE on pharmacy competencies development.

Method: An innovative IPE tool was designed and validated through a three-step Delphi technique by two multidisciplinary panels of experts composed of Maltese and international healthcare professionals. The tool was distributed to Doctorate in Pharmacy students (N=35) and alumni (N=16) of the same course, who all had experienced IPE-based placements. Internal consistency of the tool was assessed by Cronbach's Alpha test. Kruskal Wallis was used to compare mean core competency scores between groups of participants clustered by gender, age, year of study, years of practice and area of practice.

Results: The developed 'Interprofessional Education on Pharmacy Competencies (IPEPC)' tool consists of ten statements divided into four core competencies namely, 'Values-Ethics for Interprofessional Practice', 'Roles-Responsibilities', 'Interprofessional Communication' and 'Teams and Teamwork'. The tool was completed by 32 students and 14 alumni of the Doctorate in Pharmacy course. The tool shows adequate internal consistency between the statements in each of the core competencies (Cronbach's Alpha values>0.07). All statements received a mean score higher than 4 out of 5 (5 being the highest agreement). 'Roles/Responsibilities' core competency received the highest score.

Conclusions: High scores received by all statements of the IPEPC tool showed the critical role of IPE on pharmacy competencies. IPE helped to provide confidence in the 'Roles/Responsibilities' core competency. The tool is useful to evaluate IPE pharmacy competencies and improvement of person-centred care.

OC4: Student Conferences: Integrating and Contextualising Learning in Practice

N. Ward, M. Shivkumar, S. Swallow, M. Wang

Leicester School of Pharmacy, De Montfort University, Leicester, United Kingdom

Introduction: The MPharm degree must produce graduates with integrated scientific knowledge and clinical practice skills[1] along with the professional attributes and resilience to thrive in all sectors of practice. Graduates need to communicate effectively with a diverse patient population, and to provide compassionate, person-centred care, whilst also being equipped to contribute to the knowledge and evidence base through research.

Method: A half-day conference was organised for each year group, focused on programme year themes: Year 1: People and Medicines, Year 2: Pharmacotherapy, Year 3: Advanced Therapeutics, Year 4: Professional clinician. Patients were involved as speakers and panellists to provide an insight into their lived experience of conditions taught that year e.g., dementia and to provide context to the reality of concepts such as shared-decision making and personalised care. Sessions led by alumni and expert practitioners aimed to inspire student future career paths, introduce postgraduate study and development opportunities. Recent graduates provided insight to Year 4 students about maximising their foundation training year, and Year 3 students shared their reflections with Year 1 students. Voluntary organisations promoted the benefits of volunteering in providing health advice to the homeless community or emergency response first-aid. Students could view posters from previous student projects, PhDs and staff and visit stands with representatives from training providers and patient groups.

Results: Over 400 students attended. Overall feedback was positive, with students commenting "it was very interesting to get real life experience from staff and patients" and "...helpful to prepare for the future".

Conclusions: The integration of conferences within the curriculum can be an effective strategy to introduce students to a professional conference environment, networking and research poster presentations. Tailored sessions provide context, integration and real-life application of curriculum content.

Reference

1. General Pharmaceutical Council. Standards for the initial education and training of Pharmacists; 2021.

OC5: Team-based Learning in Social Pharmacy

L. Holst, R.L.S. Kjome, H. Erdal, M. Alfarah

University of Bergen, Bergen, Norway

Introduction: The method Team Based Learning (TBL) is not just "group work" but a well-defined method including strategically formed, permanent teams, pre-reading (literature, podcasts etc), individual Multiple-Choice Questions (MCQ) to assess understanding of pre-reading (Readiness Assessment Test = iRAT) followed by team MCQ (tRAT) with the same questions for discussion requiring consensus.[1] Students have the possibility to write an appeal with reference to the pre-reading if they believe wrong answers are correct. By then, the teacher has identified what is difficult to understand, and can address these topics in a brief, clarifying lecture. Lastly, the students apply the knowledge – for instance in case discussions in groups followed by voting for suggested solutions and arguing their case in plenary discussions.

Method: Thematical analysis of student feedback in the forms of focus groups, written and oral course evaluations.

Results: TBL was assessed by the students as the number one teaching method to help them learn. When asked to grade a list of learning activities from 1 to 5, only TBL preparations and reading the textbook got average grades over 4 (4.7 and 4.6 respectively). The students highly appreciated that teachers explained how activities are connected, how to use various learning resources and why we teach the contents we do.

The focus group told us that students retained knowledge best from TBL-sessions because they were challenged to think for themselves and to discuss, while traditional lectures were quickly forgotten. TBL also improved the students' teamwork skills.

Conclusions: TBL is a method which motivates most students and promotes learning better than traditional lectures.

Reference

1. Team-Based Learning Collaborative [Internet]. Available from: https://www.teambasedlearning.org/ [accessed 2022 Mar 7]

OC6: Impact of Simulation in Pharmacy Practice on Student's Perception of Learning, Knowledge and Skill Acquisition

M. Alvarez de Sotomayor, C. Pérez-Guerrero, M.C. Monedero, J.M. Calderón-Montaño, M.D. Herrera, E. Talero, J. Escamilla, A. Ramos, M.J. Peral

School of Pharmacy, University of Seville, Spain

Introduction: Simulation in Pharmacy Practice (SPP) was included in the Pharmacy MSc Curriculum in 2018-19. SPP was part of the following courses: Pharmaceutical Care (5th year), Legislation and Pharmacy Management (5th year) and Pharmacology and Pharmacotherapy (4th year). SPP included problem solving and interaction with simulated patients in an environment that imitates a Community Pharmacy. The following topics were included: Cardiovascular risk assessment and pharmacotherapy, dispensing medicines, counselling on minor symptoms, pharmacotherapy follow-up and monitored dosage systems (MDS). The aim was to identify if SPP improved student perception of learning and their knowledge and skill acquisition.

Method: The perception of learning was evaluated by a Likert questionnaire (1 to 5) made to 5th year students at the end of 2018-19 course. Results were expressed as median, IQR. Student´s knowledge and skill acquisition were assessed by an exam at the end of the Pharmaceutical Care course. The cases about "counselling on minor symptoms" and "cardiovascular risk assessment" were selected and their scores (0 to 10) were compared within the years 2017-18 (no simulation in pharmacy practice), 2018-19 (simulation in 5th year) and 2019-20 (simulation in 4th and 5th year). Results were expressed as mean ± SE.

Results: The students perceived that SPP helped them develop skills in communication (4.1), integration of knowledge (5.1), understanding of adherence (5.2), cardiovascular risk assessment (4.1), pharmacotherapy follow-up methodology (4.1), minor symptoms counselling (4.2), dispensing protocol (4.1) and MDS preparation (5.0). Scores in cardiovascular risk assessment improved from 6.1±0.3 (2017-18) and 6.4±0.2 (2018-19) to 7.3±0.2 (2019-20). Scores in minor symptoms counselling improved from 6.3±0.3 (2017-18) to 7.7±0.2 (2018-19) and 8.7±0.2 (2019-20).

Conclusions: There is a positive impact of SPP in student perception of learning and knowledge and skill acquisition.

OC7: Factors Influencing Pharmacy Technician Students' Motivation to Learn from Students' Perspective

A. Galkontas, E. Kizevičienė

Kaunas University of Applied Sciences, Faculty of Medicine, Department of Pharmacy, Lithuania

Introduction: The constant changes in life in modern society, dictated by the economic, social, political and ecological and COVID-19 pandemic situation, cover a wide range of activities, including higher education. Research on students' motivation is relevant because it helps to clarify learning motivation issues. Not only for higher education teachers, but also for students, it is important to know the problems of learning motivation in order to increase students' motivation for learning and achieve a better quality of studies. In this dynamic and difficult time, every higher education institution must look for new methods and ways to develop a creative, independent personality, motivated and capable of learning, deepening knowledge and continuous improvement.

Method: Analysis of scientific literature and legal acts regulating pharmaceutical activity in Lithuania and the method of empirical research - an anonymous questionnaire. Research subjects - pharmacy technician students of Kaunas University of Applied Sciences. The processing of the obtained data was performed in IBM SPSS 22.

Results: The vast majority of students rated their motivation as high. A comparison between students from different courses found that third-year students rated their motivation the highest. Pharmacy technician students are most motivated to study by the desire to acquire education (4.8 of 5 points), the desire to acquire knowledge and the desire to have a higher education diploma (4.7 of 5 points) and the desire to work in a well-paid job (4.6 of 5 points). These motivational factors motivate third-year students the most. As one of the most demotivating factors, students indicated changes in pharmaceutical legislation that could hurt employment opportunities.

Conclusions: Learning is mostly motivated by the desire to acquire education and have a profession, the desire to acquire professional knowledge and the desire to have a higher education diploma. Comparing students of different courses, it was found that the above factors motivate third and second-year students the most.

OC8: Innovative Use of a Mock-Trial as a Teaching/Learning/Assessment Strategy in Pharmacy Education over Four Years

E. Rosenberg[1], H. A. Truong[2]

[1] West Coast University School of Pharmacy, USA

[2] University of Maryland Eastern Shore, School of Pharmacy & Health Professions, Maryland, USA

Introduction: Mock-trial is a common active-learning strategy in law education, but prior to implementation at one institution in 2015, limited literature existed in pharmacy education. The Center for Advancement of Pharmacy Education (CAPE) 2013 outcomes and Accreditation Council for Pharmacy Education (ACPE) 2016 standards mandated graduate competencies in advocacy, communication, education, problem-solving, professionalism, and innovation. This presentation describes development, implementation, and lessons-learned from a mock-trial innovation in two Doctor of Pharmacy programs over 4 years.

Method: First professional year pharmacy (P1) students were assigned controversial topics to research and debate in courtroom-style format. The mock-trial is the final exam in a required P1 course, necessitating application of knowledge, skills, and attitudes from respective course content and evidence-based practice principles. As a self-directed group project, mock-trial actively engaged students in learning and research, literature critique/evaluation, critical-thinking, communication, teamwork, and professionalism. Student-peer evaluations of teammates also contributed toward individual students' scores. Controversial topics covered either a pharmacotherapy debate, or a health policy issue relevant to contemporary pharmacy practice. Students debated topics including pharmacist-provider status, behind-the-counter status for statins, pharmacists' contraceptive prescribing authority, and the pharmacist and medical marijuana. Each institution obtained Institutional Review Board approval.

Results: Strategies and lessons-learned from four-years implementation incorporating over 300 student-pharmacists debating eight different topics in 16 mock-trials at two institutions will be presented and discussed. Faculty-judges and student-jurors rated student-participants' content/knowledge, critical thinking, application/discussion of federal/state law, citations/references, visual aids, delivery/style, and active listening. Statistical analysis, including inter-rater reliability, compared faculty-judges' and student-jurors' evaluation of performance.

Conclusions: Results from faculty-judges' and student-jurors' evaluations consistently indicated students performed well, and were able to apply their knowledge, skills, and attitudes gained from previous required courses, and were consistent with and student-peer evaluations. Mock-trial can be replicated and implemented in other courses/ institutions to support faculty-teaching and student-learning.

OC9: Chemotheca-based Innovative Didactic Tool for Medicinal Chemistry Courses

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[2] Net4Science academic spin off, Università "Magna Græcia" di Catanzaro, Catanzaro, Italy

Introduction: Didactic innovation is always a relevant issue in modern Medicinal Chemistry academic courses. The use of interactive web-based platforms is well accepted, especially in the new students' generation. The Chemotheca tool[1] has been adopted as a pilot project in several courses (Bachelor degree in Pharmacy, Hospital Pharmacy specialisation and Life Science PhD programme) at Università Magna Græcia since the 2017-2018 academic year with relevant interests from the users. A new specific version of this tool, called EDU-Chemotheca, designed explicitly for innovative didactic purposes, is proposed to the European Medicinal Chemistry scientific community involved in Pharmacy courses with the aim to promote a modern educational model.

Method: The original Chemotheca virtual database (http://chemotheca.unicz.it/) is the tool for promoting the culture of chemical sharing within the scientific community of the "Multi-target paradigm for innovative ligand identification in the drug discovery process" MuTaLig COST Action CA15135 (http://www.mutalig.eu). It is based on open-source environments running under Linux OS and implemented by PHP and Python programming languages. It includes a JSME molecular editor and MySQL database storage.

Results: A Python engine computes, on the fly, 70 molecular descriptors (such as Lipinski's rules, CNS bioavailability, PAINS matching, LogBB, LogP, total polar surface area, molecular weight, etc.) using the OpenBabel and Pybel libraries. A fingerprint-based algorithm prevents duplicate structures. Outputs currently implemented are SMILES, 2D and 3D SDF and MOL2 file formats which allow to interface the in-house chemical databases with most of the *in-silico* methods and tools.

Conclusions: An innovative and modern web-based training platform, already tested with Pharmacy students following undergraduate and graduate courses, is proposed as a possible novel educational model for Medicinal Chemistry courses to the scientific community.

Reference

1. Ortuso F, *et al* The Mu.Ta.Lig. Chemotheca: A Community-Populated Molecular Database for Multi-Target Ligands Identification and Compound-Repurposing. *Front Chem.* 2018, *6*, 130. https://doi.org/10.3389/fchem.2018.00130

OC10: MOOC about Medicines – A Perspective Tool for Lifelong Learning

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[1] University of Tartu, Tartu, Estonia

[2] State Agency of Medicines, Tartu, Estonia

[3] Hospital Pharmacy of Tartu, University Hospital, Tartu, Estonia

Introduction: A MOOC (massive open online course) is a free-access e-course for everybody. MOOC provides an affordable and flexible way to learn new skills. As the population ages, drug-related topics have become popular in society, besides there is a growing trend towards misconceptions and myths about pharmaceuticals. "Medicines down to earth", developed in 2019, was the first MOOC at the Institute of Pharmacy, University of Tartu, to provide short introduction about pharmaceuticals, from lab to patient. The topics of the MOOC involved history, manufacturing, composition, administration and utilisation of medicines as well as overview of service provision at community pharmacy. The aim of this study was to identify MOOC as a tool for continuing education, based on a learner profile.

Method: Demographic indicators and course feedback in 2019-21 were analysed.

Results: There was a great interest in participating in the MOOC course. Since 2019, there have been 1933 registered participants and of them 1558 (81%) successfully graduated the course. The average share of graduates in all MOOC courses at the University of Tartu in 2020 was ca 45% (https://etu.ut.ee/2021/e-oppe-statistika-2020/). Many students also took this course as an elective subject, and 97% have completed it successfully. More than 80% of the participants were women and the majority under the age of 40. In different years 3-8% of the course participants were 61 years of age or older. The professional and educational information about the participants in the course registration form was voluntary. According to data provided, a quarter of the participants had a medical or educational background.

Conclusions: The MOOC is a flexible tool for continuing education. The course was particularly popular among middle-aged individuals with medical and educational backgrounds.

Oral Previews

The Development and Validation of a Globally Applicable Pharmaceutical Development Framework
D. Koudmani | University College London, UK

Supporting Our Teaching Staff: Aligning Educational Scholarship and Teacher Development
T. Koehler | Utrecht University, The Netherlands

Incorporating Case-Based Discussions within a Medicines Information Advanced Experiential Placement
D. Sammut Alessi | University of Malta

Multimedia Resources in Pharmacy Education: A Lab Experience
R. Oliveira | University Fernando Pessoa, Porto, Portugal

University Garden of Medicinal Plants and Missions of Higher Education Institutions
Z. Faixova | University of Veterinary Medicine and Pharmacy, Košice, Slovakia

Views and Perceptions of Pharmacy Students about Online Learning and Teaching in the COVID-19 Era – A Quantitative Study of the University of Nicosia
A. Peletidi | University of Nicosia, Cyprus

Pharmacy Students' Perspective on Online Lectures during the COVID-19 Pandemic: Case Study from the University of Belgrade
A. Malenović | University of Belgrade, Serbia

Moving Forward from the COVID-19 Pandemic: Do Students See eLearning as an Integral Part of their Future Learning Environment?
B. E. Benediktsdóttir | University of Iceland, Reykjavik, Iceland

How to Maintain Students' Activity in Gaining Knowledge and Practical Skills during Online Education Era?
M. Kurek | Jagiellonian University Medical College, Kraków, Poland

Simulation-Based Training in Professional Competences and Skills in Pharmacy Education
B. Pilicheva | Medical University of Plovdiv, Bulgaria

The Implementation and Development of a New Master Program in a Faculty of Pharmacy from Romania
C. Mogosan | Iuliu Haţieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

Developing Interactive Augmented Reality Platform for Learning Laboratory Skills in Pharmacy
M. Sivén | University of Helsinki, Finland

Pharmaceutical Marketing Education with Online Serious Game for Students Across Europe
D. Bonte | University Paris-Saclay, France

OP1: The Development and Validation of a Globally Applicable Pharmaceutical Development Framework

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Introduction: The imperative of meeting current global healthcare challenges requires advancing pharmacy practice and ensuring the delivery of quality services to improve patient outcomes in a global context. This research aims to design and develop a valid and consented set of global goal-oriented pharmaceutical development frameworks and corresponding indicators to support and guide systematic practice transformation needed to meet the national and global pharmaceutical healthcare demands of changing population demographics.

