eHealth4all@EU

Interprofessional European eHealth Programme in Higher Education

IO7: Final Report

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- Osnabrück University of Applied Sciences, Health Informatics Research Group
- Osnabrück University, New Public Health Research Group
- University of Eastern Finland, Research Group of Health and Human Service Informatics (HHS)
- University of Porto, Centre for Health Technology and Services Research (CINTESIS)

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Abstract

This report summarizes and discusses the development, main achievements and overall progress of The Interprofessional European eHealth Programme in Higher Education (eHealth4all@EU) project. The project evolved through a strong partnership between members of the consortium, grounding its activities on previous initiatives like TIGER and taking them one step further while looking into the digital health competencies required by graduate students working in health and care and providing teaching approaches and other initiatives to extend further a set of core competencies: Health Information Systems Interoperability, Data Security and Privacy and Data Analytics.

Although the project activities underwent during the pandemic period, a condition that forced reorganization and adaptation of the workplan, the main initiatives like the identification of significant areas of interest for digital health competencies and related relevant teaching methods that foster active learning paved the way for the construction of learning content structured around a syllabus aimed at distance learning and face-to-face learning moments developed with the intent for reuse and fostering the development of these set of competences in future Health Professionals.

To this purpose, we are convinced that grounding steps have been taken with these eHealth4All@EU activities and initiatives.

1 Introduction

This report summarizes and discusses the development, main achievements and overall progress of The Interprofessional European eHealth Programme in Higher Education (eHealth4all@EU) project. It presented itself as innovative as it combines problem-based learning to foster teamwork and problem solution, different types of digital support to build up cohesion with the inter-professional perspective to educate the next generation of professionals. It further pushes forward the wave of eHealth education with a focus on graduate students from multiple backgrounds and their advanced needs for eHealth literacy. One of the main guidelines is its focus on recognizing the critical importance of this heterogeneity of health professionals promoting the interchanging of ideas and experiences in a culturally sensitive and interprofessional way.

The project grounded its activities on initiatives like the Technology Informatics Guiding Education Reform (TIGER) Initiative (Hebda & Calderone, 2010; O'Connor et al, 2017, Hübner et al. 2018) taking them one step further, by looking into the digital health competencies required by a range of graduate students working in health and care and providing teaching approaches and other initiatives to extend competencies in this core professionals further.

The project outlined activities derived from a strong partnership between strong European universities. As the project started, one of the partners dropped out and the planned activities, while keeping the core objectives and aims, had to be rearranged and adapted.

Almost the totality of the timeframe of the project execution was strongly influenced by the Corona/COVID-19 pandemic period, during which its derived restrictions and conditionalism were constantly hovering over every partner institution and country. This putted a strong emphasis on the adapting capabilities of the team and forced the need to redesign and adapt core teaching activities, project meetings and multiplier events.

This report provides a general glimpse into the several activities and conclusions derived from the Intellectual Outputs and discusses the developed activities undertaken to materialize the purposes of the eHealth4all@EU project.

2 Methods

This report was created collaboratively, drawing from each partner's contributions and summarizing in a brief fashion the more detailed information included in each of the IO's reports.

3 Results

The Project started still outside the COVID-19 restrictions, fortunately providing the opportunity for a face-to-face kickoff meeting in Kuopio. From then on, the project management and activities organization evolved through online videoconference platforms and other digital tools. The team meetings were numerous, with variable frequencies ranging from monthly to weekly, depending on the nature of ongoing activities. Besides

consortium meetings, several other bilateral meetings took place for specific work preparation. A collaborative documentation tool (Confluence) was made available to all partners allowing for easy document elaboration and information sharing throughout the duration of the project.

Summary of the Intellectual Outputs

With respect to the defined Intellectual Outputs chronogram, the project followed the planned sequence with adjustments caused by the pandemic restrictions.

The activities started by diving into the healthcare professionals' competencies panorama. On IO1 it was reinforced the notion that all health care professionals need skills and knowledge in HI that should be included right from the beginning of their studies to create an early awareness and further down the curriculum to extend the knowledge for a deeper understanding. It was found that there are no specific recommendations on how to teach HI competencies. Still, the teaching approaches could be a combination of different approaches, from traditional seminars to online classes. The learning activities may also vary from individual tasks to group assignments. However, a strong emphasis should be put in including hands-on exercises or training in the course or education promoting active learning not only through interaction between students and teachers but also between other students. Several competencies in HI were highlighted as essential to be included in the education process of Health Professionals. These ranged from documentation and communication, management such as project management and change management, interoperability, and basic skills in technology and entrepreneurship.

From this acquisition and given the broad range of competencies, a subset of core items was identified and chosen to be further addressed in the next activities: Interoperability, Security and Privacy, and Data Analytics (IO1).

Following the core competencies to be addressed, we followed to identify pedagogical methods that could enhance knowledge acquisition. In this context, both PBL and DPBL (digital problem-based leaning) are identified as useful teaching/learning methods to promote students' competence development beyond a narrow subject-specific qualification. The developed studies' results show that DPBL can be implemented in a comparable way to traditional PBL and that similar student performance can be

achieved. The precise structure of traditional PBL makes it easy to transfer to digital teaching; it also offers an excellent opportunity to be applied to other teaching formats, such as the ones planned for this project's teaching activities: online teaching and summer schools. Furthermore, students are additionally strengthened in their digital competencies (IO2).

From having a set of competencies to address and the identification of pedagogical methods, the next activities were devoted to creating the grounds for content and teaching activities preparation.

With this purpose, a syllabus construction framework was developed around a consensus of partners' practices and general recommendations. After, for each topic (Interoperability, Data Analytics and Security and Privacy), a syllabus was developed and used in the following teaching activities making available for students' information about the teaching activities and promoting the reuse of contents. Assessment and feedback tools were designed to gather evidence on the teaching activities. At this stage, a pipeline for competencies development was devised (IO3).

From this point on, various teaching and learning materials were developed and used for courses on the three subjects, using multiple technologies for knowledge transfer, such as learning videos, and for communication and collaboration of participants and teachers, such as the online whiteboard Miro.

An online course around the three subjects was created and put into practice by each partner (each responsible for one topic). It made use of the content prepared and followed a mixed synchronous/asynchronous model and selected pedagogical methods. A learning management system (Moodle) was made available and used throughout to support content management and activities (IO4).

Drawing from the virtual summer school progress, a face-to-face summer school took place in Porto. This summer school involved a preliminary online preparation phase, given that it was proven helpful in the previous summer school. The methodology of problem-based learning in a highly condensed form continued to be used, given that it had contributed to knowledge transfer and was rated positively by the participants (IO5).

From the evaluation activities that were put into action both in the virtual summer school and on the face-to-face summer school, the main result is the participants' positive feedback agreeing on the importance of present and future eHealth and eHealth education in Europe. They considered each of the topics to be vital and well-linked together (IO6).

The educational pipeline (Fig. 1) illustrates how the IOs were used to finally reach the results, the courses in Interoperability, Data Protection and Security and Clinical Data Analytics.

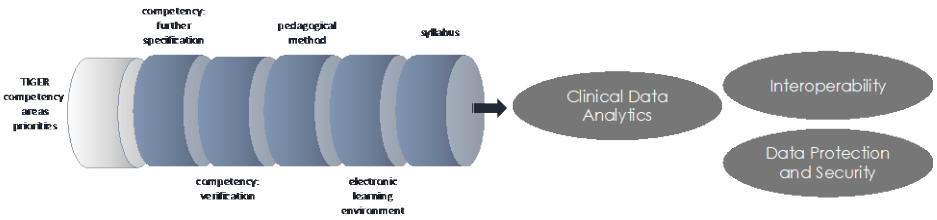

Figure 1: Educational Pipeline. Legend: competency: further specification and verification (IO1), pedagogical method (IO2), electronic learning environment and syllabus (IO3), results and their evaluation (IO4, IO5, IO6).

