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.
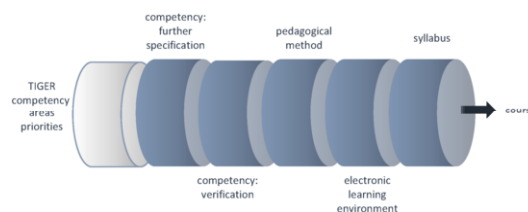

Figure 1– Educational pipeline with different stages

Results

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

Specification of the competencies: A total of 28 publications from 2016-2020 were included in the scoping review. They showed that interprofessional health informatics education should be provided for all healthcare professionals. 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. Competencies 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 the generation of evidence.

Pedagogical method: A total of 24 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, teamwork 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 focusing 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 focusing 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 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 contributes to the adoption and meaningful use of health IT.

Acknowledgements

References

[1] J. Mantas, E. Ammenwerth, G. Demiris, A. Hasman, R. Haux, W. Hersh, et al. Recommendations of the International Medical Informatics Association (IMIA) on Education in Biomedical and Health Informatics. *Methods Inf Med* **49** (2010), 105-120.

[2] Global Health Workforce Council (GHWC). Global Academic Curricula Competencies for Health Information Professionals. Chicago, IL: The AHIMA Foundation 2015. https://ifhima.org/global-health-information-curricula-competencies/. (last accessed 10 Mar 2021).

[3] HIMSS. Health Informatics [Internet]. 2020 [last accessed 10 Mar 2021]. Available from: https://www.himss.org/resources/health-informatics

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

[5] U. Hübner, J. Thye, T. Shaw, B. Elias, N. Egbert, K. Saranto, B. Babitsch, P. Procter, M.J. Ball. Towards the TIGER International Framework for Recommendations of Core Competencies in Health Informatics 2.0: Extending the Scope and the Roles. *Stud Health Technol Inform* **264** (2019), 1218-1222.

[6] U. Hübner, G. Wilson, T. Shaw, M. Ball. *Nursing Informatics: A Health Informatics, Interprofessional and Global Perspective.* 5th Edition. Springer 2021

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