Method: A mixed-methods approach was used. Preliminary exploratory fieldwork was conducted to evaluate the appropriateness and acceptance of a systematic set of proposed global pharmaceutical development goals (PDGs) by conducting a series of international expert focus groups. This was followed by recruiting global pharmacy leaders from differing sectors and nations who participated in a modified nominal group technique to further develop the content of the initial PDGs framework. In a subsequent study, a qualitative modified Delphi approach was employed by a panel of international pharmacy experts and leaders to ensure the credibility and content validity of the framework outputs and to generate consensus on a final matrix of the proposed global PDGs.

Results: The initial analysis of the nominal group study indicated that there was a need to conduct further modifications to the content of the proposed DGs. This was done by embedding the conceptual framework of the previously published global Pharmaceutical Workforce Development Goals (2016). The subsequent modified Delphi consultation and consensus generation produced a realistic global consensus-driven version of a PDGs framework, comprising 21 discrete practice-related development goals ready for deployment.

Conclusions: A systematic global set of PDGs was developed for ensuring the sustainable advancement of pharmaceutical practice and supporting the needs-based roadmap for global pharmacy practice transformation. In addition, this provides a foundation for evidence-based indicators and metrics to be developed to measure and monitor the progress of implementing these goals.

OP2: Supporting our Teaching Staff: Aligning Educational Scholarship and Teacher Development

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Introduction: The department of Pharmaceutical Sciences at Utrecht University is known for its innovative educational culture, in which educational (research) projects are a means of continuous curriculum improvement. However, the projects are not driven by a shared vision and support for teachers is lacking. The aim of this project was to develop a shared vision on the roles of educational scholarship and educational innovation for quality of education and teacher development within the department. This project was conducted as part of the Educational Leadership Program, one of the professional development programs at Utrecht University.[1]

Method: Interviews were held with a variety of governing bodies responsible for the quality of pharmacy education, frontrunners in educational scholarship, and various teaching staff and students within the department. Participants were asked about their vision on the roles of educational scholarship, teaching innovation and teacher development in our department. In addition, they were asked to share their views on 'barriers and facilitators' contributing to educational innovation and educational scholarship.

Results: The analysis of the interviews resulted in the shared vison that the focus of educational research and innovation should be 'demand-driven' and 'Pharmacy-specific'. In addition, recommendations could be disseminated as to what type of roles, activities and organizational structure would support teachers in achieving this vision.

Conclusions: The departmental vision will further align educational (research) initiatives and support our teachers in the continuous development of education and teaching. In addition, this vision and the recommendations will be used for the development of an organisational structure, '*Center of Pharmaceutical Teaching and Educational Research* (CoPTER), to align educational scholarship and teacher development to better support our teaching staff.

Reference

1. Educational Leadership Programme [Internet]. Available from: https://www.uu.nl/en/ education/centre-for-academic-teaching/educational-leadership-programme [Accessed 2022 Mar 3].

OP3: Incorporating Case-Based Discussions within a Medicines Information Advanced Experiential Placement

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Introduction: The Department of Pharmacy at the University of Malta offers a three-year international post-graduate Doctorate in Pharmacy programme in collaboration with the University of Illinois at Chicago. Within this course students may opt for a Medicines Information Advanced Pharmacy Practice Experiential rotation. This rotation includes a case-based discussion (CBD) designed to structurally assess students on the delivery of patient care.

Method: An advanced pharmacy practice case is selected by the preceptor for preparation as a CBD by each student. The case is selected by the preceptor to strategically practice a research-based environment to facilitate the students in developing the required workplace skills. On case assignment the preceptor explains the goals of the activity. Students are expected to apply critical appraisal skills in managing patient care, identify care issues and discuss holistically an action plan.

Results: The CBDs are delivered by students in front of experienced preceptors and structurally evaluated by two assessors including preceptors and program coordinator. The Clinical Case Presentation Evaluation Form assesses for clarity, accuracy and validity of the case discussion together with problem identification and skill in delivery of the discussion. The structured assessment form is utilised to deliver constructive feedback to the students which enables the identification of key areas of improvement and to further elicit reflection on patient-centred care.

Conclusions: The application of CBDs using carefully chosen cases by the preceptors supports critical thinking skills and reflection on clinical pharmacy interventions by the students. Throughout the process to organise, collate data and deliver the CBDs, students are empowered to take initiative, engage in clinical decision making, and utilise problem-solving skills using actual patient-specific factors.

OP4: Multimedia Resources in Pharmacy Education: A Lab Experience

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Introduction: During the COVID-19 pandemic crisis, teachers were forced to suddenly adjust their teaching methods. The phenomenon was particularly challenging for teaching laboratory classes at a time of full lockdown. Visual memory shows the personal ability to process images and this type of memory is very important for enhancing learning and processing of information. This experience aimed to develop pedagogical strategies to help the students' learning process in a particular moment, as well as to use the methods developed to enhance future learning of pharmaceutical techniques within pharmacy education.

Method: Multimedia resources were used to produce short videos of the preparation of laboratory assignments for pharmaceutical technology classes. In synchronous online classes, the videos were watched, commented on, the compounding preparation record was performed and at the end of the class the video was shown once again to consolidate the compounding process. In a first approach, in 2019/2020, students did not repeat the assignments in person and carried out their assessment remotely. In a blended-learning approach, with different students in 2020/2021, they had the opportunity to return to the lab to repeat the experiment protocols viewed online and perform the assessment in person.

Results: There was no relevant difference between the grades obtained with classical face-to-face teaching (before the pandemic) and with the use of e-learning/blended-learning methodologies. However, students with online exclusive learning reported that they would have liked to repeat the assignments face-to-face in the laboratory. The blended-learning students reported that seeing the videos before the experimental work helped their memory and execution, leading to the perception that the video resources are useful.

Conclusions: A combination method of multimedia resources to stimulate visual memory and practical execution of the activity may have a synergistic effect on learning and acquisition of practical skills.

OP5: University Garden of Medicinal Plants and Missions of Higher Education Institutions

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Introduction: In recent years, there has been increasing pressure on universities to go beyond their primary focus on teaching and research and add a third mission (TM) labelled "a contribution to society" to their activities. TM is the relationship between universities and non-academic stakeholders. The mission of the University of Veterinary Medicine and Pharmacy in Košice (UVMP) is to "develop a harmonious personality, knowledge, wisdom, goodness, and creativity in people and contribute to the development of education, science, culture and health for the well-being of the entire society, thus contributing to the development of the knowledge society".

Method and Results: In line with its mission, UVMP created a garden of medicinal plants. It has the shape of a monastery garden with a central fountain and benches. It has perennials and annual plants and is used for educational and research purposes: practical teaching of pharmaceutical subjects, students' graduate theses and scientific projects. UVMP Flora Club students grow medicinal plants in the garden. The TM implies providing education to audiences beyond traditional students and contributing to public debates and cultural activities. In this term, UVMP has been providing pharmacy courses as part of the "University of the Third Age" funded by UNESCO, with seminars taking place in the garden. UVMP organises the "Children's University of Veterinary Medicine and Pharmacy in Košice", which is aimed at encouraging children's interest in the human-animal bond and understanding the value of their own health. UVMP is planning to build rest areas with gazebos in the garden, open the garden to the public for rest, and organise lectures and seminars on environmental protection, in accordance with the "Race to Zero for Universities and Colleges" initiative, to which UVMP has signed up.

Conclusion: Universities engaged in TM activities are becoming engines that contribute to the development of the regions in which they operate.

OP6: Views and Perceptions of Pharmacy Students about Online Learning and Teaching in the COVID-19 Era – A Quantitative Study of the University of Nicosia

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Introduction: Online teaching (OT) has evolved into a new pedagogical approach in pharmacy education. The COVID-19 outbreak forced universities worldwide to initiate OT.[1] Therefore, OT replaced the "traditional" classroom environment. Luckily, the University of Nicosia was well prepared, so pharmacy students were switched to OT without any delay.

Method: The purpose of this study was to explore the perceptions of pharmacy students about OT and learning during lockdown periods using a quantitative-based questionnaire including 28 questions. After ethical approval, a pilot study was conducted with 8 students who were enrolled in one of the 8 teaching semesters. The completion of the questionnaire was anonymous and on a voluntary basis and it included multiple choice and Likert scale questions (a five points scale from "strongly agree" to "strongly disagree").

Results: In total, 205 students (151 females and 51 males) completed the questionnaire (response rate 51%). Interestingly, for 159 students (77.6%), it was their first time participating in OT. Almost half of them (n=87, 47.5%) strongly agreed/agreed that they felt comfortable to participate in discussions during OT and surprisingly 21.4% (n=44) mentioned that it is more likely to obtain a degree through online teaching. Additionally, 48.3% (n=99) reported that they are more engaged to pass an online module compared to a face-to-face one. Despite the clear advantages of OT, face-to-face lectures are still the predominant teaching method (n=93, 45.4%).

Conclusions: The COVID-19 pandemic has accelerated the transition to the digital era in teaching. This study identified that students felt comfortable with OT despite being their first using it. The study limited by the number of participants and the data collection period set (October 2020-March 2021). As technology gains ground day by day, implementing online tools ought to be embraced by the pharmacy programmes worldwide.

Reference

1. Wu S-Y. How Teachers Conduct Online Teaching During the COVID-19 Pandemic: A Case Study of Taiwan. Front Educ. 2021; 6: 675434. https://doi.org/10.3389/feduc.2021.675434

OP7: Pharmacy Students' Perspective on Online Lectures during the COVID-19 Pandemic – Case Study from the University of Belgrade

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Introduction: Synchronous lectures tend to be used as the prevalent method of online instruction, irrespective of notable differences and obvious limitations when compared to their in-person delivery. Study aim was to assess students' perspective on online lectures held during the emergency remote teaching (ERT) due to COVID-19 pandemic.

Method: Students were invited to take part in online survey related to their experience with ERT. Survey included 25 items related to: satisfaction (14 items), motivation (3 items), interaction with peers and lecturers (4 items), and perceived challenges (4 items). A 5-point Likert scale was employed. Statistical analysis was performed using the SPSS software.

Results: A total of 387 students participated in the survey. Majority of respondents (79.3%) were junior students. Among them, 72.6% reported no previous experience with online learning. Although relatively high level of satisfaction was reported (mean score 3.91±0.75), challenges were also scored relatively high (3.05±0.99), while interaction was scored somewhat lower (2.98±0.73), and the least mean score was observed for motivation (2.73±0.58). Students reported having trouble to keep motivation, concentration and focus during online lectures, which usually took long hours per day. Interaction with peers was reported as unsatisfactory (2.48±1.46), whereas it was more feasible with lecturers (3.24±1.42). Students were quite satisfied with the possibility to organize their time flexibly (71.4%), and with respect to the workload (54.5%), while they were less convinced that online sessions provide enough opportunities to reflect on what has been learnt (50,1% agree, 25,1% neither agree nor disagree).

Conclusions: The results obtained indicate that students are somewhat hesitant with respect to online lectures as the main mode of instruction. Lectures, generally, place students in a passive role, which is further increased in online delivery. In order to support students' engagement and success, online lectures should be combined with more active instructional strategies.

OP8: Moving Forward from the COVID-19 Pandemic – Do Students See eLearning as an Integral Part of their Future Learning Environment?

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Introduction: The COVID-19 pandemic caused a paradigm shift in the way study material was presented and how learning was assessed at the Faculty of Pharmaceutical Science in Iceland. The pandemic resulted in an unplanned shift from classical on-site lectures and problem-based learning to online activities through Teams, Zoom, Canvas, hereafter termed eLearning. The way forward post-pandemic has been under discussion. Within this context, the aim of this study was to explore the students' view regarding what platform of teaching would benefit their learning environment in the future.

Method: A survey was sent to all registered pharmacy students using Google Forms. Participation was voluntary and anonymous.

Results: The response rate was 25.8% (n=55). Majority of students (96%) either partially or fully agreed that access to lectures (streaming lectures or pre-recordings) improved during the pandemic compared to pre-pandemic. Students were asked if they had a good overview of their education when it comprised of both on-site and eLearning (on the scale of 0-10, with 10 being a complete overview), 69% of students gave an overview score of 7 or above, showing that this combination was not problematic in terms of an oversight. When asked what combination of on-site and eLearning would be most beneficial for their education moving forward, nearly 75% of students preferred to have the main focus on eLearning with some on-site activities. Only 9% of students preferred to have all lectures and learning activities on-site, whilst 14% of students preferred to have all learning via eLearning platforms.

Conclusions: It is evident, from the students' point of view, that eLearning will become an integral part of the future learning environment at the Faculty of Pharmaceutical Science. Most students appreciate face-to face discussions and problem-based activities to some extent, so a combination of eLearning and on-site activities will be the way forward beyond the pandemic.

OP9: How to Maintain Students' Activity in Gaining Knowledge and Practical Skills during Online Education Era?

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Introduction: A pharmacy program offered by the Faculty of Pharmacy of Jagiellonian University includes 11 semesters of full-time studies leading to the Master of Pharmacy diploma. The curriculum is strongly focused on the obtaining of multiple laboratory and professional practical skills. Approximately 65% of the curriculum consists of practical teaching, including obligatory practices in pharmacies. The pandemic restrictions introduced at the beginning of 2020 impeded practical teaching and compelled implementation of distance learning. Laboratory classes were partially conducted face-to-face, while some of them were moved to online teaching platforms. This raised many concerns about the sufficient quality of the practical skills of the students, as well as their activity and participation in the learning of pharmaceutical technology.

Method: Online platforms were used to create tutorials on pharmaceutical compounding and processing (videos, photos, description, comments), self-assessed tests, quizzes, and on-line seminars were introduced. To increase the activity of the students, they were awarded for preparing test questions and answering questions prepared by others on the online platform. The effect of the changes was evaluated by comparing the pass rate of the exam in pharmaceutical technology (practical and theoretical).

Results: The obtained results indicate that the introduction of additional activities for students, and the switch to a partial online education, did not affect the quality of pharmaceutical technology teaching. In addition, it even increased the overall 1st term exam pass rate from 72% in 2020 to 86% in 2022.

Conclusions: Additional activities introduced via on-line platforms made the teaching more flexible and self-manageable by the student, thus increasing their activity in learning. Moreover, the better access to knowledge complemented the classes conducted in previous years, which in turn resulted in a higher exam pass rate.

OP10: Simulation-Based Training in Professional Competences and Skills in Pharmacy Education

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Introduction: Recently, the use of simulation training in health professions has become increasingly popular. At the Medical University of Plovdiv simulation training is represented in the Pharmacotherapy course for students from the fifth year of study. However, with the advancement of technology, it is imperative that classical teaching methods be adapted to the rapidly changing conditions and the growing demands of learners. The aim of this project was to implement a simulation pharmacy in the Faculty of Pharmacy, which would be used as a learning environment for students.

Method: The project realization started in the academic year 2020/2021. A working group was established to perform the main project tasks: clarification of the concept and design of the facility, finding funding, infrastructure construction, providing IT equipment, medical devices, and other necessary products, and organisation of training activities.

Results: *PharmaSimCenter* was established and put into operation. The center consists of two training laboratories – *Pharmacy SimLab* and *Pharmacy SkillsLab*. *SimLab* is a demonstration model of a pharmacy creating a real environment for students. The trainees work in small groups using the latest technologies for expert training and research skills; access to the individual areas in the pharmacy is provided, incl. pharmacy counter, consultation area, workstations. The computers are provided with pharmacy simulation programs for teaching in 'Pharmaceutical care', 'Pharmacology and pharmacotherapy, 'Social pharmacy and legislation', etc. Additionally, students can acquire skills for interprofessional communication, critical thinking, decision making, and teamwork. *SkillsLab* has the necessary devices (blood pressure and glucose monitors, inhalation devices, etc.) for practical training. During the academic year 2021/22, the simulation pharmacy has been used to carry out practical activities in three modules – arterial hypertension, diabetes, and pulmonary drug delivery, to integrate prior knowledge.

Conclusions: A simulation pharmacy has been established as a model tool to teach key competences and skills in patient care, drug therapy management and communication.

OP11: The Implementation and Development of a New Master Program in a Faculty of Pharmacy from Romania

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Introduction: In Eastern European countries, the National Pharmacovigilance Systems are in an incipient phase, thus their improvement could ultimately result in an enhancement of patient safety. In order to achieve this purpose, an Agence Universitaire de la Francophonie (AUF) educational pharmacovigilance project addressing pharmacists and physicians was implemented in 2013 at the Iuliu Hatieganu University of Medicine and Pharmacy Cluj-Napoca, Romania. This project demonstrated the necessity of pharmacovigilance education for increasing knowledge and abilities of healthcare professionals.