Multiplier Events

The Corona pandemic also had an impact on the implementation of multiplier events to disseminate the project results. Thus, only the following two events could be conducted during the project period:

eHealth4all@EU: Cybersecurity competencies challenging healthcare

This event took place on 16.06.2022 as a side event within the HIMSS 2022 in Helsinki (Finland) and was organized by the University of Eastern Finland. The aim of this event was to focus on three components that play active roles in a cybersecurity posture in healthcare: people, processes, and technology.

The Digital (Competence) Transformation in Healthcare

The second event took place von 14.12.2022 at the University of Applied Sciences in Osnabrück (Germany). Interprofessionality, digital health and the transfer of competences in dealing with health data were the main topics of this event.

The programme of the two events can be found in the Appendix I.

Publications and conference contributions

A number of publications and conference contributions have been generated by the project (see Appendix II):

Publications:

- Hübner UH, Vieira-Marques P, Hüsers J, Haukkakallio T, Ikonen J, Egbert N, Almeida J, Babitsch B, Kinnunen UM, Correia R, Saranto K. Lessons Learned from an Interprofessional European Summer School in Health Informatics. (submitted)
- Mannevaara P, Saranto K, Kinnunen UM, Hübner U. Recommended target audience, course content and learning arrangements for teaching Health Informatics Competencies: A scoping review. (submitted)
- Mannevaara P, Kinnunen U, Saranto K, Hübner U, Egbert N, Marques P, Sousa P. Exploring what digital competencies are needed in health informatics education. A Focus Group Interview. (will be submitted soon)
- Babitsch B, Pöche-Guckelberger I, Maske D, Egbert N, Hübner U: Concepts and Implementation of Digital Problem-Based Learning (DPBL) in health-related Study Programmes – a Scoping Review. (submitted)
- Hübner U, Saranto K, Vieia-Marques P, Kinnunen UM, Egbert N, Babitsch B, Kalthoff D, Cardosa A, Sousa P, Hüsers J, Padilha M, Mannevaara P, Jokinen T, Mansholt H, Correia R, Morawski TS, Wilson GM, Ball MJ. The eHealth4all@eu Pipeline of Course Development: TIGER Recommendations in Action. Stud Health Technol Inform. 2022;290:1126-1127. doi: 10.3233/SHTI220300

Conference contributions:

- Hübner UH, Egbert N, Kinnunen UM, Correia R, Abdelhak M, Händel A, Boyer C, Ball MJ. TIGER goes ERASMUS: Implementing Problem Based Inter-Professional Health Informatics Education. Workshop at the EFMI Special Topics Conference STC 2020, online, 26.11.2020.
- Hübner UH, Egbert N, Kinnunen UM, Marques P, Saranto K, Mantas J. Interprofessional Health Informatics Education: A view from the Field. Workshop at the Conference Medical Informatics Europe MIE 2021, online, 30.05.2021.

- Hüsers J, Egbert N, Hübner U. Designing international teaching and learning digitally? Experiences from the Online Summer School Learning Healthcare in Action - Clinical Data Analytics. Presentation at the Teaching-Learning-Conference 05.11.2021, Osnabrück University of Applied Sciences. 05.11.2021.
- Mayer P, Egbert N, Hüsers J, Czech H. Making international teaching and learning borderless through digitalization? Opportunities and challenges of global classroom courses. Workshop at the Teaching-Learning-Conference, Osnabrück University of Applied Sciences, 05.11.2021.

4 Conclusion

Reaching the final stages of this endeavor, we can only make a positive balance. The Pandemic created several difficulties bringing unexpected and intense difficulties, particularly in the pursuit of one of the objectives of this program, the face-to-face interconnection, collaboration, and exchange of experiences for students and the project team members. Fortunately, with some adaptations, the available technology made it possible to find solutions and minimize some of the impacts and allowed us to devise new approaches that enriched and reinforced cooperation bonds. In this context, the reorganization of teaching activities leads to the creation of a Virtual Summer School. In the end, given the lift of corona restrictions, a face-to-face Summer School was held in Porto. Also, it was possible to proceed with two multiplier events.

As a future work, further collaboration between partners is ongoing with the reuse of the developed teaching models and contents to replicate in Spring the successful teaching activities developed within this project.

These initiatives further straighten the team's collaboration beyond the project time frame and continue to promote the advance of eHealth education, addressing the continuously evolving challenges that health professionals face in this ever more digital environment and highly heterogeneous environment between countries, healthcare systems and eHealth solutions. This reality will be further enhanced by initiatives such as the European Health Data Space, which will surely be a challenge and an opportunity for health professionals, research and educators throughout the different graduation stages. To this purpose, we are convinced that new steps have been taken with the eHealth4All@EU activities and initiatives.

References

Hebda T, Calderone TL. What nurse educators need to know about the TIGER initiative. Nurse Education. 2010;35(2):56-60.

Hübner U, Shaw T, Thye J, Egbert N, de Fatima M, Chang P, O´Connor S, Day K, Honey M, Blake R, Hovenga E, Skiba D, Ball MJ. Technology Informatics Guiding Education Reform – TIGER - An International Recommendations Framework of Core Competencies in Health Informatics for Nurses. Methods Inf Med. 2018; 57(Open 1):e30-e42.

O'Connor S, Hübner U, Shaw T, Blake R, Ball M. (2017) Time for TIGER to ROAR! Technology Informatics Guiding Education Reform. Nurse Education Today. 2017;58:78-81.

Appendix

Appendix I: Multiplier Events

Appendix II: Publications and conference contributions

Appendix I: Multiplier Events

eHealth4all@EU: Cybersecurity competencies challenging healthcare

The Digital (Competence) Transformation in Healthcare

UNIVERSITY OF EASTERN FINLAND

Erasmus+

Co-funded by the Erasmus+ Programme of the European Union

HIMSS 2022 Side event:

"eHealth4all@EU: Cybersecurity competencies challenging healthcare"

Thursday June 16th at 3.30 pm – 5 pm

At Helsinki Expo and Convention Centre (Messukeskus, Siiven sisäänkäynti), Mesta

The aim of this panel is to focus on three components that play active roles in a cybersecurity posture in healthcare: people, processes, and technology.

Opening remarks
Kaija Saranto, Professor in Health and Human Services informatics, UEF

Cybersecurity in eHealth4all
Tiina Jokinen, Data Protection Officer at Päijät-Häme Joint Authority for Health and Wellbeing

European Health Data Space
Markus Kalliola, Project Director, Health data 2030, Sitra

Experiences from the FHIR community across the world
Grahame Grieve, Consultant, Health Interoperability Standards, FHIR Product Directory, Australia

Commentator
Jari Porrasmaa, Chief Digital Officer at KSSHP

Closing remarks
Ulla-Mari Kinnunen, Professor in Health and Human Services informatics, UEF

Please, register by June 6th 2022.

https://forms.office.com/r/r49xhreZx1

DIE DIGITALE (KOMPETENZ-) TRANSFORMATION IM GESUNDHEITSWESEN

14 DEZ 2022

10:00 - 10:15 Uhr | Begrüßung

Prof. Dr. Ursula Hertha Hübner, Leitung der Forschungsgruppe Informatik im Gesundheitswesen
Dr. Daniel Kalthoff, Koordinator GesundheitsCampus Osnabrück

10:15 - 10:30 Uhr | Vortrag

Digital Health und Interprofessionalität

Prof. Dr. Ursula Hertha Hübner

10:30 - 10:45 Uhr | Vortrag

Den Datenschatz heben: Vermittlung von Kompetenzen im Umgang mit Gesundheitsdaten

Nicole Egbert, wissenschaftliche Mitarbeiterin Forschungsgruppe Informatik im Gesundheitswesen
Jens Hüsers, wissenschaftlicher Mitarbeiter Forschungsgruppe Informatik im Gesundheitswesen

10:45 - 11:45 Uhr | Workshops

11:45 - 12:45 Uhr | Interaktive Mittagspause

12:45 - 13:00 Uhr | Zusammenfassung und Abschied

Dr. Daniel Kalthoff

Workshop I

New Work und New Learning in der Gesundheitswirtschaft – welche Kompetenzen benötigen Führungspersonen im digitalen Wandel?