Method: A new master program, 'Pharmacovigilance: Drug safety monitoring', has been developed since 2013 by a group of professors and researchers from the Faculty of Pharmacy and Drug Information Research Center from Cluj-Napoca, Romania. The master's curriculum was developed based on other European pharmacovigilance master programs.

Results: To-date, this is the only pharmacovigilance masters program in Romania accredited by Romanian Agency for Quality Assurance in Higher Education in 2013. The number of master's students has doubled from 2013 to 2020, the students being mainly graduates of the Faculty of Pharmacy, but also Medicine or other specialisations, from all over Romania. In 2017 we made curricular changes in accordance with WHO-ISoP core elements of a comprehensive modular curriculum, four disciplines undergoing changes. In the last years, master students were also involved in medical education activities for the community. A survey among graduates showed that about 40% of them work in the field or related fields of pharmacovigilance upon master graduation. 5% of the graduates continued their master's studies with doctoral studies in pharmacovigilance.

Conclusions: This program enhances the pharmacovigilance knowledge and skills of its students with the purpose of integrating them in specific work positions and for the development of the pharmacovigilance system in Romania.

OP12: Developing Interactive Augmented Reality Platform for Learning Laboratory Skills in Pharmacy

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Introduction: Teaching and learning laboratory skills undergoes revolution as digitalisation offers innovative approaches. In Pharmacy education, adequate training in laboratory skills is essential for the student. At the same time, the challenge for the educator is to provide each learner enough personalised, real-time guidance while a student group is working in teaching laboratory. This is a common challenge in study programmes where the student to teacher ratio is high, such as in Pharmacy. Our hypothesis is that augmented reality (AR) technologies could offer valuable solutions.

Method: The aim of our study was to develop an interactive AR learning environment to support students' learning and performance in teaching laboratory. Second year pharmacy students (n=16) were assigned to experimental and control groups. The experimental group worked with AR smart-glasses that provided guidance during the work, with think-aloud and gate-questions related to choosing correct laboratory tools and reagents. The control group worked in traditional way.

Results: The results showed that the interactive AR was more effective in fostering performance compared to traditional laboratory instruction, and prevented most of the mistakes. The AR group considered the real-time guidance and feedback provided by the digital platform supportive for their learning and performance, especially at critical work phases. Surprisingly, only minor differences were found in tasks measuring students' understanding of the content knowledge.

Conclusions: For the first time, an AR platform was introduced for teaching laboratory skills in pharmacy education at the university level. In conclusion, an AR environment embedded with supportive elements could offer valuable digital educational tool, which provides individual and real-time guidance for the learners as well as support to the educators in their teaching practices. Although digital technologies are not expected (nor aimed) to replace teachers, it is evident that they have potential in various ways in science laboratory education.

OP13: Pharmaceutical Marketing Education with Online Serious Game for Students Across Europe

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Introduction: The serious game is a pedagogical innovative approach to the Pharmaceutical Marketing class as an efficient way to implement learning by doing. Five European Universities from European Alliance for Global Health (EUGLOH), use an online English serious game, on pharmaceutical management, helping attendees to fully comprehend the marketing decision process and impacts on the company's results.[1]

Method: Students from various backgrounds (marketing, biotechnology, pharmacy, language, etc.) from L3 to PhD, participate in a co-modal simulation.[2] Teams manage the marketing operations of a pharmaceutical company and compete for the leadership position, in two markets with four customer segments. Teams sell up to 6 drugs, with 2 active principles, varying efficiency and features. Participants are provided with a decision-making methodology and tools, inciting them to simulate different scenarios, analyse forecasted results and benchmarking against competitors. The game runs over 9 rounds during 4 days. Teams also deliver management reports, corporate strategies, advertisement and interculturality videos.

Results: The decision-making process covers a range of corporate strategic areas such as product life cycle, management, positioning, advertising, pricing, sales forecasting, marketing, R&D, revenue and profitability. The winning criterion is share price on the last round. Students, fully participative due to competition induced by the game, develop their understanding of the complexity of marketing operations in a dynamic competitive environment, deeper than with any practical works or market study assignment.

Conclusions: Participants gain invaluable experience in teamwork, problem-solving while competing live all over Europe with an open-minded to interculturality. This game is already embedded in the curricula of several masters (for example Development of Drugs and Health Products) in University Paris-Saclay and our EUGLOH partners with 300 participants this year (3rd edition).

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Poster Presentations

Pharmacy Internship Access: Fernando Pessoa University Experience
R. Oliveira | University Fernando Pessoa, Portugal

A Study of the Metacognitive Awareness of Pharmaceutical Faculty Students
V. Narokha | Bogomolets National Medical University, Kyiv, Ukraine

Advanced Experiential Placements – Challenges and Opportunities for Preceptors
R. Agius | University of Malta

Initial Sessions of Degree in Pharmacy Internships: Face-to-Face vs. Virtualisation
R. Álvarez | Universidad de Salamanca, Spain

Coordination between Academic Tutors and Professional Tutors in Training Placements
M.M. Orta Cuevas | University of Seville, Spain

Objective Structured Clinical Evaluation (OSCE) in Pharmaceutical Care
M. Sánchez-Polo | University of Granada, Campus de Cartuja, Spain

Introduction of an Objective Structured Clinical Examination for Pharmacy Students in Serbia
S. Vezmar-Kovačević | University of Belgrade, Serbia

Objective Structured Clinical Examination (OSCE) during COVID-19 Pandemic
V. Veses | Universidad CEU-Cardenal Herrera, Valencia, Spain

Objective Structured Clinical Examination as a Tool to Evaluate the Competences of the Students of Pharmacy vs. Classical Exams: Comparative Analysis
M. Caamaño-Somoza | Complutense University of Madrid, Spain

Implementation and Improvement of OSCE in Pharmacy Degree at UCM
M. Caamaño-Somoza | Complutense University of Madrid, Spain

Engagement and Participation in Digital Classroom
K. Eha | Tallinn Health Care College, Estonia

MedChemBlog: An Innovative Distance Medicinal Chemistry Learning Tool
G. Panzarella | Università "Magna Græcia" di Catanzaro, Italy

Development of a validated Tool to identify Competences Relevant for Responsible Person position in Good Distribution Practice
B. von Brockdorff | University of Malta

Simulation of the Two-Compartment Open Model with a Simple Hydraulic System
J. Molpeceres | University of Alcalá, Spain

Remote Laboratory Work: Challenges and Solutions
A. Dambrauskas | Kaunas University of Applied Sciences, Kaunas, Lithuania

Pharmacy Education by Using Open Educational Resources Produced in Collaborative Erasmus+ Projects
F. Remião | University of Porto, Portugal

The Virtual Classroom for Quality Improvement of University Teaching
J. Molpeceres | University of Alcalá, Spain

The COVID-19 Pandemic as a Driver of Education 5.0 at UAH Faculty of Pharmacy
M.V. Aguilar | University of Alcalá, Spain

Evaluation of Virtual Pharmacy Students' Research Symposium
J. Vella Szijj | University of Malta

Evolution of Academic Data in the Pharmacy Degree of the University of Granada during COVID-19
M. Sánchez Polo | Universidad de Granada, Spain

Opening of Assistant Pharmacist Curriculum in English During the Era of Pandemic
L. Ruuben | Tallinn Health Care College, Estonia

Evaluation of Learning at UAH School of Pharmacy During the COVID-19 Pandemic
M.V. Aguilar | University of Alcalá, Spain

Mapping of Digital Competences in the Training of Pharmacists – Perception of Students and Lecturers
D. Volmer | University of Tartu, Estonia

Application of Innovation and Entrepreneurship Competencies: A Capstone Project in a Transition-to-the-Profession Required Course
H.A Truong | University of Maryland Eastern Shore, USA

A Systematic Review of Contemporary Competency-Based Education for Pharmacy Practitioners and Students
J. McMullen | University of Nottingham, United Kingdom

Minimum Requirements for a Competency-Based Pharmacy Curriculum
A. S. Koster | Utrecht University, The Netherlands

New FIP Resources to Advance Pharmacy Education and Early Career Development
R.J. Altiere | University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences, USA / International Pharmaceutical Federation (FIP), The Hague, The Netherlands

Important Academic Skills for the Future
T. Ambrus | Masaryk University, Czech Republic

Study Program for Expanding Competence of Pharmacists
J. Klimas | Comenius University Bratislava, Slovakia

Point-of-Care Testing Devices and Clinical Skills Practical Sessions: A Blended Learning Approach
F. Wirth | University of Malta

Good Distribution Practice Training for Medical Device Industry
L. Grech | University of Malta

Research-Oriented Elective Course: Analysis for Improvement
J. Molpeceres | University of Alcalá, Spain

Project-Based Learning (PBL) in the Food and Nutrition Field Based on Sustainable Development Goals (SDGs)
M.V. Aguilar | University of Alcalá, Spain

Introducing Training on Sustainable Development Goals in the Degree of Pharmacy
M. Ayerbe | University of the Basque Country-UPV/EHU, Spain

Establishing an International Educational Framework for Radiopharmacy
Y. Fenech | University of Malta

"I Started Seeing and Feeling Things Differently, This is Something That I Will Definitely Take With Me From My Years Of Study" Reflective Audio Note (RAN) in Pharmacy Education
M. Alfarah | University of Bergen, Norway

"I Never Thought That I Can Learn By Debating" Improving Pharmacy Students Communication Through Debating in the Classroom
M. Alfarah | University of Bergen, Norway

Evaluation of Pharmaceutical Analysis Tutorials
J. Vella Szijj | University of Malta

Pharmaceutical Sciences and Graduate Education: Current and Future Challenges
J. P. Miranda | Universidade de Lisboa, Portugal

Identifying Patient-Centred Training Needs for Pharmaceutical Good Distribution Practice
M.F. Bacayo | University of Malta

Implementation of a framework for the MMA Academy for Patient-Centred Excellence and Innovation in Regulatory Sciences
S. Falzon | Malta Medicines Authority

Pharmacy-Driven Assessment of Training Needs in Quality Systems for Laboratory Personnel
R. Rivera | University of Malta

ISO 17025:2017 Standard for Forensic Professionals: A Course Development
L. Grech | University of Malta

Joint Study Programme in Pharmacy – A One Health Approach in Education
Z. Faixová | University of Veterinary Medicine and Pharmacy in Košice, Slovakia

Evaluation of Educational Seminar on the Analysis of Pesticides in Cannabis
J. Vella Szijj | University of Malta

Seminar on Biosimilar Medicines
S. Falzon | Malta Medicines Authority

Double Degree in Pharmacy and Small and Medium Enterprise Management in the University of Salamanca
R. Sepúlveda | Universidad de Salamanca, Spain

Evolution of Academic Results in the First Year of the Pharmacy Degree: Last Five Years
R. Sepúlveda | Universidad de Salamanca, Spain

Pharmacy Education – Part of the European Universities Initiative
M. Dimitrov | Medical University-Sofia, Bulgaria

Statistical Analysis of Similarities and Differences Between European Pharmacy Curricula
C. Rais | Carol Davila University of Medicine and Pharmacy, Romania

Conflict Management: An Everlasting Challenge of Group Dynamics
M. Morato | University of Porto, Portugal

Converging Professors´ and Students´ Expectations: A Path for Motivation?
M. Morato | University of Porto, Portugal

Implementation of Reduced Programs for Accelerated Training on the Basis of Higher and Secondary Vocational Education
G. Ustenova | Asfendiyarov Kazakh National Medical University, Kazakhstan

Virtual Database of Medical Prescriptions
S. Kurhajec | University of Veterinary Medicine and Pharmacy in Košice, Slovakia

Role of the GPR55r Gene in the Emotional Regulation of Male and Female Mice
A. Gasparyan | Miguel Hernandez University, Spain

Formulation of a Protective Lip Balm with Natural Oils and it's Quality Research
A. Dambrauskas | Kaunas University of Applied Sciences, Kaunas, Lithuania

PE1: Pharmacy Internship Access: Fernando Pessoa University Experience

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Introduction: The Pharmaceutical Sciences Master Degree at Fernando Pessoa University (UFP) is ruled by Directive 2005/36/EC, amended by Directive 2013/55/EU, which establishes a 6 months internship in a community pharmacy or a hospital pharmacy. The access to the internship is included in the internal internship regulation of UFP and considers the courses non-approved to the date (no more than two) and the arithmetic average of the approved courses grades. Ideally, students should attend the internship after completing the curricular plan, which means they have achieved all theoretical and practical competencies. The non-approved courses imply a lack of some skills as well as the need to attend classes during the internship.

This study aims to find a relationship between course grades, non-approved courses, and internship performance.

Method: Data were retrieved by searching the UFP databases of Pharmaceutical Sciences Master Degree. The research covers 10 years (2011-2021) and includes non-approved courses, course classification means, and internship grades. Data was analysed by SPSS software and a correlation test was applied.

Results: 655 students were included. After the result analysis, we found a moderate negative correlation between the existence of non-approved courses and the course classification means. A low correlation was found between course classification mean and internship performance. The results did not demonstrate a correlation between non-approved courses and internship performance.

Conclusions: Although theoretically, the existence of a negative correlation between non-approved courses and internship performance seems logical, our results do not support this theory. These results could be explained by the low number of non-approved courses having an insignificant effect on the internship performance, the type of non-approved courses, and the fact that the compulsory internship defined by the European Directive only targets some areas related to the pharmaceutical sciences competencies.

PE2: A Study of the Metacognitive Awareness of Pharmaceutical Faculty Students

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Introduction: Modern 5.0 system of Pharmaceutical Education is oriented towards preparing specialists who are able to obtain not only professional knowledge but also relevant technologically advanced skills[1], which is hardly possible without sufficient level of metacognitive abilities.

Method: Data was obtained using Metacognitive Awareness (MA) Inventory questionnaire.[2] Second year (n=97), 3rd year (n=68) and 4th year (n=56) students of the Pharmaceutical Faculty of Bogomolets National Medical University participated in the voluntary anonymous survey. The results were performed using SPSS Statistics Base v.22 (IBM).

Results: A majority of students (70%) revealed a higher-than-average level of MA. There was no statistically significant difference in MA between 2nd, 3rd and 4th year students. All of those surveyed performed a higher number of positive responses to the questions, related to metacognitive knowledge than to the questions, related to metacognitive processes. To the questions "I ask myself questions about the material before I begin" and "I ask myself if I have considered all options after I solve a problem" half of the students responded negatively, which indicated that they have lack of development of metacognitive processes. However, all of the questioners agreed that they understand information better if they know something about the topic and that they learn more when they are interested in the topic, which assumes students' motivation for academic achievements.

Conclusions: Future detailed studying of metacognitive awareness of students is required, especially in relation to mixed (in-person/distance) learning and the implementation of innovative technologies (interactive boards, virtual laboratories, 3D reality applications and so forth) in the educational process.

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PE3: Advanced Experiential Placements – Challenges and Opportunities for Preceptors

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Introduction: The Doctorate in Pharmacy course offered by the University of Malta in collaboration with the University of Illinois, Chicago, offers six-week advanced experiential placements. Preceptors for the placement at Medicines Information guide international post-graduate doctorate students through an advanced clinical experiential education.

Method: In 2016, before the first cohort of doctorate students were admitted to the programme, the Pharmacy Department at the University of Malta offered a preceptor development programme for hospital clinical pharmacists. This short, intensive, training programme included sessions by speakers from University of Illinois, Chicago and the American College of Clinical Pharmacy in relation to clinical pharmacist activities and roles as preceptor. This programme focused on how students rely on experiential rotations to explore the application of clinical pharmacy theory in practice and to prepare them for role modelling and student mentorship as preceptors themselves. Preceptors need to be able to prioritise areas during the post-graduate rotation to guide students to reflect on real-life, dynamic patient care situations.

Results: The preceptor development programme served to highlight effective preceptorship skills for postgraduate international clinical pharmacy rotations. The requirement to balance strong communication skills, assessment skills, teaching and leadership skills with technical skills is key to successful role modelling. Applying this educational preceptorship amidst a variety of cultural and pharmaceutical differences, and integrating students within local practice is essential for enhancing the educational experience. Moreover, presenting diverse learning scenarios and maximising clinical exposure during the experiential placement are fundamental for the students' successful learning experience.

Conclusions: Preceptors can benefit from a rewarding professional experience in addition to a satisfying preceptor-student relationship, when integrating students into their daily activities by bringing out their best potential. It is important for preceptors to periodically perform self-assessment and identify areas that require further improvement.