Christin Lüttmann, wissenschaftliche Mitarbeiterin GesundheitsCampus Osnabrück

Workshop II

Welche Rollen spielen innovative Technologien wie XR Anwendungen für das Lernen?

Marieke Prien, wissenschaftliche Mitarbeiterin GesundheitsCampus Osnabrück

Workshop III

Wie können Future Skills und insbesondere digitale Skills für Health Professionals greifbar vermittelt werden?

Nicole Egbert, wissenschaftliche Mitarbeiterin Forschungsgruppe Informatik im Gesundheitswesen

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Kofinanziert durch das Programm Erasmus+ der Europäischen Union

Appendix II: Publications and conference contributions

Hübner UH, Vieira-Marques P, Hüsers J, Haukkakallio T, Ikonen J, Egbert N, Almeida J, Babitsch B, Kinnunen UM, Correia R, Saranto K. Lessons Learned from an Interprofessional European Summer School in Health Informatics. (submitted)

Hübner U, Saranto K, Vieia-Marques P, Kinnunen UM, Egbert N, Babitsch B, Kalthoff D, Cardosa A, Sousa P, Hüsers J, Padilha M, Mannevaara P, Jokinen T, Mansholt H, Correia R, Morawski TS, Wilson GM, Ball MJ. The eHealth4all@eu Pipeline of Course Development: TIGER Recommendations in Action. Stud Health Technol Inform. 2022;290:1126-1127. doi: 10.3233/SHTI220300

Hübner UH, Egbert N, Kinnunen UM, Correia R, Abdelhak M, Händel A, Boyer C, Ball MJ. TIGER goes ERASMUS: Implementing Problem Based Inter-Professional Health Informatics Education. Workshop at the EFMI Special Topics Conference STC 2020, online, 26.11.2020.

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Mayer P, Egbert N, Hüsers J, Czech H. Making international teaching and learning borderless through digitalization? Opportunities and challenges of global classroom courses. Workshop at the Teaching-Learning-Conference, Osnabrück University of Applied Sciences, 05.11.2021.

Lessons Learned from an Interprofessional European Summer School in Health Informatics

Ursula H. HÜBNER[1a], Pedro VIEIRA-MARQUES[b], Jens HÜSERS[a], Tiina HAUKKAKALLIO[c], Johanna IKONEN[c], Nicole EGBERT[a], Joao ALMEIDA[b], Birgit BABITSCH[d], Ulla-Mari KINNUNEN[c], Ricardo CORREIA[b], Kaija SARANTO[c]

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Abstract. The aim of this European interprofessional Health Informatics (HI) Summer School was (i) to make advanced healthcare students familiar with what HI can offer in terms of knowledge development for patient care and (ii) to give them an idea about the underlying technical and legal mechanisms. According to the students' evaluation, interprofessional education was very well received, problem-based learning focussing on cases was rated positively and the learning goals were met. However, it was criticised that the online material provided was rather detailed and comprehensive and could have been a bit overcharging for beginners. These drawbacks were obviously compensated by the positive experience of working in international and interprofessional groups and a generally welcoming environment.

Keywords. Interprofessionalism, Summer School, Health Informatics

1. Introduction

Health Informatics (HI) is a large field with many different branches which translates into practical eHealth applications. Technology is becoming ever more ubiquitous in all care provision workflows and settings, increasing the need for the interprofessional healthcare workforce to be prepared for the changes [1]. Challenges of such educational initiatives are well-known: Different backgrounds of the students in terms of prior knowledge, skills and understanding can make these undertakings a complex task.

While interprofessional HI courses or course tracks may not fit into classical curricula, e. g. in medicine or nursing, summer schools can fill this gap. Given their less formal environment, they lend themselves to bringing together graduate students with diverse professional experiences and backgrounds. International HI Summer Schools can

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draw on previous examples, e. g. for medical students [2] and for biomedical and health informatics students [3].

The aim of this European interprofessional HI Summer School was (i) to make advanced healthcare students familiar with what HI can offer in terms of knowledge development for patient care and (ii) to give them an idea about the underlying technical and legal mechanisms. In order to level prior knowledge and skills, online educational material for self-paced learning should prepare the students for this Summer School. The research question of this study was: How do the participants evaluate and experience the HI Summer School from the perspective of the learning outcomes, the interprofessional setting and the didactic approach?

2. Methods

2.1. The Educational Pipeline

The interprofessional European HI Summer School was planned as a face-to-face activity enriched by digital learning. To select the appropriate theme and choose the right didactic and digital approach, an educational pipeline was employed (Fig. 1).

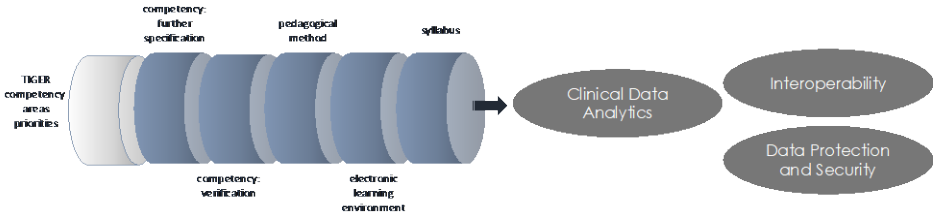

Figure 1. The educational pipeline of the European Summer School.

- **Educational recommendations:** The Summer School intended to address health informatics competency areas for the role "direct patient care (nurses, physicians, physiotherapists)" and "clinical/administrative executives" as these roles well reflected the field of studies of our potential participants. Following the interprofessional TIGER recommendations on HI [4], competencies for "information and knowledge management in patient care" ranked among the first five for these roles and were therefore chosen as the overall theme. This area encompasses the close relationship between data and knowledge development.
- **Specification**: A scoping review on health informatics competencies served to learn from others. The findings from 28 studies that were selected emphasised the importance of a good mix of transferring knowledge and practising skills.
- **Verification**: Focus groups with 22 healthcare professionals (in direct patient care and management) from Finland, Germany and Portugal were conducted to verify the competencies and focus on selected ones. Although the findings were quite diverse, "information and knowledge management" was found highly important, together with "data protection/security" and, to some extent, also "data analytics". Competencies in "interoperability" were debated diversly but esteemed relevant.
- **Pedagogical method:** Problem-based learning (PBL) was considered because of its high capacity for activating students. In order to find out how PBL can be translated into a digital format, a scoping review was conducted. Out of 1007

publications, seven studies were selected that demonstrated the feasibility of digital PBL in a blended or fully online fashion. The PBL approach chosen for this Summer School focused on a clinical case for each module that could also serve as a parenthesis for all course topics. Deviating from the classic 7 step PBL method, self-studies were replaced by group work.

- **Electronic learning environment**: Given its flexibility in content organisation and previous good experience, the Summer School organisers used Moodle as the learning platform for content management and activity support.
- **Syllabus**: Following the syllabus, the summer school was divided into a) an online learning phase using videos, quizzes, and other material to get acquainted with the topics beforehand and b) a face-to-face event where mini lectures were given, the students had to work on a case and finally to present their findings to the plenary.
- **Courses**: Based on the educational recommendations and focus groups, we decided to keep the overall theme "Information and Knowledge Management", following a reasoning line that focused on the life cycle of health information. This rationale included the path of the production and management of interoperable data to the generation of newly derived knowledge in the context of "secondary use of patient data", keeping legal and security concerns transversal to this data flow. Hence, the three interconnect courses Interoperability, Data Analytics and Data Protection and Security were prepared.

The expected learning outcomes were defined as (i) to explain the value of interoperable data and law-compliant data management for secondary use of patient data and (ii) to practically apply the knowledge in selected cases. Table 1 provides the detailed learning goals per course and table 2 the overview of the overarching case.