PE4: Initial Sessions of Degree in Pharmacy Internships: Face-to-Face vs. Virtualisation

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Introduction: Curricular external internships of Pharmacy Degree are a compulsory subject, by European directive, of 30 ECTS. In the 2019/20 academic year, Specific Training Sessions prior to the 5th year students' incorporation to the internships were organised for the first time. A program divided into five practical/theoretical workshop presential modules was proposed (electronic prescription, pharmaceutical care, magistral formulation, pharmacovigilance and research in pharmacy). During the 2020/21 academic year, due to the health emergency caused by SARS-Cov2, it was necessary to hold it in a hybrid mode (face-to-face and online, 20/80%). Third edition (2021/22) has recovered face-to face attendance and kept some virtual sessions. The objective of this work is to evaluate the experience of the implementation and subsequent virtualization of the Pharmacy Degree Internship Initial Sessions and assess the satisfaction of the participants in them after three years of experience.

Method: Evidence has been collected through a satisfaction questionnaire completed both by students and speakers. The questionnaire was carried out using Google Forms tool with 26 statements in the first edition, 20 in the second and third, on a Likert-type scale. In addition, open questions were included to express suggestions.

Results: First year, we use streaming retransmission to facilitate the intervention of technicians related to electronic prescription. The use of this technology received a positive evaluation by 70% of the students. The good acceptance of this methodology, as well as the pandemic situation of second year, made this tool essential for more virtualization.

Conclusions: The answers received after the first and second edition made it possible to introduce improvements that contribute to improve overall evaluation by students The Initial Sessions have been, both in the face-to-face and virtual modalities, a very satisfactory experience for students, teachers and organisers. This initiative has made it possible to integrate knowledge, acquire skills and develop abilities, helping to establish a frame of reference and increase the interest of students before their insertion in the world of work in collaboration with pharmaceutical professionals.

PE5: Coordination between Academic Tutors and Professional Tutors in Training Placements

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Introduction: Supervised Training Placements are the practicum of higher pharmacy studies. The students carried out their training placements for six months in Community Pharmacy and in Hospital Pharmacy Service.[1] Students must acquire skills defined by the Faculty of Pharmacy based on the regulations on the pharmaceutical profession.[2] Each student is assigned to an academic tutor responsible for their supervision during the period of Supervised Training Placements, and a professional tutor with whom students have the opportunity to practice all the knowledge previously acquired and learn the competences, skills and capabilities they have to acquire during their stay in community pharmacy or hospital pharmacy. Each academic year more than 250 professional tutors participate in the Supervised Training Placements. Thus, the coordination between academic and professional tutors is important to ensure the correct training of these students for their subsequent employment. The aim of this study was to implement an efficient system of monitoring student learning and to make the necessary didactic tools available to professional tutors.

Method: Academic tutors of Supervised Training Placements have designed a protocol of action in which chronology and the type of contact with professional tutors have been defined, and a document for collecting information. In order to evaluate the results of this activity, a survey was developed to assess the opinion of professional tutors.

Results: The coordination mechanisms developed and the decisions taken have allowed to improve the quality of the seminars of the students attending their training placements.

Conclusions: Coordination between academic tutors and professional tutors is important for the optimal development and learning of students in Supervised Training Placements.

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PE6: Objective Structured Clinical Evaluation (OSCE) in Pharmaceutical Care

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Introduction: Objective Structured Clinical Evaluation (OSCE) is a method to evaluate clinical skills and competencies, which is relevant in Pharmacy studies and more specifically in Pharmaceutical Care (PC). It is an opportunity to advance educational innovations and improve the teaching-learning process.

Method: Five stations with standardized patients and written records were designed, and a checklist was elaborated in each station with different items in order to evaluate competencies. The implementation process was structured in: 1) Preparation phase, which includes theoretical design and practical planning; 2) Execution phase, and 3) Evaluation phase. The pilot study was carried on at the Faculty of Pharmacy of the University of Granada in the 2018-2019 academic year. Finally, a questionnaire to explore students' opinion was designed.

Results: The pilot study was carried out at 33 Grade students and 14 Master students during two days of June 2019. The mean of the global OSCE was 65.17±11.30 out of 100 points, being higher for the Master student (68.79±12.27) than Bachelor (63.64±10.69). The best scored station was the one of 'Adherence' (86.7±16.36) and the worst were both the written stations, 'Dispensing Record' (48.3±20.78) and 'Medication Review with Follow-up' (46.6±19.81). The best competency was technique (15.02±3.06/20 points). The number of students who passed the exam was 85.10% (81.82% from Bachelor and 92.86% from Master). The global score of the opinion questionnaire had a mean of 4.50±0.50 out of 5. The internal reliability as measured by Cronbach's alpha was 0.769.

Conclusions: Pharmacists can enhance their skills and competencies needed to conduct pharmacy services. The use of OSCE represents a new tool to evaluate these PC skills in a way close to reality.

PE7: Introduction of an Objective Structured Clinical Examination for Pharmacy Students in Serbia

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Introduction: At the Faculty of Pharmacy University of Belgrade, the Objective Structured Clinical Examination (OSCE) was introduced to assess clinical competences and communication skills of pharmacy students following their 6-weeks practice in public pharmacies during the 10th semester.

Methods: The OSCE consisted of one patient case that was presented to the student firstly in a short written form. The patient case had at least one drug-related problem that the student was expected to identify and solve. A teaching assistant played the role of the patient and a teacher assessed the communication skills and clinical competences during the student's interview with the „patient" using a structured form (checklist). The student had limited time (7 minutes) to identify and solve the drug-related problem(s) and to councel the patient. The use of a Drug register and Pharmacotherapy guide were allowed.

Results: One hundred fifty students completed the OSCE so far. The students could achieve 0-40 points during the exam, according to their performance. The maximal point score was achieved if the student obtained all relevant information from the „patient", identified and solved the drug-related problem(s) and offered appropriate information. The minimal point score (0) was assigned if the student made an error which could harm the patient. The median result of the OSCE was 28 points (interquatile range 10), while 7 students (4.7%) scored 0-9 points, 12 (8.0%) scored 10-19 points, 68 (45.3%) scored 20-29 points, 58 (38.7%) scored 30-39 points and 5 students (3.3%) scored 40 points.

Conclusions: The introduction of the OSCE was successful and enabled the teaching staff to obtain a more accurate knowledge of the students' clinical competences and communication skills as well as to identify gaps in the competences in skills which need to be improved.

PE8: Objective Structured Clinical Examination (OSCE) during COVID-19 Pandemic

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Introduction: Objective Structured Clinical Examination (OSCE) allows simulation of the interaction between the pharmacist (or the pharmacy student) and the patient in a community pharmacy or at a hospital setting. Hence, OSCE is considered nowadays the gold-standard for competency-based assessments in clinical disciplines such as Pharmacy. As a result of the pandemic situation, conventional face to face OSCE presents with challenges related to health and safety. Accordingly, we designed alternative clinical competence assessments with similar objectives and standards for pharmacy students.

Methods: OSCE was conducted during the academic year 2020-21 for fifth-year students after the completion of 6 months of practical rotations. Students completed an exam with five stations consisting of two face to face stations with simulated standarized patients and three online stations developed through the online learning platform Blackboard, each one with a duration of 5 minutes. The stations tested student knowledge, patient counselling and communication and acquisition of technical and/or clinical skills.

Results: A total of 49 fifth-year students and 10 examiners were involved in this OSCE hybrid format. The analysis of results showed that the best average grade was obtained at live stations. Comparing the results with previous conventional OSCEs (before pandemic) shows higher average grades for the hybrid OSCE celebrated in 2020-21. Amongst the participants in the hybrid OSCE, 33% of them preferred the online stations.

Conclusions: During the COVID-19 pandemic, online stations have been implemented in OSCE as an opportunity to assess clinical skills in pharmacy students. The online version was effective for evaluating knowledge. However, there were limitations in the assessment of some specific skills such as communication.

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PE9: Objective Structured Clinical Examination as a Tool to Evaluate the Competences of the Students of Pharmacy vs. Classical Exams: Comparative Analysis

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Introduction: The implementation of new methodologies for competences assessment focused in problem-based teaching constitutes a remarkable strategy to develop new evaluation tools. Objective Structured Clinical Examination (OSCE) has emerged as a gold standard in this context, due to its reliability and validity for the evaluation of clinical skills of pharmacy students. Nevertheless, OSCE is more expensive, time-consuming and requires more trained personnel with clear and validated descriptors for the evaluation.[1] In this work, a comparative correlation analysis between a classical method of evaluation, a multiple-choice test (MCT) and OSCE was carried out for the same group of students in the context of the final practical evaluation of the Degree of Pharmacy in the Faculty of Pharmacy-UCM.

Method: Data were obtained from Pharmacy Degree databases corresponding to a group of 220 students at the end of their internship period, in the academic year 2020-2021. The results obtained for each student in the MCT and OSCE were analysed using a statistical software (GraphPad prism v8.0). Data were previously randomly assigned to codes in order to preserve the privacy of the students.

Results: OSCE average qualifications (7.6 ±0.8) were 1 point below in comparison to MCT (8.7±0.1). Almost 92% of the students obtained better results at the MCT. In fact, a moderate correlation between OSCE and MCT grades were found (Pearson r 0.47), suggesting that the best students obtained higher rates in both, MCT and OSCE.

Conclusions: OSCE rates were consistently lower than classical MCT ones, although better students obtained higher rates in both OSCE and MCT. Significant differences were also found between the different OSCE stations. These results are very useful to refine the design and the descriptors for further editions of the OSCE.

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PE10: Implementation and Improvement of OSCE in Pharmacy Degree at UCM

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Introduction: OSCEs were first introduced in the 1970s as training tools and a means of assessing students' practical skills in Health Sciences and are intended to assess whether students are competent as practicing professionals. Despite these great advantages, it is well known that it is an expensive evaluation in terms of time and resources needed.[1] Our main goal was the design of an OSCE for the evaluation of students after their practice period in Community Pharmacy, but after three years some changes were made to reduce the resources needed for the OSCE and this was our second goal.

Method: Initial design consisted in three manned (clinical) and two unmanned (pictorial) stations played in three simultaneous rounds, which allows the evaluation of up to 15 alumni in 30 minutes. Our data come out from more than 500 students between 2019 and 2022. For the evaluation of changes two KPI were rated, alumni qualifications, and costs in terms of man-hour. Data analysis was done in a spreadsheet program; data for cost evaluation were obtained from planning and monitoring meetings, Gnatt diagrams, and questionnaires during the project.

Results and Conclusions: Our experience through these three years is that OSCE shows a good sensitivity, with a great degree of satisfaction expressed by the alumni. An important improvement in terms of reduction of time-consuming processes such as manual codification of results was achieved creating electronic forms based in excel. Further standardisation of questionnaires resulted in an even bigger time reduction.

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PE11: Engagement and Participation in Digital Classroom

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Introduction: It is easy to assume students have the same level of attention and willingness to participate in e-lectures and seminars as they had previously while back in the classroom. But attention can and will disperse as students feel they can multitask and not be 100% present. It is a challenge for lecturers to find meaningful ways to engage students and encourage efficient and targeted time use while learning.

Method: The study program was thoroughly restructured to enable more opportunities to ask questions and circle back to subjects covered during lecture. Students were asked to write down all the new vocabulary covered in the previous lecture and ask 3 questions which were used as rotation questions in the next lecture. Automated quizzes and tests were used on e-platforms.

Results: Initial agreements with students will set the mutual expectations for achieving learning outcomes. Setting rotations for answering questions during lecture keeps students alert and engaged in the topic. The divided workload and opportunities to re-watch lectures, try out self-evaluation tests and circle back to lecture subjects in the Q & A section help students to implement new knowledge and prepare for tests. Broad time window for taking tests allows students to prepare better and relieve stress as they can choose the most appropriate time to take the test. Automated quiz banks allow lecturers to spend less time evaluating tests and randomise questions for individual tests – less cheating.

Conclusions: There is no universal approach for teaching in this new era. Learning methods must evolve to accommodate new needs and different approaches to learning and acquiring new skills. At the same time lecturers need to set boundaries for workload and try to automate e-platforms as much as possible.

PE12: MedChemBlog: An Innovative Distance Medicinal Chemistry Learning Tool

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Introduction: The global SARS-CoV-2 health emergency has launched a major challenge within the traditional world teaching system, forcing traditional education methods to reinvent themself and give up *de visu* interaction with students. Since 2020/2021 academic year, General Medicinal Chemistry and Medicinal and Toxicological Chemistry I courses, within the Pharmacy degree programme at Università Magna Græcia (UMG), accepted the challenge by renewing their teaching approach, trying to re-establish the sense of community jeopardised by distance learning. The found way was the MedChemBlog. This approach has been focused on the remote involvement of students with the aim to improve the understanding of the chemical structures, drug molecular mechanisms of action, in a unique interaction and constructive fashion.

Method: Students were involved in the creation of a multimedia tool, i.e., MedChemBlog, by proposing cues and insights related to the teaching schedule and collected from the most scientifically trusted websites and databases, e.g., Protein Data Bank, DrugBank and PubChem. MedChemBlog highlighted the unexpected advantages of distance e-learning, sometimes stimulating more than traditional teaching models. How do drugs and targets interact with each other? Which are the protein residues and contacts involved? Which are the recognition patterns of ligand analogues? These, only some of the questions analysed during interactive e-lessons.

Results: MedChemBlog promoted awareness and responsible learning in students as well as thriving interactions and dialogue among them and teachers. Students proved not only to enjoy Chemistry but also to be grinders of ideas and artistic collages relating to this scientific world and collected on the blogs’ *MedChemArt* section. Both blogs are freely accessible from the following link: https://web.unicz.it/it/page/blogs.

Conclusions: This innovative Medicinal Chemistry educational approach has been a successful experience, as confirmed by surveys compiled by all involved Pharmacy students and their released feedbacks. This novel teaching proposal for Medicinal Chemistry has become the adopted joint teaching system for Medicinal Chemistry at UMG and could be used as a model for an innovative didactic project to be shared within all European Pharmacy courses.

PE13: Development of a validated Tool to identify Competences Relevant for Responsible Person position in Good Distribution Practice

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Introduction: Defined competences or educational frameworks are not established within the EU to define educational development for the Responsible Person (RP) position in wholesale distribution of pharmaceuticals adhering to Good Distribution Practice (GDP). The educational approach for current educational development for the accession to the RP position is topic-driven and not competency-based. This research aimed to establish competences required for the RP position, by proposing a validated Tool to identify Competences Relevant for the Role of the Responsible Person (COMP-RP tool).

Method: The development of the validated *COMP-RP tool* consisted of establishing six areas of expertise encompassing knowledge, skills and competences for the RP role based on current legislation and existing general pharmacy education frameworks. Knowledge, skills and competences were ranked using a five-point Likert scale ranging from 'not important' to 'essential/obligatory' via two Delphi rounds consisting of a European panel of experts representing pharmacy education, pharmaceutical regulation and industry.

Results: Sixty-three criteria were generated for assessment in the first Delphi round: 33% (n=21) were requirements for Wholesale distribution activities, documentation and leadership carried similar coverage; 20% (n=13) and 19% (n=12) respectively. The lowest three ranking categories were Quality Management and Quality Systems (9%,n=6), Management of 'outsourced activities' (6%,n=5) and Reviewing and monitoring (9%, n=6). Demographic data shows that almost half the expert panel participants (N=16, n=7) had 11-20 years of working experience and n=4 had, over 20 years of experience. After the second Delphi round, Fifty-eight knowledge, skills and competences criteria passed the statistical elimination criteria and were retained in the COMP-RP Tool. The eliminated criteria pertained to leadership and documentation sections.

Conclusions: The developed COMP-RP tool contributes to identification of competences that are relevant to RP position and facilitates harmonization in GDP educational requirements to support patient-centric and safe wholesale distribution practices.

PE14: Simulation of the Two-Compartment Open Model with a Simple Hydraulic System

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Introduction: The course on Biopharmaceutics and Pharmacokinetics includes lab training where pharmacokinetic (PK) simulations are common in order to make it easier and more understandable for the student the basic principles behind compartmental PK analysis. A well-known experimental approach to perform such simulations is based on the use of a simple hydraulic system. However, this is mainly used for the one-compartment open model whereas the PK behaviour of most drugs are better explained using a two-compartmental approach.

Method: The classical hydraulic system was adapted by including two additional feeding lines and a second flask. Two different administration modes were simulated: bolus IV dosing and zero order incorporation kinetics (T=40 min). Sampling was performed in the central and peripheral compartments, and the fluid renewal flow in the central compartment was considered as urine sampling. Carboxyfluorescein (CF) as model drug was measured by UV-vis spectrometry at 493 nm.

Results: Concentrations (C) and log C of CF in the different samples were plotted versus time and the profiles were consistent with a two-compartment open model. After bolus IV dosing the following parameters were obtained: β=0.006 min^{-1}, B_0=2.4 µg/ml and α=0.07 min^{-1}, A_0=9.2µg/ml. These values were further used to estimate the rest of PK parameters. The same hybrid macro-constants values were obtained when the administration mode was changed

Conclusions: A simple hydraulic system commonly used in pharmacy studies to simulate the one-compartment open model can be adapted to simulate also the two-compartment open model.