Table 1. Learning goals for the three courses

Interoperability	Data Protection and Security	Data Analytics
To understand the key elements of structural/semantic interoperability.	To understand the meaning of privacy, confidentiality, integrity and security for processing personal data.	To develop a statistical prediction model using logistics regression.
To understand the main concepts of HL7 FHIR and apply them in a clinical case.	To analyse these legal and ethical requirements and explain how they can be implemented.	To interpret the findings in terms of their applicability for clinical decision support.

Table 2. Overview of the overarching problem-based learning case

A group of doctors and nurses from primary and secondary care wished to improve the quality of care by early detecting patients at risk for diabetes. To do so, patient data from two different types of electronic patient records had to be merged. It was unclear whether they were allowed to share the patient data across settings. Finally, they wanted to develop a risk prediction model from their own data and compare it with the literature.

The Summer School

The Summer School took place at the Faculty of Medicine of the University of Porto, Portugal, from September 8th to 14th, 2022, as a face-to-face event. The participants were recruited from the Universities of Porto, Eastern Finland (UEF) and Osnabrück (Tab. 3). The students (mean age 36 years, 10 females, 2 males) had mixed prior knowledge in the three fields. A certification (2.5 European Credit Points) was issued upon completion of the Summer School. The University of Porto was responsible for the Interoperability course, UEF for the Data Protection and Security course, and Osnabrück UAS for the Data Analytics course. These three courses had been successfully given in 2021 for a similar audience in a complete digital format (due to COVID-19).

Table 3. Characteristics of participants

Students	Finland	Germany	Portugal
Number	4	5	3
Level	PhD	Master	PhD
Background	Health Informatics	Nursing, Physiotherapy, Public Health, Management	Medicine, Nursing, Engineering

2.2. Evaluation Methodology

The aim of the evaluation was to obtain information about the teaching arrangements and students' experiences covering the learning goals of the three courses, interprofessional education and problem-based learning. All in all, the questionnaire included 103 items, the large majority were closed questions. The survey took place at the end of Summer School. Additionally, an open discussion took place.

3. Results

Figure 2 shows main selected findings from the survey. Interprofessional education was very well received. In a nearly similar way, problem-based learning focussing on cases was rated positively. According to the students' votes, the learning goals of the three courses were met for the large majority of them.

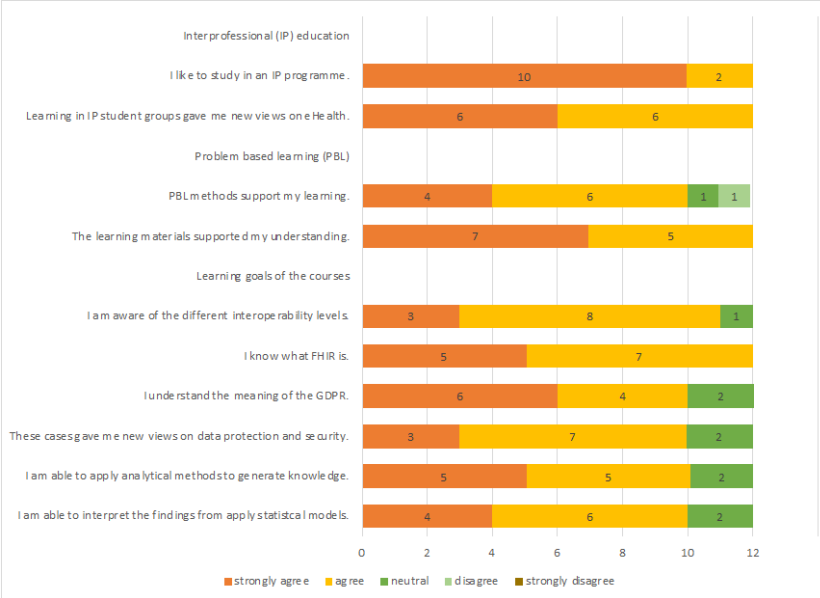

Figure 2. Results of the survey (n=12). Legend: GDPR: General Data Protection Regulation

The open discussion revealed further insights as the following six comments reflect:

1. *The courses gave me inspiration and motivation to continue with my work back at home.*
2. *I enjoyed the week and would recommend participating in a summer school like this.*
3. *I felt very welcomed.*
4. *I think more students would have participated if the information about the program, travelling and financial support would have been given earlier and more transparent.*
5. *Sometimes difficult because of the different education levels.*

6. *Bad communication about the uploaded learning materials - a lot of stuff – it wasn't clear if it was necessary to work through all the stuff. If you have no basic knowledge, it's hard to understand it.*

4. Discussion

As the survey findings and the open discussion demonstrate, the Interprofessional European Summer School was esteemed successful by the large majority of the participants. The goals were met, interprofessional education was highly appreciated and the case-based version of PBL worked well. However, there were also some difficulties encountered. As it was not clear if the Summer School could take place as a face-to-face event due to COVID-19, students were informed rather late about the details. Furthermore, the preparation phase prior to the Summer School was scheduled for the summer vacation, a less favourable time window. The online material provided was rather detailed and comprehensive. For beginners, this could have been a bit overcharging. These drawbacks were obviously compensated by the positive experience of working in international and interprofessional groups and a generally welcoming environment. This Summer School gives evidence for the positive attitude of graduate students towards interprofessional education in HI. It also underlines the value of Summer Schools for demanding topics. Promoting these skills is an influencing factor in the successful implementation and acceptance of eHealth applications [5].

The educational pipeline proved to be time-consuming but rewarding. It offers a rationale for systematic course development which otherwise would have been based on experience only. This procedure pays off, however, only if the courses are given repeatedly. Therefore, the universities involved plan to offer further HI Schools in the years 2023 and 2024. Recent recommendations in biomedical and health informatics [6] will have to be incorporated.

Acknowledgement

ERASMUS + project eHealth4all@eu (grant no. 2019-1-DE01-KA203-005040).

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The eHealth4all@eu Pipeline of Course Development: TIGER Recommendations in Action

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Abstract

This study describes the eHealth4all@eu course development pipeline that builds upon the TIGER educational recommendations and allows a systematic development grounded on scientific and field requirements of competencies, a case/problem-based pedagogical approach and finally results in the syllabus and the course content. The pipeline is exemplified by the course *Learning Healthcare in Action: Clinical Data Analytics.*

Keywords:
Health informatics, education, course development

Introduction

There is a wealth of educational recommendations in health informatics. Some of them have gained high visibility and impact [e.g. 1, 2]. Correspondingly, there is a wealth of health informatics courses tied to a university study programme, or available through subscription to a platform, e.g. the TIGER Virtual Learning Environment [3] and many more channels. While many of these courses originate in the internal expertise of a teacher or professor, there is a need to make the course production more transparent, standardised and thus enhance the quality.

The TIGER (Technology Informatics Guiding Education Reform) initiative embraces a "community of practice" with members from 29 countries around the globe. It comprises an international task force organising regular meetings, workshops, white papers and publications [3-5]. The European ERASMUS plus Strategic Partnership project eHealth4all@eu was inspired by the TIGER educational recommendations and is anchored within the TIGER initiative. It embraces partners from Finland (FI), Germany (DE) and Portugal (PT). eHealth4all@eu develops, implements and evaluates health informatics courses that have been designed according to a scientific procedure, the eHealth4all@eu pipeline of course development. These courses address Master and PhD students as well as health professionals who are seeking continuing education. The courses are designed for an interprofessional audience with a healthcare background and wish to upskill their health informatics competencies. The courses have synchronous and asynchronous online elements as well as face-to-face components. It is the aim of this study within eHealth4all@eu to present the pipeline showcasing its stages and to exemplify how to develop a course in clinical data analytics.

Methods

The course development pipeline (Fig. 1) is triggered by the TIGER International Framework for Recommendations of Core Competencies in Health Informatics 2.0 [5], which specifies priorities of health informatics competency areas for various roles and professions. Because these competency areas are rather broad, further specification is needed that should result from the different stages of the pipeline: specification of competencies (scoping review), verification (6 focus group discussions in FI, DE and PT), pedagogical approaches (scoping review), electronic learning environment (pragmatic decision based on experience), syllabus with meta information about the course and course content.

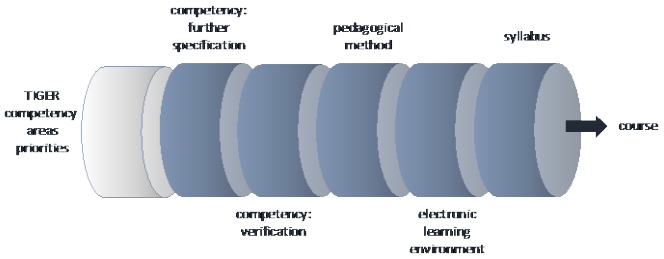

Figure 1– Educational pipeline with different stages

Results

Results of the educational pipeline are presented regarding one exemplar course.

Specification of the competencies: A total of 27 publications from 2016-2020 were included in the scoping review. They showed that interprofessional health informatics education should be provided for all healthcare professional. The courses should include the spectrum of basics in health informatics to information management, information processing, data modelling, as well as practical training including the use of software. The studies showed that online education requires careful planning of interaction among students and teachers.

Verification: Two focus group discussions per country with a total of 22 experts reflected the necessity of education in digitalisation. The group discussion served as guidance for the development of the course contents. Comptencies commonly agreed were data protection and security including ethics and legislation, interoperability, terminologies and coding, management and leadership competencies. Experts hinted at the importance of data-driven health and generation of evidence.

Pedagogical method: A total of twenty-four publications from Pubmed and CINAHL were included in the scoping review on problem based learning in online health informatics education (ePBL). The review revealed a great variety of ePBL methods with the majority of publications reporting advantages such as enhanced scores of students, better time management for participants or cost-effectiveness.

Learning environment: Based on prior experience Moodle was chosen for the courses and Confluence for managing the cooperation in the consortium.

Syllabus: Name: Learning Healthcare in Action: Clinical Data Analytics; ECTS: 3 (81 hours); Language: English; Learning method: synchronous online lectures, self-paced learning via webinars, team work following the case/problem based learning approach; proof of achievement: presentation; duration: Jun to Aug 2021.

Course content: 1) Overview of Learning Health System Principles, 2) Clinical Data and Secondary Use focussing on electronic health records, data sharing and interoperability, 3) Evidence Based Practice – Practice Based Evidence with a focus on observational data and designs, 4) Statistical Modelling with a focus on different regression analyses, 5) Workshop focussing on building models from patient data (wound care, intensive care, cardiovascular conditions) in an ePBL learning paradigm.

Discussion

This pipeline has been tested for the "Clinical Data Analytics" course. The next online courses will address "Interoperability" and "Data Protection and Security". Furthermore, face-to-face courses in "Innovation and Entrepreneurship", "Leadership and Governance" and "Ethics and Legal Topics" will be developed in particular for a Summer School. Feasibility of these courses, learning outcomes regarding pre-post self-evaluation of the students and a proof of achievement per student will serve as material for an evaluation of the courses.

The courses will be offered as a virtual summer (2021) / winter school (2022) with participation from all three countries in a global classroom manner consisting of two half day synchronous online sessions, a self-learning phase of 1.5 months and a 3-day synchronous online session. Furthermore, there will be a 5-day face-to-face summer school in Porto in 2022. More courses will follow that are based on [6] and will reach out to students in the US and the EU.

Conclusions

The eHealth4all@eu project makes a contribution to upskill the (future) healthcare workforce that contribute to the adoption and meaningful use of health IT.

Acknowledgements

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TIGER goes ERASMUS: Implementing Problem Based Inter-professional Health Informatics Education

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Abstract. This workshop is part of the endeavours of TIGER (Technology Informatics Guiding Education Reform) and is taking place in cooperation with members of the American Health Information Management Association (AHIMA) and the International Federation of Health Information Management Associations (IFHIMA) to lay out an actionable vision of inter-professional health informatics education. These efforts have informed the European ERASMUS + project eHealth4all@eu, which is translating amongst others TIGER's core competency recommendations into a European curriculum. The intention of this workshop is to reflect (1) how problem-based learning (PBL) vignettes can serve as a focal point for learners, (2) how electronic media can become instrumental in achieving PBL and how these achievements can be assessed.

Keywords. Health informatics education, inter-professional, electronic learning, problem-based learning

1. Topic

While progress in health digitalization and adoption has been made, a number of barriers still exist including a lack of awareness, understanding and confidence regarding health IT amongst health professionals. Better inter-professional education in eHealth addresses these issues. The TIGER (Technology Informatics Guiding Education Reform) initiative, which has become a part of HIMSS in 2014, has been striving to upskill the health care workforce globally to facilitate collaborative practice utilizing technology and informatics to provide better patient care. These

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efforts in particular the educational recommendations have informed the European ERASMUS + Strategic Partnership project eHealth4all@eu. This project, which embraces partners from UK Scotland, Finland, Portugal and Germany is translating amongst others TIGER's core competency recommendations into a European curriculum and its implementation and evaluation at four sites.

2. Rationale

This workshop is part of the endeavours of TIGER and is taking place in cooperation with members of the American Health Information Management Association (AHIMA) and the International Federation of Health Information Management Associations (IFHIMA) to lay out an actionable vision of inter-professional health informatics education [1]. There are multiple efforts pursuing innovative approaches to inter-professional electronically supported teaching and learning, e.g. out of a vast range [2-4]. The challenge, however, remains how to obtain the best and most sustainable learning outcomes. Problem-based learning (PBL) looks back to a track record in medical education [5] but has rarely been adopted to online-based learning. Guided by the Recommendation Framework [6-8] a practical scheme for teaching health informatics to inter-professional graduate students and health professionals in different European countries will be presented and discussed with the audience. The intention is to reflect together with the workshop attendees (1) how problem-based learning vignettes can serve as a focal point and seed corn for learners to actively develop a deep understanding of the matter, (2) how electronic media can become instrumental in achieving problem-based learning and finally how the learning achievements can be assessed effectively.

3. Outcome

The outcome of this workshop will be twofold. First, input talks together with the findings from the group discussions will effectively impact the plans within the eHealth4all@eu project particularly the work in the field of pedagogical methods, e.g. problem-based learning scenarios in combination with digital media and tools, and the curricular framework. Second, a summary of the workshop will be shared globally in the TIGER community which consists of representatives of 29 countries who have monthly conference calls. At the same time, it will be made available for the public on the eHealth4all@eu website and via the various local and European multiplier events planned in this project.

4. Programme

The programme of the workshop comprises two sections. First there will an input section with short talks and statements on where TIGER, AHIMA/IFHIMA and the eHealth4all@eu project current stand. This section will be followed by a discussion together with the attendees, preferably splitting up into smaller groups to be able to

have focussed discussions. The first section will include the following talks and statements each of which will take 5 minutes plus 20 minutes for questions:

1) The TIGER inter-professional core competencies and the ERASMUS Project eHealth4all@eu (Marion Ball / Ursula Hübner)
2) Health Information Management competencies leading the way to inter-professionalism (Mervat Abdelhak / Angelika Händel)
3) eHealth4all@eu in Finland: inter-professional training (Ulla-Mari Kinnunen)
4) eHealth4all@eu in Germany: learning vignettes in PBL (Nicole Egbert)
5) eHealth4all@eu in Portugal: online media (Ricardo Correira)
6) Example of learning module: trustworthiness of health apps (Célia Boyer)

Following these talks there will be group discussions in the second section which will altogether take 40 minutes. The small group discussions (20 min.) will target the three topics, i.e. "problem-based learning vignettes", "use of electronic media" and "assessing the learning achievements". There will be a moderator who will be assisted by a note keeper for each of these groups. The three groups will convene for the final presentation (20 minutes) in which the three moderators summarise the findings from the group discussions. A conclusion will round up the outcomes of the workshop.

Acknowledgment

eHealth4all@eu is funded by ERASMUS (grant no. 2019-1-DE01.KA203-005040).