PE15: Remote Laboratory Work: Challenges and Solutions

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Introduction: Remote learning has been of interest to students for a long time. And this method has been under development for decades. During the COVID-19 pandemic, remote working and study became the main alternative to contact activities. But is distance learning paying off in all areas: can remote laboratory work replace work in a laboratory class?

Method: Literature review. Collection of research and examination of data.

Results: The sudden appearance and effect of the coronavirus has caused major disruption to the education sector. Group work, acquisition of individual skills in the laboratory, learning from mistakes are important components of the educational process. To get those competencies virtual laboratory classes were created to continue studies. Teaching students practical skills and evaluation of their practical skills become a challange. Both teachers and students are positive about the solution during pandemic period to use remote laboratory work. However, most students do not agree that remote laboratory work can replace a live one. Opinions are different in terms of ease of attendance: more students would choose a distance class. Although attendance at distance classes is higher, it is more difficult to maintain students 'attention and motivation. It is also difficult to assess the acquired knowledge, to ensure academic integrity.

Conclusions: Today's technology makes it possible to take remote learning to the next level. Although the online laboratory class cannot replace live class. The most effective learning method is a hybrid of remote and live learning classes.

PE16: Pharmacy Education by Using Open Educational Resources Produced in Collaborative Erasmus+ Projects

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Introduction: The "Open Educational Resources" (OER) labels teaching, learning and research materials in any medium (digital or not), which is available, released under an open license that permits free access or use (1). In this presentation, it will be described the use of the OER produced in Faculty of Pharmacy of U.Porto in two collaborative Erasmus+ projects: TOX-OER (Learning Toxicology through Open Educational Resources), finished in 2018 and OEMONOM (Open access Educational Materials on Naturally Occurring Molecules – sources, biological activity and use), in course. Both projects targets at preparation of comprehensible, free and easily available materials for professionals, students of biomedicinal disciplines as well as lay persons in areas included in Pharmaceutical Sciences.

Method: In both projects the OER materials were or have been prepared by common work of experts from different fields (pharmacologists, pharmacognosists, toxicologists, microbiologists, analytical chemists and E-learning experts).

Results: In TOX-OER project a Massive Open Online Course (MOOC) (http://moodle.toxoer.com/) in 7 languages was developed, which included a Pharmaco-Toxicokinetics module with 4 topics: ADMET, Membrane and Transport Mechanisms; Membrane Transporters and BBB; Absorption, Distribution, Excretion; and Xenobiotic Metabolism.[1] In OEMONOM project, a review paper on Khat (a recreational, chewed herbal drug) was published in open source that will be used as OER in a MOOC.

Conclusions: This presentation demonstrates the potential of using OER in Pharmacy Education, namely in Toxicology field.

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PE17: The Virtual Classroom for Quality Improvement of University Teaching

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Introduction: Recently, there has been a growing interest in teaching for the incorporation of Information and Communication Technology (ICT) and adaptation to the European Higher Education Area (EHEA). Therefore, one of the challenges of university education is the adaptation of content, methodology and procedures to the new learning requirements through the use of tools and technological resources offered by commercially available educational platforms.

Methodology: The current experience was developed in the 2017/18 (N=167) and 2018/19 (N=170) courses using the Blackboard learning platform as support. The students of "Nutrition and Bromatology in the Pharmacy Degree can use several tools on the platform: basic educational material, videos, problems, web links and communication and evaluation tools.

Results: One of the most used communication tools is the advertisement. This tool allows students to see important messages from the University and its instructors. Examples could be an announcement about: a change of venue for a seminar, a reminder of a deadline, or for students to know that some new material has been added to your Blackboard course. On the other hand, the application of evaluation techniques implies an improvement in teaching through the use of these e-learning platforms. The continuous evaluation allows the assessment of a progressive assimilation of concepts and competences that must be achieved in a course. We propose self-assessment tests as a valuable tool for the student to judge their level of seminars knowledge. Students can receive comments on tests and other assessments quickly. The platform allows you to evaluate the student's knowledge and / or progress. The participation of students in the self-assessment in the two courses was very high, 80-90%.

Conclusions: Thus, once applied to the experience of the study group and after application of assessment techniques it is emphasized that the use of e-learning platforms improves teaching.

PE18: The COVID-19 Pandemic as a Driver of Education 5.0 at UAH Faculty of Pharmacy

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Introduction: In March 2020 the outbreak of the Covid-19 pandemic in Madrid province forced changes in the teaching and organizational methodologies of University educational centers in order to continue delivering knowledge contents that allowed students to acquire the competences and skills required by current regulations.

Method: Different surveys were carried out on possible alternative teaching methodologies and strategies to be used by the teachers responsible for the different courses in the face of the pandemic situation. They explained to students how the teaching was going to proceed using different remote channels.

Results: Different strategies such as the heuristic, discovery or playful method facilitated the teaching-learning process allowing students for the acquisition of useful knowledge, competences and skills for job placement. Innovative teaching methods were used, such as the inverted classroom or flipped classroom, cooperative learning, project-based learning or gamification, depending on the characteristics of the different disciplines. The results achieved so far have been, despite initial concerns and doubts, satisfactory, achieving the objectives and skills set at the beginning of the courses. The students have worked on specific, individual or cooperative projects, in which they have faced real problems in the context of service-learning, stimulating their critical thinking, communication, problem solving abilities, with a more practical and tangible dimension.

Conclusions: The pandemic has accelerated the implementation of an Education 5.0 project, making teachers use resources that they had but not all of them had used previously to promote effective and quality teaching. Combining the new technological tools with traditional educational methodologies help teachers to achieve their teaching outcomes in a more effective way without losing sight to prepare students for lifelong learning far beyond the digital.

PE19: Evaluation of Virtual Pharmacy Students' Research Symposium

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Introduction: The Annual Pharmacy Symposium organised by the Department of Pharmacy, University of Malta brings together academic staff, undergraduate and postgraduate students, collaborators and stakeholders to discuss outcomes of student research projects as oral and poster presentations. The 2021 Pharmacy Symposium was held online for the first time via the Zoom platform due to restrictions brought about by the COVID-19 pandemic. The aim was to evaluate student perception about the remote modality used.

Method: A self-administered questionnaire was distributed to students who attended the symposium at the end of the four-day symposium. Students were asked to rate on a 5-point Likert scale from 'strongly agree' to 'strongly disagree' with regards to remote environment used and appreciation of the transmission of scientific information in the presentations.

Results: Out of 370 students who attended the symposium, 19% (n=72) completed the questionnaire. Forty-four students were female and the ages of the students ranged from 18 to 51 years. The majority of students (n=46) were undergraduate students. The majority of students gave positive feedback (score 4 or 5) about the symposium: 71 students felt the virtual symposium was well organised, 69 students agreed that the platform used was appropriate, 66 students agreed that the quality of research presented was of a high standard and 57 students agreed that presentations were understandable and stimulating. Fifty-five students felt that the duration of the oral sessions was appropriate, 40 students enjoyed visiting the virtual poster gallery and 38 students found it easy to access the virtual poster gallery.

Conclusions: The virtual pharmacy research symposium was positively evaluated by students indicating that it is a suitable forum to support students in developing competencies in research dissemination and to appreciate ongoing research by other students.

PE20: Evolution of Academic Data in the Pharmacy Degree of the University of Granada during COVID-19

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Introduction: The Quality Internal Guarantee Committee of the Degree in Pharmacy is responsible for annually analysing the results of the teaching-learning process obtained from the databases of the Quality, Innovation and Prospective Unit of the University of Granada (UGR). During the academic year 2019/20, COVID-19 pandemic caused several adaptations in teaching methodologies. The objective of this work is to study the effect of COVID-19 pandemic on the performance indicators and satisfaction rate with the study plan in the Degree in Pharmacy of the UGR, and to conduct a comparative study with previous years.

Method: The following indicators have been analysed: satisfaction levels with the study plan, demand rate, performance rate, overall qualifications and number of final projects (TFG) performed for the Degree in Pharmacy during last academic years.

Results: The general level of students' satisfaction with the study plan has decreased slightly in the academic year 2019/20. This decrease may be related to: a) the delay in the information on the adaptations made to the Teaching Guides, and b) the lack of teaching coordination between teachers, especially among those who teach different subjects in the same course. However, the performance indicators for Pharmacy Degree in this last academic year have been very positive (acceptable). Thus, we observed a decrease in the initial dropout rate (7.74%) and an increase in the graduation, success and performance rates (52.40%, 78.79% and 88.37%, respectively), which reached maximum levels. However, failure and non-attend rates among Pharmacy Degree' students were lower than previous academic years (5% and 9%, respectively).

Conclusions: The health crisis caused by COVID-19 has been a great challenge for the adaptation of the Pharmacy Degree curriculum. The analysis of the performance indicators and satisfaction rate has allowed the Quality Internal Guarantee Committee to implement several improvement actions to upgrade the adaptations in teaching methodologies for the Pharmacy Degree.

PE21: Opening of Assistant Pharmacist Curriculum in English During the Era of Pandemic

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Introduction: Opening a new curriculum for Assistant Pharmacists in English during the pandemic has been a challenge in many aspects. The application of technological advancements and e-learning has provided much needed support for versatile studying and allowed to incorporate international lecturers.

Method: The study program was thoroughly analysed to find the balance for e-learning, independent work, and contact lessons for practical work. In addition to Moodle courses and Zoom lectures, new platforms were added for enhanced learning experience. Learning methods now include real-world experiences, role-play, lab-simulations, etc.

Results: The admission of the first group of international students took place in the fall of 2021. Simulations and different learning platforms enable students to prepare for practical work and be more flexible in time management. Lecturers from other countries bring valuable and different perspectives for Assistant Pharmacy vocation, obligations, and legislation. This enables the students to choose the next step of their career more deliberately. Students use their time for learning more purposefully and flexibly to achieve the learning outcomes.

Conclusions: Although there is less face-to-face contact, the students have stayed motivated and engaged in learning processes and have started to integrate into the community while being prepared for a vocation. Different background brings valuable experience to the group and into the learning process.

PE22: Evaluation of Learning at UAH School of Pharmacy During the COVID-19 Pandemic

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Introduction: The problem caused by the COVID pandemic led teachers to use different tools to measure the learning process of students in a distance context. For this reason, during the 2019-20 academic year, the teachers at the Faculty of Pharmacy had to come up against the challenge of establishing a consistent, systematic and rigorous on line evaluation system to screen which students had the competences and skills demanded by current regulations.

Method: From the Dean's office, a survey was designed using Google forms and addressed to professors and lecturers of the five undergraduate courses, concerning the type of evaluation tools that they were going to use with the students in order to proceed with a sound evaluation, taking into account that data protection regulations had to be respected, rigorously.

Results: Doubts were raised about integrity and ethics when carrying out the different online evaluation tests. News appeared in the media and social networks about how to know the correct answers in a questionnaire through its source code, by hiring experts who solve the exams, or doing the activities together using the versatility of social networks that allow simultaneous collective interaction, etc.

In this survey, in addition to indicating the number of tests to be performed, the teachers informed us about the tools available to be used: short answer questions, multiple choice tests, essay or interrelated concepts questions with clear evaluation rubrics, reflection on practical cases, open-book exams...

Conclusions: All teachers learned and adapted quickly to the different assessment tools available on the Blackboard platform according to the characteristics of the course and considered that the pandemic has opened a critical window for innovative technology based-assessment methodologies.

PE23: Mapping of Digital Competences in the Training of Pharmacists – Perception of Students and Lecturers

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Introduction: Digital competence is one of the eight key competences for lifelong learning referring to the use of digital technologies for information, communication and basic problem-solving in everyday context. In addition to professional knowledge and skills, digital competences are needed to support the professional careers of future pharmacists. The objective of this study was to evaluate and compare the digital competences of pharmacy lecturers and pharmacy students in pharmacy studies at the University of Tartu (IPUT), Estonia.

Method: Two cross-sectional surveys among pharmacy lecturers (N=21, self-assessment) and pharmacy students (N=113, self-assessment + evaluation of lecturers) at the IPUT was conducted. The survey instrument was developed based on the Digital Competence Framework 2.0. For data analysis an independent t-test was used.

Results: Lecturers (n=21; 100%) and students (n=31; 27.4%) who participated in the study self-assessed their digital competences mostly as good. The lecturers were more self-critical, but this was not confirmed in the students' evaluation. The highest self-rated digital competence for both lecturers (M=3.98±0.82) and students (M=4.05±0.75) was information and data literacy. According to the lecturers, the topic of data privacy (2.43 ±1.22) as well as knowledge about copyright and licences (2.86 ±1.17) were covered poorly during the pharmacy studies. Students in contrast to the lecturers evaluated highly (4.19±0.95) the competence of the lecturers in terms of copyright and licences ($p < 0.001$). The application of the latest digital solutions and public e-services in the field of pharmacy in the pharmacy curriculum should be developed more effectively in order to support the development of students' professional digital competences.

Conclusions: The digital competences of both lecturers and students need to be improved in some areas. The development of digital competences at the IPUT could be supported by an action plan and specially developed courses.

PE24: Application of Innovation and Entrepreneurship Competencies: A Capstone Project in a Transition-to-the-Profession Required Course

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Introduction: The 2013 Center for the Advancement of Pharmacy Education (CAPE) outcomes and 2016 Accreditation Council for Pharmacy Education (ACPE) standards include Innovation and Entrepreneurship as a domain competency for pharmacy graduates. The objective of this project is to describe the implementation of a capstone project on the application of innovation and entrepreneurship competencies in a Transition-to-the-Profession required course for final professional year student pharmacists.

Method: A capstone group project was developed by incorporating outcomes on innovation and entrepreneurship, population-based care, problem-solving, pharmacoeconomics and practice management. Students were required to identify a pharmacy practice issue for intervention and narrow it to a specific population based on literature search and health statistics. They had to conduct a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis, develop a specific, comprehensive plan for intervention, incorporate Pharmacist's Patient Care Process, propose a business plan, including a budget and funding sources. Written reports and presentations to faculty and students were also required.

Results: Eighteen groups of 3 students developed and presented innovation and entrepreneurship projects with interventions on topics ranging from vaccination clinics to home visit, contraceptive clinic, cancer prevention program, medication reconciliation tool, Smart phone apps for smoking cessation and medication adherence, foot care clinic and travel clinic. Proposed business plan and budget ranged from U.S. $200 to $980,000, with a total of U.S. $1.8 million for all 18 groups of 54 students.

Conclusions: Results suggested that students were innovative and entrepreneurial in developing capstone projects on pharmacy-based services for patient care with appropriate consideration for clinical, humanistic and economic outcomes.

PE25: A Systematic Review of Contemporary Competency-Based Education for Pharmacy Practitioners and Students

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Introduction: In accordance with the increasing use of competency-based education (CBE), the International Pharmaceutical Federation (FIP) created the first global competency framework (GbCF) for pharmacists in 2012. However, adopting CBE is complex and involves various features and stages of development. This systematic review examines the research in pharmacy education to identify the features of CBE used around the globe post-development of the GbCF.

Method: Scopus, Web of Science, Medline, Embase and ERIC electronic databases were searched to identify relevant literature. All studies associated with the CBE or training of pharmacy practitioners and related undergraduate students were included. Studies were limited to those published in English from 2010-2021. Two authors performed the screening and selection of studies and a third author was utilised to resolve any discrepancies. The review follows PRSIMA guidelines and is registered with PROSPERO under CRD42022296424. The findings are synthesised and presented descriptively.

Results: Twenty-eight studies were included in the review, all of which originate from high-income countries, spanning a range of educational levels and research designs. A total of 41 features were identified and categorised into 6 overarching themes; design, teaching and learning, feedback and assessment, faculty, resources, and internal and external factors. A collective understanding of the concept of competency, in combination with a shared vision between education, regulation, and practice, underpins successful application of the CBE approach.

Conclusions: This review summarises common features of CBE across the globe which can be used to guide further developments in pharmacy education. Mutual consensus on the design and delivery of CBE features ensures that the intended learning outcomes are in alignment with the learner's experience, and congruent with the realities of pharmacy practice. However, further research is warranted for the application of features of CBE in lower-income countries.

PE26: Minimum Requirements for a Competency-Based Pharmacy Curriculum

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Introduction: With increasing importance of competency-based educational (CBE) frameworks the question arises when a curriculum (new or re-designed) can be considered 'competency-based'. For formal evaluations it is required that clearly-defined standards are shared by all parties involved. Implementation of CBE is a complex process, which affects the organisation of content, development of skills, feedback and assessment, teacher professionalisation, and curriculum management. Given the widely divergent implementations of competency-based programmes, the question must be asked what defines a competency-based curriculum across different contexts.

Method: A recent Delphi-study among medical education experts described core components of competency-based medical education [ref.], that have a strong theoretical (educational and developmental) basis. These core components were used as a starting point to suggest minimum requirements for CBE in the pharmacy field.