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Interprofessional Health Informatics Education: A View from the Field

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Abstract. While the role of academic health informatics education is undoubted, it is less clear what priorities are set by the field. A continuous dialogue between academia and the field is therefore highly desirable. This workshop will serve as a platform to discuss the perspective of the field that had been garnered before through systematic focus group discussions with stakeholders in three European countries within the ERASMUS eHealth4all@eu project. These results will include views from nurses, physicians, pharmacists, chief information officers, managers and representatives of health ministries from Finland, Germany and Portugal. These presentations will be followed by a discussion focussing on education in data protection and security, interoperability and data analytics.

Keywords. Health informatics education, inter-professional competencies, interoperability, data protection, data security, data analytics, science-practice dialogue

1. Topic

While the role of academic health informatics education in a digital healthcare system is undoubted [1, 2], it is less clear how the field, i. e. the variety of stakeholders representing the interprofessional community, sets the priorities in health informatics knowledge and skills of the healthcare workforce. A continuous dialogue between academia and the field is therefore highly desirable. Consequently, this workshop will serve as a platform to discuss the perspective of the field that had been garnered before through systematic focus group discussions with stakeholders in three European countries. It is the aim of this workshop to feedback these findings into the academic community and draw conclusions from the academic view that can later be communicated with the practice.

Rationale

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The TIGER (Technology Informatics Guiding Education Reform) initiative has been striving to offer a platform for the global and interprofessional practice-academic dialogue through its international task force activities, workshops, white papers and publications e.g. [3-5]. The European ERASMUS + Strategic Partnership project eHealth4all@eu is part of these activities. This project, which embraces partners from Finland, Germany and Portugal, is translating amongst others TIGER's core competency recommendations into a European curriculum. The resulting courses are implemented in an online global classroom fashion including students from the three sites and a summer school.

2. Outcome

The outcome of this workshop will be twofold. First, input talks together with the findings from the group discussions will effectively impact the plans within the eHealth4all@eu project particularly for shaping and crafting the online global classroom courses. Second, a summary of the workshop will be shared globally in the TIGER community which consists of representatives of 29 countries who have monthly conference calls. At the same time, it will be made available for the public on the eHealth4all@eu website and in one publication on health informatics education priorities.

3. Programme

The programme of the workshop comprises two sections. First, there will be an input section with two short introductory talks for setting the stage (together 15 minutes) and presentations of the focus group results from each of the three countries in the eHealth4all@eu project (each 15 min.). This section will be followed by a discussion together with the attendees (30 min. altogether), preferably splitting up into smaller groups to be able to have focussed discussions.

1. Recommendations in Biomedical and Health Informatics Education: An Introduction - John Mantas
2. The ERASMUS eHealth4all@eu Project: An Overview - Ursula Hübner
3. Results of the eHealth4all@eu Focus Groups in Finland - Ulla-Mari Kinnunen
4. Results of the eHealth4all@eu Focus Groups in Germany - Nicole Egbert
5. Results of the eHealth4all@eu Focus Groups in Portugal - Pedro Marques
6. Discussion: moderated by Kaija Saranto and Ursula Hübner

The presentations of the results from the focus group discussion will include views from nurses, physicians, pharmacists, chief information officers, managers and representatives of health ministries. These presentations summarise their overall priority ratings of health informatics competencies based on [5]. Furthermore, they will reflect their particular views on data protection and security, interoperability and data analytics as topics that have an impact on the quality of care and need to be trained on a practical level. The group discussions in this workshop will target these three topics. A conclusion will round up the outcomes of the workshop.

Acknowledgment

eHealth4all@eu is funded by ERASMUS (grant no. 2019-1-DE01.KA203-005040).

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INTERNATIONALES LEHREN UND LERNEN DIGITAL GESTALTEN?

Erfahrungen aus der Online Summer School „Learning Healthcare in Action – Clinical Data Analytics“

JENS HÜSERS, NICOLE EGBERT UND URSULA HÜBNER


Photo by Gaëtan Werp on Unsplash


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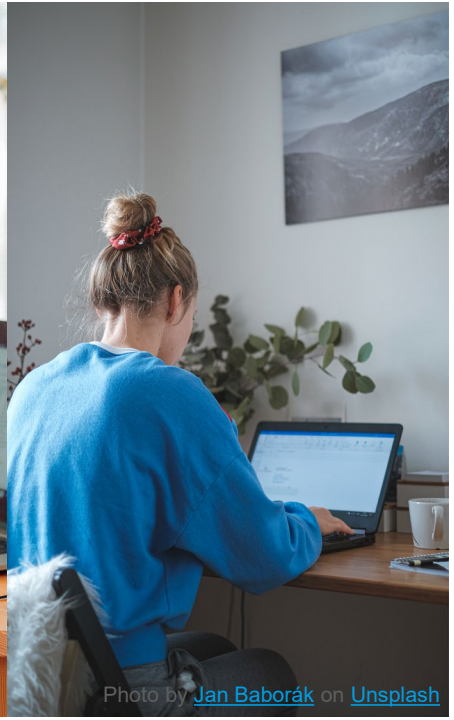
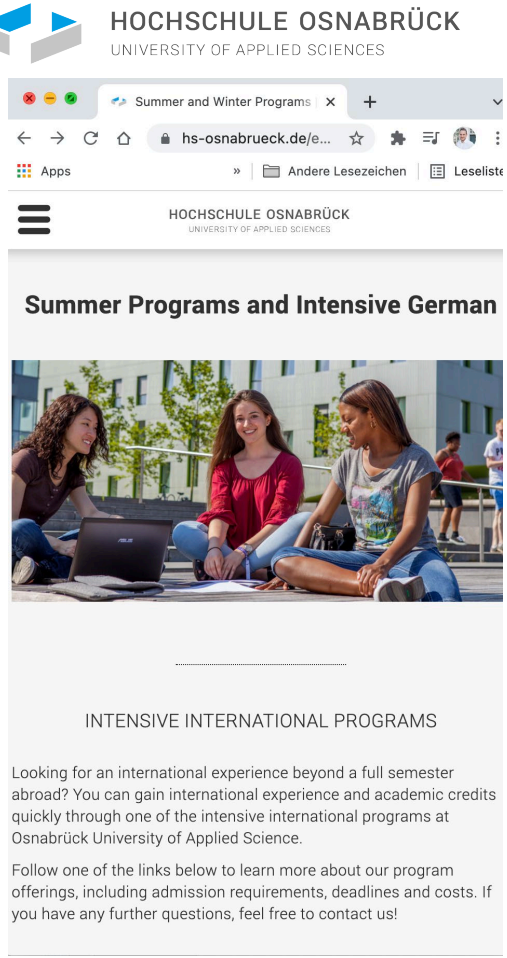


Photo by Jan Baborák on Unsplash

- **Summer Schools** haben eine Tradition an der Hochschule Osnabrück

- **Gemeinsames Lernen** und interkultureller Austausch steht im Vordergrund



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Syllabus and Course Content

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Kick-Off Meeting

Agenda 17th June 2021	
Welcome	The eHealth4all@EU project Syllabus and time schedule Learning outcomes
10 minutes break	
Introduction	Introduction of all participants Learning Management Platform
10 minutes break	
Learning Health System	Presentation Questions & Answers Adjournment

Agenda 18th June 2021	
Learning Health System: Practical Examples in Wound Care	Presentation Questions & Answers
10 minutes break	
Sharing Experience in Data Analytics	Applications Data Methods
10 minutes break	
Introduction into SPSS	Data and variable management Descriptive statistics and visualization

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Syllabus and Course Content

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Kick-Off Meeting

Agenda 17th June 2021	
Welcome	The eHealth4all@EU project Syllabus and time schedule Learning outcomes
10 minutes break	
Introduction	Introduction of all participants Learning Management Platform
10 minutes break	
Learning Health System	Presentation Questions & Answers Adjournment

Agenda 18th June 2021	
Learning Health System: Practical Examples in Wound Care	Presentation Questions & Answers
10 minutes break	
Sharing Experience in Data Analytics	Applications Data Methods
10 minutes break	
Introduction into SPSS	Data and variable management Descriptive statistics and visualization

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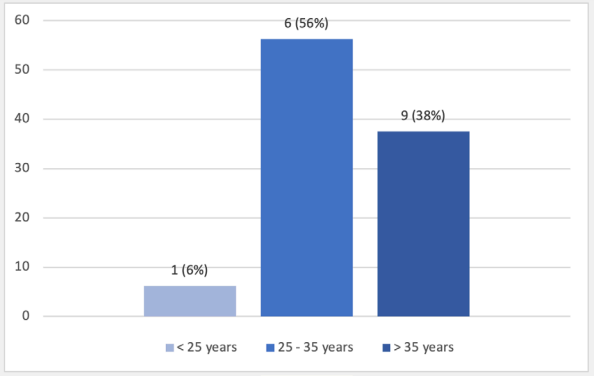
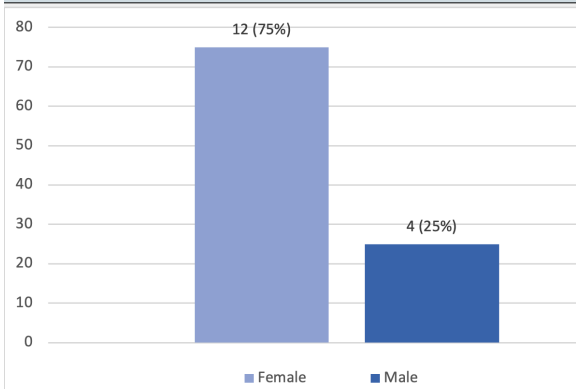
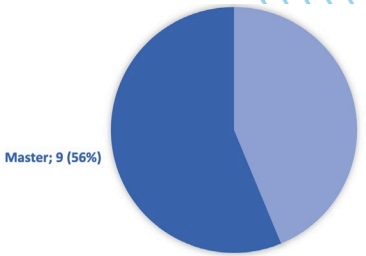
Please specify your age (n = 16 (in %))



Please indicate your gender (n = 16 (in %)).





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Syllabus and Course Content

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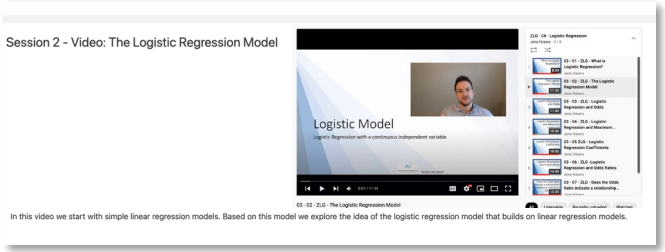
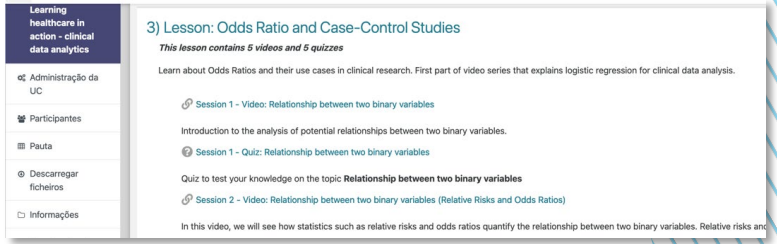
Kick-Off Meeting

Agenda 17th June 2021	
Welcome	The eHealth4all@EU project Syllabus and time schedule Learning outcomes
10 minutes break	
Introduction	Introduction of all participants Learning Management Platform
10 minutes break	
Learning Health System	Presentation Questions & Answers Adjournment

Agenda 18th June 2021	
Learning Health System: Practical Examples in Wound Care	Presentation Questions & Answers
10 minutes break	
Sharing Experience in Data Analytics	Applications Data Methods
10 minutes break	
Introduction into SPSS	Data and variable management Descriptive statistics and visualization

Self-Learning





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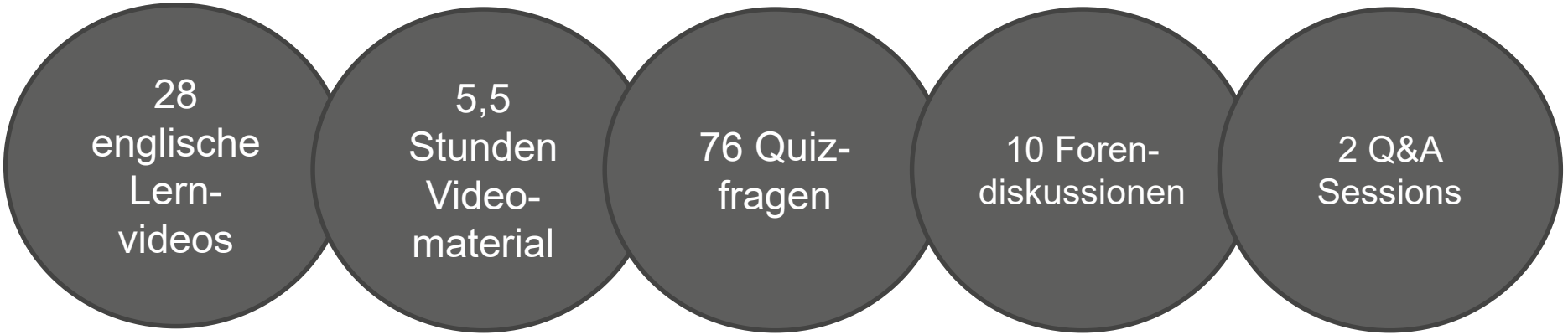
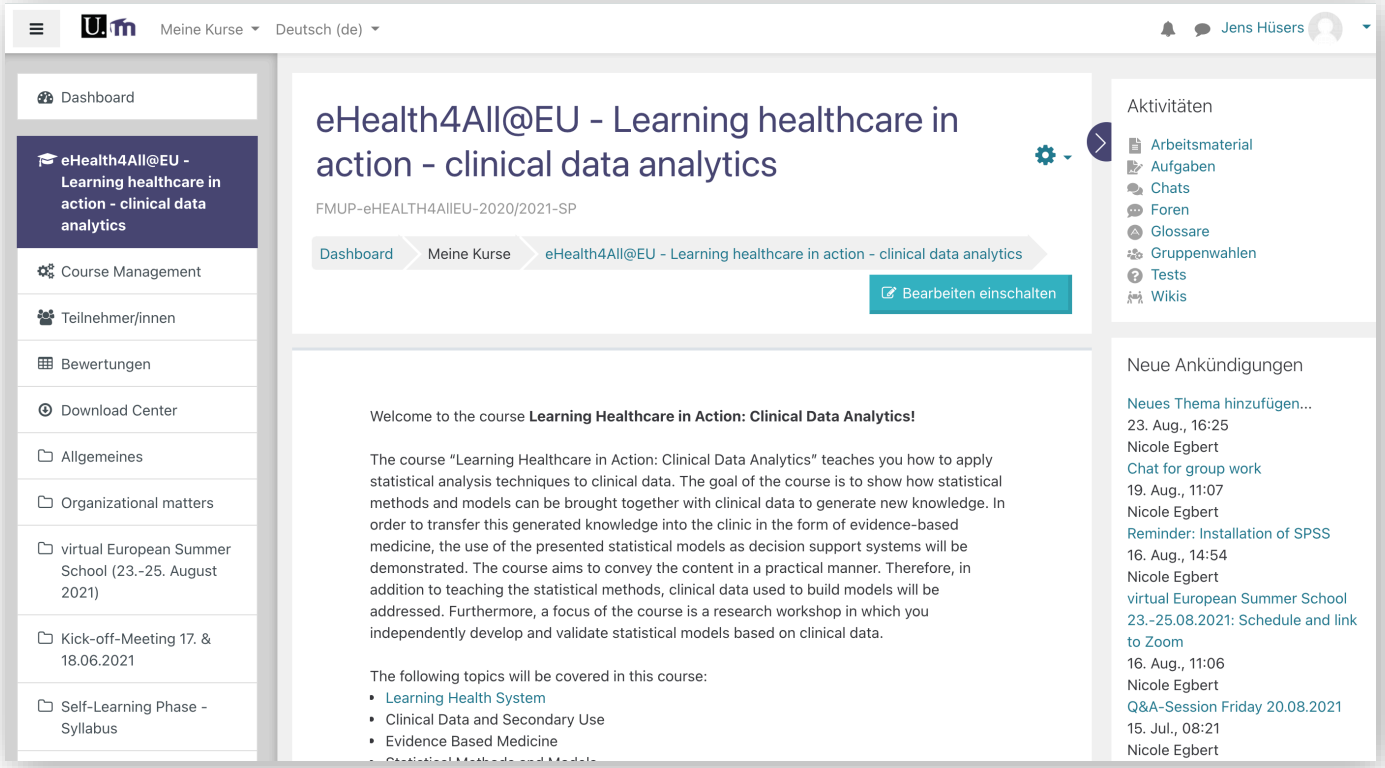
Zahlen und Fakten zur Selbstlernphase