Results: The five identified core components (outcome competencies, progressive sequencing, tailored learning experiences, competency-focussed instruction, and programmatic assessment) appear to be suitable for defining CBE in pharmacy, but minimum requirements need to be detailed by further discussion among pharmacy educators. In addition, curricular elements need to be constructively aligned with each other to build an effective curriculum. It must be noted that evaluation of a curriculum can be based on documentary evidence only (for accreditation of the designed curriculum), but evaluation on a deeper level (for accreditation of the experienced curriculum) will require site visits, observations and interviews with faculty and/or students.

Conclusions: Five core components of CBE in the medical field can be used as a starting point for establishing minimum requirements for a competence-based pharmacy curriculum. EAFP can be instrumental in establishing a shared European 'minimum requirement standard'.

Reference

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PE27: New FIP Resources to Advance Pharmacy Education and Early Career Development

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Introduction: During the COVID-19 pandemic FIPEd continued to produce reports, guidance documents, toolkits and virtual programs to advance pharmacy education and early career development.

Method: FIPEd - AcPS, AIM, WDH, UNITWIN - collaborating with BPS, BPP, YPG, IPSF, developed resources, through consultation and validation, to advance pharmacy education and training programs.

Results: FIPEd resources 2020 – 2022 span a wide perspective of areas: 1) *Global Competency Framework v2 (2020)* – competencies for early career development; 2) *Digital Health in Pharmacy Education report (2020) and Train the Trainer Course (2022)* – current status and development of digital health education programs; 3) *UNITWIN Pharmacy Education in Sub-Saharan Africa report (2020) and 4) UNITWIN Pathfinder Toolkit (2021)* – led to UNITWIN Regional Workshops and Global Summit 2021, subject of the FIP Workshop at EAFP 2022 with a regional specific roadmap for the European region; 5) *FIP WiSE – Women in Science and Education toolkit (2021)* – promote positive practice environments for women in science and education; 6) *FIP AIM Enhancing academic leadership horizons in trying times virtual course (2021)* – academic leadership skills development; 7) *Global Humanitarian Competency Framework (2021)* – competencies for pharmacists working in humanitarian arenas; 8) *Curriculum for pharmacy students on substandard and falsified medicines (2021)* – collaboration with WHO; 9) *FIP handbooks for accreditors and providers of programs supporting the FIP platform for provision through partnerships (2022)* – a new FIP program whereby the FIP Seal assures program providers align with the FIP mission and meet quality criteria. *Upcoming resources for 2022 include*: Competency Framework for Pharmaceutical Educators; Competency Based Education Handbook; Quality Assurance education tool; Impact of pharmaceutical workforce on health improvement and outcomes tool; Interprofessional Education Readiness tool

Conclusions: FIP resources have been used effectively by educators globally as guides to advancing pharmacy education. These new resources provide further guidance to assure pharmacy education programs prepare graduates for contemporary and future-oriented careers to meet societal needs.

PE28: Important Academic Skills for the Future

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Introduction: When applying for an academic position within the Faculty of Pharmacy, it is common to see misleading expectations. As fresh Ph.D. graduates, many academics expect to devote their career to science. And occasionally share scientific knowledge with students who are excited to absorb every piece of information. However, we are not trained to transfer knowledge in an effective manner. For this reason, we believe it is essential to train academics, support their personal growth and deepen the set of qualities that are vital to becoming a successful academic.

Method: To provide the academics with essential skills to cope with their role within the educational system, we have launched the set of soft-skills trainings. These are focused on communication, presentation skills, stress management, leadership, mentoring and coaching, all in academic context. Trainings were delivered by two soft-skills trainers and teaching methods were experience sharing, brainstorming, theory explanations and practical exercises that aim to help transferring newly gained experience into practice.

Results: By January 2022, 9 trainings were delivered. Highest interest was observed in Stress Management and Academic Presentation Techniques courses. In total, 81 participants from 22 European and 1 Asian countries have attended the trainings and 45 participants filled the detailed evaluation form. Overall satisfaction was measured on the scale 1 - 10, one being the worst. 51 % evaluated training with 10; 36 % with 9; 7 % with 8 and 4 % with 7. None of the participants used rating lower than 7.

Conclusions: Soft-skills in pharmacy education is recently a "buzz-word". However, it is equally important to support educators in improving themselves in soft-skills to become successful role models to their students.

PE29: Study Program for Expanding Competence of Pharmacists

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Introduction: Vaccination as a health intervention is one of the most successful and cost-effective methods to address preventable diseases. Pharmacists are highly trusted health professionals and highly accessible across all our communities. Undergraduate education does not include vaccination delivery as a core qualification component.

Method: The Faculty of Pharmacy Comenius University Bratislava (FoP CU), in cooperation with the Slovak Chamber of Pharmacists (SChP) has developed the Certification Study Program in Vaccination (CSP-V) to enlarge the scope of pharmaceutical care as a part of the Continuing Education of the health professional. The CSP-V aims to enhance pharmacists' comprehensive and working knowledge in vaccination. Five basic questions were analysed by the Working group and Expert group of FoP CU and SChP: Who will be able to vaccinate? Who will be vaccinated? Which vaccines will be used? Where will the vaccination be conducted? How to classify vaccination by pharmacists?

Results: The CSP-V authorizes the certified pharmacist for adult vaccination by intramuscular or subcutaneous administration. The CSP-V lasts six months, during which the pharmacist has to complete a theoretical part and practical training. The practical training includes vaccination training, anaphylaxis and a syncope simulation, and the administration of first aid medicines. The mandatory condition is a professional practice under general practitioner supervision and vaccination documentation. In the future, vaccination will take place through certified pharmacists in a community pharmacy. Vaccination, as a medical performance, is related to national legislation. Therefore, changes in the Slovak health legislation are expected.

Conclusions: The FoP CU promotes pharmacists' competence in vaccination by developing the required knowledge and skills as an integral part of pharmacists continuing education and training and through continuing professional development opportunities.

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Act on healthcare providers, health workers and professional organizations in the health and amending certain laws, Act No. 578/2004 Coll.

Regulation of the Government of the Slovak Republic No. 296/2010 Coll. on professional aptitude for the practice of medicine, further training of health professionals, the system of specialised fields and the system of certified work activities.

PE30: Point-of-Care Testing Devices and Clinical Skills Practical Sessions: A Blended Learning Approach

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Introduction: For academic year 2020-21 during the COVID-19 pandemic, the point-of-care testing devices and clinical skills practical sessions for first year undergraduate pharmacy students, were converted to a blended learning approach, combining traditional in person laboratory practical training with pre-laboratory synchronous remote sessions. The practical sessions consisted of 1) three two-hour synchronous pre-laboratory sessions for all the class held using Zoom, and 2) three two-hour in person laboratory sessions for each student held in groups of three students. The in-person laboratory sessions covered: Urinalysis and blood glucose monitoring, Blood pressure, lipid profile and obesity measurements, and Injection techniques. The aim was to evaluate student perception of practical sessions delivered using a blended learning approach.

Method: A self-administered questionnaire was developed and validated by an 8-member expert panel consisting of pharmacy academics and pharmacy students in other course years. The questionnaire consists of Likert-type questions (1 Strongly Disagree to 5 Strongly Agree). The questionnaire was disseminated electronically to all (N=24) first year undergraduate pharmacy students at the completion of the sessions.

Results: Nineteen students (13 female, age range 18-21 years) completed the questionnaire. The majority of students gave positive feedback (score 4 or 5) about the blended learning approach adopted: Allowed me to review material covered in the remote sessions on the virtual learning environment as often as necessary and at my own pace to help me prepare for the in-person laboratory sessions (n=18), helped me to participate more in the in-person sessions (n=18), provided me with opportunities to pursue my own learning (n=16) and stimulated critical-thinking (n=14). Sixteen students recommended continuation of the blended learning approach for such practical sessions.

Conclusions: Students had a positive perception of practical sessions delivered using a blended learning approach and reported that the remote sessions supported the in-person sessions.

PE31: Good Distribution Practice Training for Medical Device Industry

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Introduction: In 2017 the European Parliament initiated the process towards a safer regulatory framework for medical devices with the change from Directives to Regulations. The EU Medical Device Regulation 745/2017 and In-Vitro Diagnostic Regulation 746/2017 came into force in 2020 and 2022 respectively. The aim is to devise a training programme on good distribution practices based on the new medical devices regulations.

Method: Feedback from medical device industry stakeholders was compiled to assess training needs. A 6 hours online training programme was developed. The training was delivered on two mornings. Topics were divided into 5 sessions covering 1) introductory session focusing on regulations and medical devices classifications; 2) quality and safety of medical devices; 3) case-studies of challenges experienced by stakeholders 4) CE markings and 5) vigilance of medical devices. The online delivery method adopted an interactive approach with intermittent quizzes and discussion platforms.

Results: Out of the 53 participants who completed the training, 18 were pharmacists. A total of 29 participants completed the evaluation form of the training. All the respondents indicated that the course was very useful for their line of practice with 28 participants strongly agreeing that training content was well delivered, and assisted them to adapt to the new medical device regulations. The majority of the participants (n=20) opted for an online delivery mode, 4 participants indicated hybrid while 5 preferred a face to face delivery mode. The main reason given for online/hybrid choice was because this mode fitted well with work demands.

Conclusions: The training developed was well received by the participants who whilst gathering the required knowledge were provided with a forum to share their experiences and discuss approaches adopted to overcome challenges presented with the transition to the new MDR regulations whilst continuously ensuring patient safety.

PE33: Research-Oriented Elective Course: Analysis for Improvement

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Introduction: Among the different elective courses that pharmacy students can take in the fifth academic year there is one entitled: "Initiation to Pharmaceutical Sciences Research" where the students learn about the main fields of research and the trends followed by pharmaceutical companies and research institutes. As a part of the activities developed during the course, the students have to create and design a research project related to any field in the pharmacy curriculum. They choose it freely. The objective has been to analyze the fields chosen and the marks obtained in order to optimize future editions.

Method: Data from 2014 to 2019 were analysed using Excel software.

Results: A total of 227 research projects have been designed. An increasing trend was observed with 42 students in 2014-2015 and 60 in 2018-2019. In all years, more than 50% of the projects were pharmacology-related. Secondary fields were nutrition, physiopathology, toxicology, pharmacognosy or biochemistry, all of them showing a highly variable distribution. Concerning the marks obtained they were relatively homogeneous within fields (average marks in pharmacology projects varied from 7.05 to 7.68 from 2014 to 2019). Marks were also homogeneous between fields (in 2018-2019 pharmacology 7.4; biochemistry 7.6 and nutrition 7.1).

Conclusions: According to the results analyzed, the preference for pharmacology projects is clear but this fact does not seem to be related to the marks obtained in this elective course.

PE34: Project-Based Learning (PBL) in the Food and Nutrition Field Based on Sustainable Development Goals (SDGs)

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Introduction: Project-based learning is a teaching technique based on active and collaborative learning, focused on the student's research on a real and specific problem that helps the student to acquire the basis for an inductive study. The objective of this work is for students to know and deepen the SDGs related to the area of nutrition and food science and develop projects that allow them to engage in improvement strategies for different population groups.

Method: The project has been carried out by students in the elective course of Clinical Nutrition and Diet Therapy. A total of ten groups have developed projects related to nutrition and food considering SDGs. The information was further disseminated among the target population and improvement strategies were designed in order to promote behavioral changes in the target population. The projects were co-evaluated and self-evaluated following a rubric. Two surveys were carried out, one at the beginning to collect information on their prior knowledge on the subject and after the presentation of the projects on the degree of student satisfaction, and their usefulness as a collaborative experience in the acquisition of specific and generic skills.

Results: From the different topics proposed in the projects, the students chose topics on: Consumption of sustainable food and Health promoting lifestyle and Healthy diet. In the survey initially carried out, it was found that 87% of the students had heard of the SDGs. After completing the project, the students stated that they had expanded their knowledge in this regard and highly valued this type of activity

Conclusions: This project-based learning system is a teaching technique positively valued by students who propose different activities to be developed by pharmacists.

PE35: Introducing Training on Sustainable Development Goals in the Degree of Pharmacy

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Introduction: Sustainable Development Goals (SDG) declared by UN in 2015 should guide every human activity. This is far to be accomplished though. Professionals of Health systems can help achieving them, and so do pharmacists, as long as they are strongly committed to the SDGs. The UPV/EHU launched a call for educational innovation projects to introduce SDGs in the curricula, and the Faculty of Pharmacy joined this initiative with four projects to develop awareness and knowledge in several targets of SDGs 3, 4, 6, 10, 11, 12 and 13.

Method: Educational interventions were implemented in ten subjects and Final Degree Projects (FDG) of the degree in Pharmacy and double degree in Pharmacy and Nutrition and Dietetics. Selected methodologies were Problem Based Learning (PBL), Research-Based Learning (RBL), Inquiry-based Learning (IBL), Case study and Flipped Classroom. Each activity was analysed with *ad hoc* questionnaires and there was another one related to the progression along the degree.

Results: Twenty-six professors participated in these four projects affecting most of the students of these degrees (up to 736 students). Six community pharmacists were also involved. The most employed methodology was PBL, followed by IBL.

Some projects are still in progress; therefore, we cannot assess global gain by now. However, analysis of each activity showed that students' awareness of the role a pharmacist can play regarding SDGs increased in 8 out of 11. So far, we verified a greater commitment to SDGs 6, 12 and 13. The students assessed the activities with scores higher than 4.5 out of 5, and so did the professional instructors of students who carried out the abovementioned FDPs during their internships.

Conclusions: Short and repeated interventions are low demanding, but give raise to great results. Successful execution of these projects represents first steps to boost Sustainability in the degree.

PE36: Establishing an International Educational Framework for Radiopharmacy

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Introduction: There is no established programme outlined for radiopharmacy within pharmacy education. The aim of this study was to analyse the education on radiopharmaceuticals (RP) for pharmacists in Europe, USA, and Australia.

Method: A literature review was compiled describing the characteristics and education on RP in pharmacy programmes. Data was compiled by assessing curricula descriptions of schools of pharmacy in Europe and Australia (University of Monash and University of Sydney). For Europe, website links listed on the European Association of Faculties of Pharmacy (EAFP) site were accessed. The Accreditation Council for Pharmacy Education (ACPE) guidelines for USA were appraised. The curriculum content was analysed by checking title and content of each study unit relevant to radiopharmacy and if they are compulsory or optional. Post-graduate courses and Master specialization in RP were identified. Subsequently, an educational framework was developed. The framework considers educational components that are relevant to an understanding of RP, quality systems and regulatory aspects, safety, and patient awareness. The framework will be validated through a Delphi Method.

Results: All 81 universities registered with EAFP were analysed. From these, 47 offered information on RP in study units within a pharmacy degree programme. The University of Monash, University of Sydney and ACPE did not have compulsory topics on RP for pharmacy students.

From the 47 European universities, 36 study units covering radiopharmacy are compulsory. Seven universities offer a postgraduate course. As to content, the majority of universities covered diagnostic and therapeutic use, and production of RP. The developed education framework is divided into 6 categories: terminology, nuclear physics, diagnostic use, therapeutic use, production of RP and safety.

Conclusions: This study provides a snapshot of the RP-related topics covered in a pharmacy degree programme, particularly in Europe.

PE37: "I Started Seeing and Feeling Things Differently, This is Something That I Will Definitely Take With Me From My Years Of Study" Reflective Audio Note (RAN) in Pharmacy Education

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Introduction: One of the key ideas and features of all aspects of learning from experience is that of reflection. It helps develop critical thinking, problem-solving, and self-directed and lifelong learning skills. Reflection practice can enable pharmacy students to build on previous experiences to deliver more effective performance in their profession.

Method: This study looks at how the reflective audio note (RAN) can help to create the right conditions for reflective learning. The RAN study was designed, implemented, and evaluated as part of the FREMFARM project. The sample consisted of 1st and 7th semester pharmacy students, and the data was collected using observation, post-activity focus groups, and pre- and post-activity questionnaires. We performed a thematic analysis of the collected data with the help of NVivo12.

Results: The results demonstrated that almost 86% of the students prefer to use RAN rather than a written reflective note, while 10% found it more time-consuming. In addition, students confirmed that their comprehension of how their personal thoughts and feelings are influencing their interactions with others are significantly improved after applying the RAN. Teachers reported that the RAN captures more emotions, which was a great added value to understand and assess the students' learning better. Similarly, the students reported that receiving short and concise audio feedback was very practical and useful. Nevertheless, not all of the teachers felt comfortable with the audio component, and this could pose a challenge in the long term.

Conclusions: We conclude that integrating an audio component into the reflective assignments offers a unique opportunity for students to bridge the theory and the complexities of practice. In addition, the RAN helped as a self-assessment tool for critically evaluating their own knowledge, performance, and beliefs. The identified limitations and challenges will be taken into consideration while redesigning the activity for the next implementation.

PE38: "I Never Thought That I Can Learn By Debating" Improving Pharmacy Students Communication Through Debating in the Classroom

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Introduction: The communication skills of practicing pharmacists are key in providing information and advice between patients, other healthcare practitioners, and the community. This study aims to explore implementing the debate as a pedagogical tool into pharmacy education to improve students' communication skills.

Method: A pilot intervention for the FREMFARM research project was designed, implemented, and evaluated. The sample consisted of 7th semester pharmacy students, who on average were 24 years old. 100% of the students took the course for the first time. Qualitative methods were used to collect the data; pre and post short questionnaires, observation using an adapted version of the Teaching Dimension Observation Protocol and post activity focus groups. We performed thematic analysis of the collected data with the help of NVivo12.

Results: Results show that almost 80% of the students agree that the debate helped them to structure their thinking and to simplify their language to communicate complex concepts. Students also expressed that preparing for the debate helped them to organise their thoughts and to gather information from other subjects and make connections with other topics to prepare their arguments. However, 40% of the students found that the effort used to prepare for the debate activity was too large in relation to the gains. Some students reported transformation in their learning and change of their position and perspective after the debate.

Conclusions: We conclude that the debate as a teaching tool has many potential benefits to improve student's communication skills and learning in comparison to traditional learning activities. Therefore, we consider the pilot successful, and we will upscale and implement in pharmacy education next semester.

PE39: Evaluation of Pharmaceutical Analysis Tutorials

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Introduction: Students reading for a pharmacy degree follow study units in Pharmaceutical Analysis in the second and third year of studies (4 ECTS each). Study units focus on sample preparation techniques and spectroscopic methods used in bioanalysis. The study units are delivered via lectures and tutorials. Tutorials were re-designed so as to support students to identify suitable methods for different applications. The aim was to evaluate feedback by students regarding the tutorials.

Method: A self-administered questionnaire was distributed to all second (n= 22) and third year (n= 18) students who attended the tutorials at the end of each study unit. Students were asked to rate on a 5-point Likert scale from 'strongly agree' to 'strongly disagree' whether: the content of the tutorials met their expectations, tutorials helped enhance knowledge gained during lectures and tutorials were understandable and stimulating.

Results: Thirty-three students completed the questionnaire. Twenty-two students were female and the ages of the students ranged from 18 to 29 years. Eighteen and 15 students were in their second and third year of studies respectively. The majority of students gave positive feedback about the tutorials: 26 students agreed that the tutorials were well organised and 24 students agreed that the content of tutorials met their expectations and tutorials helped enhance knowledge gained during lectures. Twenty-two students agreed that the lectures were understandable and stimulating and recommended the tutorials.

Conclusions: The newly implemented tutorials which focused on the application of sample preparation techniques and spectroscopic methods in bioanalysis were positively evaluated by students. Future tutorial sessions will focus on more examples and types of applications of novel bioanalytical techniques.

PE40: Pharmaceutical Sciences and Graduate Education: Current and Future Challenges

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Introduction: The higher education of future pharmacists offers a wide, comprehensive range of education and education so as to accommodate a lifelong learning perspective and eventual learning along with professional mobility. However, it is necessary to ensure that students acquire, upon leaving university, competencies for the exercise of their future profession.[1,2] Despite pharma's recent change in approach to drug discovery and development, pharmaceutical sciences graduate programs in Europe are mostly maintaining traditional methods for master's and doctoral student education. As such, the present study seeks to understand the current training in a pharmacy in the face of the challenges of the profession

Method: For this purpose, the General Level Framework directive is used to perform a systematic assessment the level of training perceived by 4th-year students of pharmaceutical sciences in Portugal.

Results and Conclusions: Our study reinforces the importance of the development of transversal skills focused on the user, mainly for pharmaceutical sciences students, emphasising the importance of basic technical and scientific knowledge, articulated with communication and interaction skills. We recommend that our pharmaceutical sciences graduate programs take a proactive leadership role in meeting the needs of our future graduates and employers. Moreover, our graduate programs should include the innovation and collaboration that our industry also requires to be successful and relevant in this century.

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PE41: Identifying Patient-Centred Training Needs for Pharmaceutical Good Distribution Practice

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Introduction: Patient-centeredness in healthcare delivery recognizes that a patient's values and preferences must be central in the delivery of pharmaceutical services. Within the Ministry of Health, the Pharmacy of Your Choice (POYC) unit is responsible for providing access to medicines within the national health service scheme through private community pharmacies. The service includes distribution of medicines, which are centrally procured, to the community pharmacies in Malta and Gozo. The study is aimed to address the training needs for pharmaceutical good distribution practice of Pharmacy of your Choice health workforce instilling an enhanced patient-centred approach.

Method: A questionnaire aimed at assessing the core competencies of the services of the POYC workforce was compiled and validated by 4 pharmacists each coming from academia, hospital, community, and regulatory sectors respectively. The validated questionnaire was disseminated electronically to POYC workforce. The questionnaire consisted of open and closed ended questionnaires with a Likert scale (1 to 5, 5 being strongly agree).

Results: All members of the validation panel (n=4) agreed that the questionnaire was feasible, practical to complete, taking not more than 10 minutes to complete. The questions were concise and clear. Study findings from the distribution of the questionnaire: 27 POYC workforce indicate that the highest training need focuses on Good Distribution Practices (Mean = 4.3). The second priority is Organization and Personnel (Mean = 4.1) followed by Philosophy of Patient-Centred Care (Mean = 4.1) where the participants will capacitate themselves in building more responsive patient care.

Conclusions: An online self-paced training course focusing on the themes highlighted by the POYC workforce is designed based on an interactive participant approach.

PE43: Implementation of a framework for the MMA Academy for Patient-Centred Excellence and Innovation in Regulatory Sciences

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Introduction: The Academy for Patient Centred Excellence and Innovation in Regulatory Sciences, launched under the auspices of the Malta Medicines Authority (MMA), was set up to merge research, training and education into the regulatory environment, strengthening the commitment of the Authority towards sustainable development and innovation. The aim was to implement a framework for the academic platform that encompasses the elements of accreditation, collaboration and optimisation.

Method: In 2020, the Educational Planning and Academic Development (EPAD) Unit within the MMA prioritised the process for accreditation of the MMA Academy as an Educational Institution through the Malta Further and Higher Education Authority (MFHEA). Application forms for provider and programme accreditation, accessible through the MFHEA website and supporting documentation, including a robust Internal Quality Assurance (IQA) policy were compiled and submitted to the MFHEA for evaluation. Sustained liaison with national and international partners was undertaken during the process.

Results: Over a total of two hundred and fifty (250) email exchanges, minuted meetings and trainings were recorded between MMA Academy staff, the MFHEA and Pharma Consulting Walther throughout the accreditation process. The Award in Good Manufacturing Practice Programme was accredited at Level 5 on the Malta Qualifications Framework (MQF) in January 2021 following two evaluation cycles by the MFHEA. The MMA Academy was licensed as a Higher Education Institution in April 2021 subsequent to the positive accreditation of the first educational programme and an intensive review of the IQA policy by the Quality Assurance Unit within the MFHEA.

Conclusions: The licensing of the MMA Academy as an Educational Institution marks another milestone in the strides made by the professional workforce of the Authority, in collaboration with pertinent national and international bodies, to expand on advanced scientific initiatives that cascade through educational planning and academic development of accredited programmes that meet stakeholder needs and expectations.

PE44: Pharmacy-Driven Assessment of Training Needs in Quality Systems for Laboratory Personnel

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Introduction: Within a constantly evolving landscape in the scientific and technical realm, the adoption of good quality management systems for laboratory staff is an important component of every lab-based institution, organisation, and scientific centre which aims towards accreditation. This study aimed to identify the training needs of laboratory personnel within the aspect of quality systems.

Method: A self-administered "Training needs assessment questionnaire" intended to capture the training needs of laboratory personnel on quality standards was developed. The questionnaire was validated through a focus group consisting of a quality manager pharmacist, an academic pharmacist, a scientist, and four international pharmacists undertaking a Doctorate in Pharmacy fellowship programme at the Malta Laboratories Network. The questionnaire consisted of a combination of closed-ended and open-ended questions. The questionnaire was electronically disseminated to 80 laboratory personnel based in Malta.

Results: All 7 members of the focus group agreed that the "Training needs assessment questionnaire" was clear, concise, practical and capture the data required. Out of the 50 laboratory personnel who completed the questionnaire (response rate 63%), 10 were from laboratories in pharmaceutical firms. Out of the 50 respondents, the majority (n=48) of the laboratories were testing laboratories and 2 were calibration laboratories. Thirty respondents highlighted training needs. The topics identified included a focus: ISO 17025:2017 (n=10), instrument use and quality control (n=9), measurement uncertainty (n=5), ISO 9001:2015 (n=3) and Good Laboratory Practices / Good Manufacturing Practice (n=3).

Conclusions: The identification of current laboratory training needs highlights the niche of pharmacy driven interprofessional training programmes that could address the gaps identified and facilitate continued adherence to quality systems within laboratory operations.

PE45: ISO 17025:2017 Standard for Forensic Professionals: A Course Development

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Introduction: In forensic science, accreditation of the laboratory ensures that the service provided is robust, reliable and reproducible. This study aimed at developing a training course with a focus on ISO17025:2017 *General requirements for the competence of testing and calibration laboratories* as a case example for forensic laboratory professionals.

Method: A preliminary meeting was held with the quality manager of the forensic science laboratory to explore the gaps in knowledge and practice with respect to ISO 17025 which needed to be addressed. Subsequently the course programme consisting of learning objectives, outcomes, description of the content, method of delivery, and choice of tutors was designed. The course programme was validated by a 7-member expert panel. The training course was scheduled over 14 hours delivered in a classroom mode to a total of 22 forensic laboratory professionals. The training course which adopted an interactive participant-tutor approach was evaluated by the participants using a questionnaire consisting of Likert-type (1 Strongly Disagree to 5 Strongly Agree).

Results: All 7 members of the expert panel strongly agreed that the course topics covered the individual requirements of the ISO 17025:2017, quality management systems principles, and the practical aspects of the standard as applicable to forensic sciences. Tutors included pharmacists with experience in good quality management systems and ISO standards. The training course was evaluated by 18 participants out of a total of 22. The majority of the respondents strongly agreed that the subject (n=11), content (n=12), tutors' knowledge (n=14), and logistics (n=12) met their expectations. All the participants strongly agreed that the course was well delivered and designed assisting them in their daily practice.

Conclusions: The course has provided an academic interprofessional platform for sharing the expertise between participants and experts to improve laboratory quality systems.

PE46: Joint Study Programme in Pharmacy – A One Health Approach in Education

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Introduction: The University of Veterinary Medicine and Pharmacy in Košice (UVMP) is the only veterinary university and one of two universities providing pharmacy education in Slovakia. UVMP has been preparing pharmacists with Pavol Jozef Šafárik University in Košice (UPJŠ). In 2016, preparation of a Joint Study Programme (JSP) 'Pharmacy' started. It enabled education within the 'One world, one health' concept, which considers interconnections between human medicine, veterinary medicine, and the environment. This is important in preventing diseases, understanding their causes and treatment personalisation. The aim is to better prepare graduates through patient-oriented education by equipping them with skills and competences that are expected from the pharmacy workforce and professionals.

Method: The JSP study plan was prepared in accordance with Directive 2005/36/EC of the European Parliament and of the Council and Regulation (EU) No 1024/2012, based on previous experience and the latest pharmacy education trends. New subjects were introduced and the syllabi were updated. The study plan was discussed with the subject guarantors from UVMP and UPJŠ, pharmacy graduates, employers, Košice Pharmacy Students Association, Pharmacy Board, UVMP's Scientific Council and approved by UVMP's Academic Senate. The JSP conditions are detailed in the 'Agreement on JSP' between UVMP and UPJŠ. The accreditation dossier was sent to the Accreditation Commission (AC) pursuant to Act 131/2002 Coll.

Results: With the AC approval, the pharmacy education has been provided by UVMP and UPJŠ within the JSP since 2018/2019.

Conclusions: The JSP enables reinforcement and update of knowledge in pharmaceutical sciences, development of better and closer relationships with other health professionals, such as medical doctors and dentists, and with the society, development of skills and competence (wider range of compulsory and compulsory elective subjects, new thesis and rigorous thesis topics, preparing PhD students), joint research projects and close collaboration of students of both universities.

PE47: Evaluation of Educational Seminar on the Analysis of Pesticides in Cannabis

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Introduction: There is a need for sensitive, accurate and efficient methods of analysis to determine amounts of pesticides in herbal products intended for medicinal use, such as cannabis for medicinal use. An educational seminar on the analysis of pesticides in cannabis was organised for scientists and healthcare professionals involved in pharmaceutical analysis, evaluation of herbal medicinal products and patient safety. During the seminar reflections on standardised methods of analysis of pesticides that could be adopted by the industry were discussed to help ensure quality, efficacy and safety of herbal medicinal products. The aim was to evaluate this educational seminar.

Method: A self-administered questionnaire was distributed to attendees at the end of the seminar. Respondents were asked to rate on a 5-point Likert scale from 'strongly disagree to 'strongly agree whether the seminar was well organised, helped them appreciate fundamental principles of pesticide analysis and information in the seminar was comprehensive.

Results: Fifty-six participants out of 80 completed the questionnaire. Thirty-one respondents were female and ages ranged from 20 to 64 years. The majority of respondents (n=36) had a post-graduate education level and 25 respondents worked in industry. Positive feedback (score of 4 or 5) about the educational seminar was received: 54 respondents felt that the educational seminar was well-organised, 49 respondents claimed that the content of the seminar met their expectations, and 47 respondents felt that the educational seminar was relevant to their practice. Fifty- one respondents felt that the educational seminar helped them appreciate fundamental principles of pesticides analysis and information in the seminar was comprehensive.

Conclusions: The educational seminar was positively appraised by the attendees. Organisation of similar seminars in the future could help to provide opportunities for stakeholders to come together, network and collaborate in developing harmonised methods for pesticides analysis which are efficient and sustainable.

PE48: Seminar on Biosimilar Medicines

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Introduction: Biological medicines have revolutionised the outlook for many patients suffering from serious illnesses, including cancer, autoimmune and neurological conditions. With patents and exclusivity periods of proprietary biological medicines expiring, biosimilars are promising accessible therapeutic plans, whilst potential challenges are recognised. The objective was to develop an educational seminar on biosimilars for the sharing of knowledge and experiences amongst cross-sector stakeholders with an interest in the field.

Method: In August 2021, the Academy for Patient Centred Excellence and Innovation in Regulatory Sciences, under the auspices of the Malta Medicines Authority (MMA), in collaboration with local specialists and an international academic, organised an interactive seminar on biosimilars. The six-hour programme comprised of a series of presentations, a discussion and a networking session. The initiative was part financed by the Internationalisation Partnership Awards Scheme Plus (IPAS+) of the Malta Council for Science and Technology (MCST).

Results: The academic activity was awarded two Continuing Professional Development (CPD) points by the Malta College of Doctors. Seventy-five national and international participants working in the public and private health sectors, including representatives of pharmaceutical and biotechnological companies, patient advocates, regulatory affairs professionals, policy makers, procurement officers, physicians, pharmacists, nurses, and academics participated actively. Topics encompassed development, safety, prescribing and switching, economic considerations, impact on healthcare and the future of the biosimilar market. Barriers to uptake, and factors that contribute to long-term sustainability of biosimilars, were also addressed.

Conclusions: The seminar served a good purpose to disseminate information and as a key platform amongst different stakeholders. The academic platform within the MMA proved crucial to co-ordinate and lead such educational initiatives. The nature of the seminar provided a window into the composite landscape of biosimilars and presented an opportunity for the MMA to strengthen international relationships and foster collaborative impetus for long-lasting research consortia, knowledge propagation, pharmaceutical innovation and healthcare sustainability.

PE49: Double Degree in Pharmacy and Small and Medium Enterprise Management in the University of Salamanca

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Introduction: The double degree in Pharmacy and Small and Medium Enterprise Management (SME) was approved by the Governing Council of the University of Salamanca (USAL) on 31/03/2016 as the first double degree of this kind in Spain. The next academic course, (2016-2017), was successfully implemented. At this point, the current academic year will go through the first student's graduations. In this scenario it looks appropriate to review the evolution of the degree.

Method: We based the analysis on the available results from the surveys carried out by the quality assessment area of the USAL as well as the indicators also provided by this unit for the courses 2016-17 to 2020-21.

Results: The success rates of the double degree students have been improving progressively from its launching. Although this rate is always below the value obtained for the degree of Pharmacy, it reached 78.05% in the academic year 2019-20 (last available results). The student's survey on the training program shows that they are very satisfied with the faculty's facilities, the infrastructures and most importantly with the teaching-learning process. The lowest rated items are those related to coordination and distribution of tasks. This was also highlighted in the follow-up meetings of the students with the academic responsible. As a result of this feed-back and in order to make improvements in this regard, some changes were introduced in the organisation of the training program.