moodle2021.up.pt

Syllabus and Course Content

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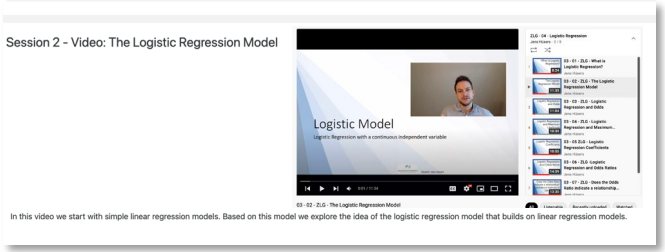

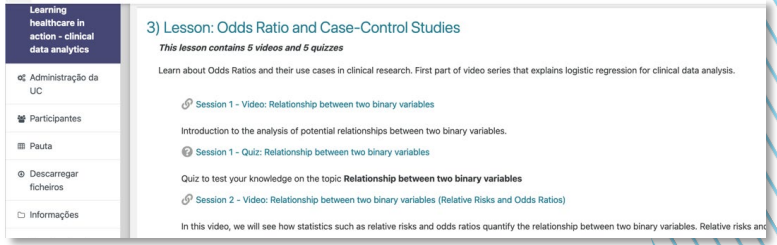

Data Lab

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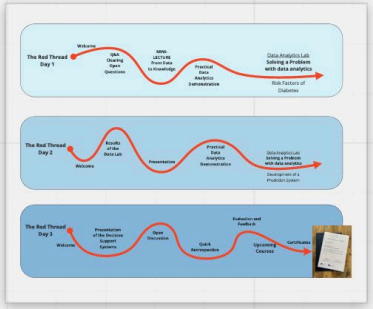
European Summer School
Learning Healthcare in Action

miro

Welcome to Day 1
"Analysing Risk Factors"

Course Event Workshop



Map Activity - What's your Location?

Welcome to Day 2
"Creating Prediction Models"

Positive Gossip

Learning Retrospective

Presentation of the results of the Data Analytic Lab

Discussion

Coffee/Lunch Break

Data Demonstration
Topic:

Welcome to Day 3
"Presentations and Certificates"

Team Osnabrück

Team Kuopio

Team Porto

Coffee Break (15 minutes)

Quick Retrospective

Herausforderungen

- Unverbindlichkeit von Online-Kursen: hohe Drop-Out Quote
- Aktivierung der Studierenden während der Selbstlernphase
- Unterschiedliche Lerntypen (Autodidakt vs. Hörer)
- Falsche Einschätzung des Workloads durch die *Studierenden*
- Falsche Einschätzung des Workloads durch die *Lehrenden*
- Vereinbarkeit mit anderen Verpflichtungen
- Studierende in unterschiedlichen Zeitzonen

VIELEN DANK FÜR DIE AUFMERKSAMKEIT!

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j.huesers@hs-osnabrueck.de

Nicole Egbert, M.A.
n.egbert@hs-osnabrueck.de

Forschungsgruppe Informatik im Gesundheitswesen
https://www.hs-osnabrueck.de/forschungsgruppe-informatik-im-gesundheitswesen/
eHealth4all@EU: https://www.hs-osnabrueck.de/ehealth4alleu/
Zukunftslabor Gesundheit: https://www.zdin.de/zukunftslabore/gesundheit

> Der Sommerkurs zum Thema „Clinical Data Analytics“ war angenehm intensiv und vermittelte richtig gutes und sofort verwertbares Wissen. […] Außerdem lernt man andere Kollegen und Studenten unterschiedlichen Alters und Kulturen kennen. Einige der Lernmaterialien (Videos) sind in YouTube für jeden verfügbar. Es ist einer der am besten konzipierten Kurse, die ich belegt habe.
>
> Teilnehmerin der Summer School

> The course was very well organized and the content was very good. Also the online sessions taught me much more than in previous courses I´ve taken in statistical analysis. I also liked the tasks had to do with real life situations and modelling them.
>
> Teilnehmerin der Summer School

”

The quizzes were fun and motivational. Jens did a really good job in preparing the videos!

Teilnehmerin der Summer School

”

Außerdem gefällt mir die internationale Stimmung im Kurs sehr gut, das etwas steife und altbackene Deutsche fällt weg.

Teilnehmerin der Summer School

”

Due to the timing of my dissertation, it was not possible to conciliate both things. I still tool advantage of the course as it had some topics which I used in my dissertation.

Teilnehmerin der Summer School, die den Kurs abgebrochen hat

> Lehrende die sich im Bereich von Digitalisierung bewegen, berichten immer von Mehrarbeit. Sie müssen Lehrkonzepte in ein neues Format übersetzten. Das kostet immer Zeit.
>
> Dr. Malte Persike, RWTH Aachen; Leiter Center für Lehr- und Lernservices

- Hochschulen müssen Unterstützungsangebote machen
- E-Learning Zentren an den Hochschulen
- Unterstützung der Lehrenden bei der Produktion von digitaler Lernmittel

Ziel: Lehrende in die Lage versetzen, mit den erstellten Materialien Lehre zu gestalten

> Eines der wichtigsten Kriterien [der Digitalisierung der Lehre] auf Seiten der Lehrenden ist der Aufwand, der mit der Erstellung eines digitalen Lernmaterials verbunden ist. Digitalisierung […] darf nicht zu einer Belastung für die ohnehin knappen Ressourcen bei Lehrenden werden.
>
> TAGUNGSBAND Digitale Lehrformen für ein studierendenzentriertes und kompetenzorientiertes Studium

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UNIVERSITY OF APPLIED SCIENCES

„Zukunft von Studium und Lehre in einer digitalisierten Welt“

Hochschulweite Lehr-Lernkonferenz am 05. November 2021

Workshop B

Durch Digitalisierung internationales Lehren und Lernen grenzenlos gestalten? Chancen und Herausforderungen von Global-Classroom-Veranstaltungen

Prof. Dr. Peter Mayer, Nicole Egbert, Jens Hüsers, Henning Czech (LearningCenter)

Abstract:

Die Corona-Pandemie hat viele Lehrende vor Herausforderungen gestellt, weil sie ihre Präsenzlehre ad hoc in digitale Formate überführen mussten. Zugleich wurden aber auch Vorteile der Digitalisierung deutlich. So wurden etwa die Optionen für die Internationalisierung von Studium und Lehre erheblich erweitert. Diesen Aspekt greifen wir in dem Workshop auf. In zwei kurzen Impulsvorträgen berichten die Lehrenden Prof. Dr. Peter Mayer sowie Nicole Egbert und Jens Hüsers von ihren Erfahrungen mit sog. Global-Classroom-Veranstaltungen an der Fakultät WiSo. Dabei kommen sowohl positive Aspekte als auch Herausforderungen zur Sprache. Die anschließende Kleingruppenarbeit in Breakout-Sessions lädt dazu ein, Potenziale für die Etablierung von Global-Classroom-Veranstaltungen im eigenen Lehr- und Studienkontext zu erörtern.