Conclusions: The double degree in Pharmacy and SMEs is consolidated in the Faculty of Pharmacy of the USAL, and the student performance rates have been stepwise improved since its implementation. Coordination is the most critical point of this training itinerary. Efforts, such as a reorganisation of the training program, have been made in order to achieve better and more efficient coordination besides to fulfil the students' expectations.

PE50: Evolution of Academic Results in the First Year of the Pharmacy Degree: Last Five Years

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Introduction: The COVID 19 forced changes in the teaching methodologies, in both university and high school studies. After this unusual period, in the present course 21-22 the success of the first course pharmacy students of Salamanca University has been strikingly lower than in previous years. These unexpected and undesirable results make it necessary to analyse the academic yield trend of the students in the last years.

Method: The study was based on the statistics provided by the USAL's grading management program. The results of the first semester corresponding to the last five years, from the course 2017-2018 to the actual 2021-22, were analysed.

Results: During the first four years of the analysed period, the failure mean value remains nearly constant around the value of 37%. It is worthy to note that this period includes the 20 -21 course in which master classes and a main part of the laboratory ones were online, due to COVID 2019. However, in the present course and despite the return to total face to face teaching, the rate of fails significantly increases to 48%. The university access exam taken by these students has been softened in order to overcome the deficiencies derived to the impossibility to cover all topics included in the different subjects. These apparently unreasonable results could be due to deficiencies in the background of the incoming students.

Conclusions: Two years after the COVID 2019 academic changes, a high increase in the failure percentage has been observed in the first course pharmacy students of Salamanca University. Strategies, such as an initial course, seem to be necessary to be promoted from the faculty, in order to reinforce the background knowledge of the students; what in turn will increase the success academic rate of the graduates in our faculty.

PE51: Pharmacy Education – Part of the European Universities Initiative

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Introduction: At the 2017 Gothenburg Summit, the European Council called on Member States, the Council and the Commission to take forward a number of initiatives, including "… encouraging the emergence by 2024 of some twenty "European Universities", consisting in networks of EU universities which will enable students to obtain a degree by combining studies and contribute to the international competitiveness of European universities". European Universities are transnational alliances that will become the universities of the future.

Methods: Analysis of the current state of pharmaceutical training in Bulgaria, comparison with other leading countries of the world and forecasting further perspectives in the frame of the European University Consortium was performed. The consortium that we are part of shares a particular interest in Biosciences and Engineering and a strong position in education and research in these areas. The principal topics to be covered in the study pharmaceutical units were identified.

Results: European Universities are transnational alliances and our Consortium including pharmaceutical subjects summarises information about the pharmaceutical, technical, and ethical issues related to the use of a bioscience and engineering in a systematic, transparent, unbiased, robust manner. According to the issue it was determined the target audience that has to support the training program: Ministry of Education and Ministry of Health experts, medical practitioners, pharmacists, patient organisations, business organisations. Priority in the training program was on the modern methodology of organising and conducting bio scientific studies, conducting scientific search (evidence medicine) and decision-making process.

Conclusions: Effective implementation of the pharmaceutical education in the progressive initiative of European University will be a big challenge but also a great opportunity for the future students to share the European values and identity, and it will be a step to revolutionising the quality and competitiveness of European pharmaceutical higher education.

PE52: Statistical Analysis of Similarities and Differences Between European Pharmacy Curricula

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Introduction: The quantitative and qualitative accumulations of the last half of the last century have produced considerable changes in all fields, including in the medical and pharmaceutical spheres. The training of pharmacy professionals should meet the ever-changing demands of the labour market and the need for specialised personnel in healthcare.

Methods: In the analysis of educational plans, we used statistical methods: Helmert-Pearson test and the correlation coefficient r. We applied the mathematical analysis of the similarity and equivalence in the number of hours assigned to groups of subjects in the curriculum.

Results: Regarding the distribution of the number of hours in the curricula of the Faculty of Pharmacy of Bucharest compared to other European faculties, it was found that the dissimilarity is higher for the groups of disciplines compared to the types of didactic activities (Riga -411; Dublin-307). The results of our analysis show that, both in Romania and in the rest of Europe, pharmaceutical technology disciplines prevail (Bucharest= 14; Szeged = 30; Lisbon = 24); the same for the fundamental groups (Cluj = 12; Semmelweiss = 16; Tours = 11). The medical and social disciplines are reduced as hours and credits allocated in the curricula, according to the values of the training function: Bucharest = 12; Cluj = 11; Sofia = 26; Tours = 11; Bucharest = 5; Cluj = 4; Szeged = 6; Tours = 6.

Conclusions: A concept of structural similarity was defined starting from the metrics and statistical correlation parameters. The correlation coefficient and the Helmert-Pearson test, were more sensitive and could be parameters used to highlight the harmonisation trends.

PE53: Conflict Management: An Everlasting Challenge of Group Dynamics

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Introduction: Truthful evaluation must ground the learning process. Evaluation of group works usually assumes equal contribution of the students but can be biased since the professor is not present in all the process and students might shield one-another or feel uncomfortable with denunciations. We aimed at analysing the impact of a conflict management approach (CMA) in group works.

Method: The curricular unit (CU) of Pharmacology II integrates the Integrated Master on Pharmaceutical Sciences of the Faculty of Pharmacy of the University of Porto, Portugal (4th year, 1st semester). Evaluation includes group works with 2-3 students/group. Students were informed that the same grade would be given to each student in a group, unless unequal workload (UWk) was identified by students or presumed by professors. If so, a CMA was implemented through face-to-face analysis of the situation (involving students and professors) and definition of a consensual differentiation algorithm.

Results: UWk was suspected in 7/54 (13%) groups. In 6, the risk was identified before publication of the group grade and CMA was applied. In 3 of those, CMA ended up with grade differentiation between students of the same group, which averaged 24% of the group grade. This alteration did not alter the final grade of 4/8 (50%) of the students implicated but it prevented 1 pro-working student to have his final grade decreased by 1/20 value, while prevented 2 non-pro-working students to have their final grade increased by 1/20 value. The other student did not finish his evaluation yet. Communication and planning skills were the major contributors to the group's conflicts.

Conclusions: Professors should be aware of non-equilibrate workload in group works, create an open environment so that students highlight problems in group dynamics, and pre-establish CMA to early identify and solve intergroup conflicts and legitimately evaluate each student.

PE54: Converging Professors´ and Students´ Expectations: A Path for Motivation?

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Introduction: Learning outcomes and competences should be clearly defined by the professors during the preparation of a curricular unit (CU). Also, they should plan different assignments in order to lead the students to achieve distinct skills. However, professors' expectations might not match those of the students, which might result in demotivation and absenteeism. We aimed at evaluating the putative match between the expectations of professors and students concerning group work.

Method: The CU of Pharmacology II integrates the Integrated Master on Pharmaceutical Sciences of the Faculty of Pharmacy of the University of Porto, Portugal (4th year, 1st semester). To increase participation and motivation, 156 students were divided in 54 groups (2-3 students/group) and asked to analyse a real (anonymous) medical prescription, focusing on three perspectives: pharmacodynamics, pharmacokinetics and pharmacotherapy, each guided by different professors. The task was designed to train the students not only on academic skills but also on transversal competences (social and cognitive skills, and methodological competencies). Students presented their analysis (oral presentation, 10min) to the class and discussed it with the professors who scored the overall performance. Professors' expectations were evaluated qualitatively and by the scored grades. Evaluation of the students' expectations are being held through an anonymous online questionnaire (via Moodle).

Results: Professors noticed that students were highly motivated/committed with the work and pro-actively interacted with the professors inside and outside the class. Professors' expectations on acquisition/integration of knowledge were mostly achieved since (56%) groups scored > 1.50/2.00 with @17% > 1.75/2.00. Analysis of the students' expectations is still being evaluated.

Conclusions: Professors consider that a practical work designed to recreate the professional setting was an effective way to consolidate theoretical knowledge while motivating students. Students' feedback is still under analysis but will clarify whether their expectations were also fulfilled.

PE55: Implementation of Reduced Programs for Accelerated Training on the Basis of Higher and Secondary Vocational Education

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Introduction: The rapid pace of pharmacy development necessitates the training of specialists with medical and chemical-technological and biological education for the specialty "Pharmacy". At the same time, from the employers' point of view, employees with fundamental theoretical knowledge and sufficient practical experience are in demand. In the conditions when higher professional education becomes mass-oriented and focused on the needs of regional labour markets, it is necessary to develop organisational and methodological mechanisms to meet the demand in the labour market.

Method: The accelerated distance learning program is the level of higher professional education, so the requirements to the structure, conditions of implementation and results of mastering the basic professional competencies must fully correspond to this level. Creation of this program as a type of mass, regionally oriented, higher education programs should be the basis for solving the problem of balancing the development of labour and professional education spheres in the future.

Results: The educational program includes a cycle of basic disciplines: inorganic chemistry (4 credits), organic chemistry (4), analytical chemistry (4), pharmaceutical botany (3), history of pharmacy (3), biological chemistry (4), modern information technology in pharmacy (3), pharmaceutical technology (4), analytical toxicology (4), basics of research (3) etc. The educational program includes a cycle of major disciplines: pharmaceutical technology (4), pharmacognosy (4), pharmaceutical chemistry (4), biopharmacy (4), hospital management (3), social pharmacy (4), pharmaceutical marketing (4), clinical pharmacy (4), modern aspects of phytotoning (4), pharmaceutical biotechnology (4), basics of pharmacovigilance (4) etc.

Conclusions: The educational program also has an elective component (disciplines) in the three educational departments of organisation, management and economics of pharmacy and clinical pharmacy, pharmaceutical chemistry and toxicological chemistry, pharmacognosy and botany and pharmaceutical technology. The educational program is implemented with elements of distance learning, the program of trilingualism, learning through research and dual learning.

PE56: Virtual Database of Medical Prescriptions

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Introduction: National patterns (templates) of medical prescriptions vary considerably in the individual European countries and may take the appearance of precisely defined form or may be just a blank sheet of paper. In order to get acquainted with the medical prescriptions of different countries there is The Virtual Database of Medicinal Prescriptions created by participants of European Association of Faculties of Pharmacy – Partnership for Education Development grant.

Method: Current and verified information was provided by national associations of pharmacists or by contacted faculties of pharmacy.

Results: The created website of the www.rxforms.eu domain can be considered as the main result of our work. It contains database of medicinal prescriptions (collected in 2020) and exists in two language modification – English and Slovak version. The webpage includes pattern forms (scans) of contemporary medical prescriptions of selected European countries and information about detailed specification, the period of the validity, limitations of the drug prescribing and information on electronic prescribing.

Conclusions: Created database contributes relevant and mainly verified information for pharmacy students, pharmacists as well as the general public and it also can facilitate providing of cross-border medicinal care.

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PR1: Role of the GPR55r Gene in the Emotional Regulation of Male and Female Mice

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Introduction: G-protein coupled receptor 55 (GPR55r) has been described recently as a non-CB1 and non-CB2 receptor, expressed in different brain regions involved in emotional regulation. However, despite recent research advances in this field, the actual involvement of this receptor in the regulation of anxiety and depression remains unclear. For this reason, the main goal of this study was to evaluate the role of the GPR55 in the emotional regulation under basal conditions and after stress exposure in male and female WT and GPR55 knock out (GPR55ko) mice.

Method: A total of 120 male and female mice (60 WT and 60 GPR55ko) were used in the study. Firstly, and under basal conditions, anxiety and depressive-like behaviours were assessed by the light-dark box (LDB), elevated plus maze (EPM), social interaction test (SIT) and tail suspension test (TST) paradigms in male and female WT and GPR55ko mice. An additional set of mice was used to evaluate the acute restrain stress exposure effect on hypothalamic-pituitary-adrenal (HPA) axis activity. To this purpose, the corticotropin-releasing factor (*Crf*) gene expression was measured by Rt-PCR in the paraventricular nucleus (PVN) of the hypothalamus.

Results: Under basal conditions, GPR55ko male and female mice showed higher anxiety in the LDB, EPM and SIT, without affecting depressive-like behaviours in the TST paradigm. These emotional alterations were associated with lower basal *Crf* levels and higher stress axis reactivity in GPR55ko male mice after stress exposure, with a more significant increase of *Crf* gene expression in the GPR55ko male mice than in WT. Interestingly, no differences were observed at the *Crf* level and stress axis reactivity in females.

Conclusions: The results suggest that the GPR55 gene may be strongly involved in anxiety-like behaviours due to alterations in the HPA axis regulation. However, further studies are required to explore further the GPR55 involvement in emotional regulation.

PR2: Formulation of a Protective Lip Balm with Natural Oils and it's Quality Research

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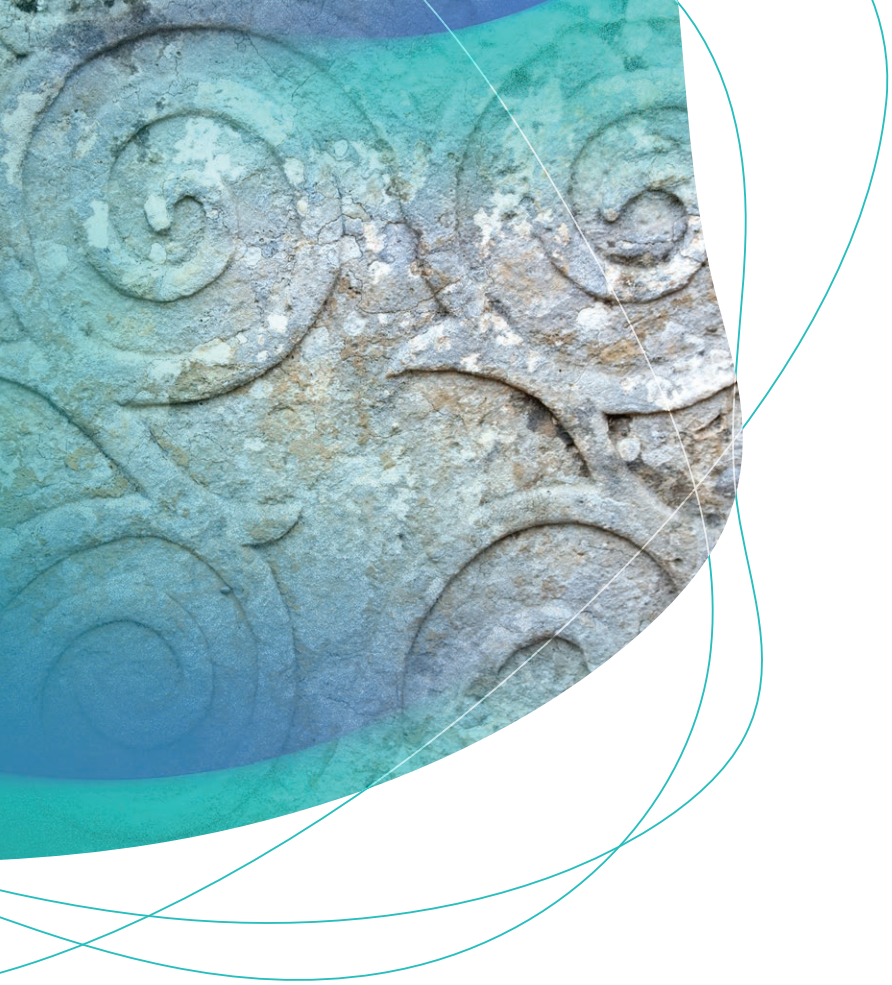
Introduction: The presence of dangerous synthetic substances in cosmetics, there is a need to develop cosmetics from products of natural origin. Cracked, dry, chapped lips are a very common beauty dilemma, especially in harsh weather. Conventional lip balms often contain synthetic waxes, alumina, parabens, hydrogenated oils, artificial fragrances and colorants. Because lip balms are applied to the skin of the lips, they can often enter the mouth, so it is important that lip balms do not contain toxic substances.

Method: Selected natural ingredients for the formulation of lip balm: beeswax, shea butter, sunflower oil, sea buckthorn oil, maple syrup, vitamin E, orange juice essential oil, soy lecithin. For the production of lip balm, the casting method was chosen, the pH value of the produced lip balm was evaluated and the melting temperature was determined, and the evaluation of sensory properties was performed. Respondents were required to rate lipstick color, odor, appearance, lubricity, smear sensation, and residence time on lip skin.

Results: After the production of lip balm, it was observed that the best consistency is a balm consisting of 60% solids and 40% oils. The pH value was determined to be 6.72 ±0.06. The protective lip balm has weakly acidic properties that are important for maintaining the skin's natural defensive function. The melting temperature of the balm was also determined -53.67 ±4.51°C, the tested balm meets the requirements.

Conclusions: The protective lip balm lasts a long time on the skin, is well absorbed, does not dry out, does not stick to the lips, has a pleasant smell and minimally sweet taste. The lipbalm is a suitable form of dermatological cosmetics.



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