

HPCH 209 - eHealth for Public Health

American University of Beirut
Faculty of Health Sciences
Department of Health Promotion and Community Health

HPCH 209 eHealth for Public Health

[2 credits]



Course Syllabus
Spring Semester, Academic Year: 2023-24
Last updated: January 17, 2024

Course Instructor

Dr. Grace Khawam (PhDc, PharmD, MPH, AFHEA)
Email : gk55@aub.edu.lb
Office hours: **exclusively by appointment** (via email)

Class time and location

Dates, times: **Mondays at 11:00 am - 1:00 pm**
Classroom: **Van Dyck Room 332**

Course description

Social media, mobile apps and artificial intelligence (AI) have become ubiquitous in nearly all aspects of our lives. These technologies are changing the ways healthcare providers interact with and deliver care to their clients. Digital technologies have also changed the way researchers design and implement health promotion and intervention programs, and consumers gather health information and make health decisions. This course is designed to introduce students to eHealth, which encompasses the use of digital technologies to deliver healthcare programs and to promote health among different publics. eHealth or digital health encompasses telehealth (telecare, telemedicine, tele-coaching, tele-rehab), technology-enabled care services, mobile apps, and social media for health promotion campaigns.

Prerequisites: HPCH 210, 212, MCOM 228 and 246

Course learning outcomes

By the end of this course, students will **be able to**:

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LO6.4a. Discuss the benefits and risks associated with artificial intelligence (AI), mobile apps and social media tools used in healthcare, health research, and health promotion.

LO6.4. Apply evidence-based practices in digital health for health promotion

LO6.1. Show proficiency in current digital health trends and issues

Competencies

This course's objectives and learning activities are aligned with the foundational domains, foundational competencies, cross-cutting experiences, and experiential activities required for a Public Health Bachelor's degree, according to the Council on Education for Public Health (CEPH).

Competencies in foundational domains: This course allows students to understand the basic concepts of public health-specific communication, including technical and professional writing and the use of mass media and electronic technology.

Foundational competencies: The course serves to purpose of enhancing the ability to communicate public health information, in both oral and written forms, through a variety of media and to diverse audiences

Format and modes of delivery

The course will be delivered face-to-face, according to the course calendar (see below). The instructor will send course-related communications via **Moodle messages** or **forum posts**, so remember to check your inbox frequently not to miss any important course-related information.

We will use a **flipped classroom peer learning design**, whereby students will go through the readings and other relevant course material ahead of each face-to-face session, and engage in class co-teaching and other course activities inside the classroom. In Module 1, students in groups of two, will choose and present a weekly topic (lecture) to the class. Each pair of students will be asked to present one topic during the face-to-face session. Classroom discussions and peer evaluation/feedback will be provided during the session. In Module 2, students will also practice other skills such as hands-on application and problem-solving, to review digital health tools and recommend better eHealth solutions.

The live sessions (lectures or Q&A sessions) will take approximately **120 mins per week**. Homework, preparing for classes and co-teaching, etc. should take up to **2-3 hours/week**.

Course requirements and student evaluations

You will be evaluated according to the following assessments:

Evaluation	Grade (individual)	Grade (group)	Learning Outcomes
A1) Participation in co-teaching and course activities	20%		LO6.1
A2) Digital Health Assignment		35%	LO6.4a, LO6.4
A3) Exam	45%		LO6.4a, LO6.1

Total	65%	35%	
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1) Participation in co-teaching and course activities (individual assignment: 20%).

Participation involves presenting topics (lectures), engaging in classroom discussions and course activities during face-to-face sessions, contributing to peer evaluation/feedback and expressing views and educated opinions (informed by the course reading material). Participation is not measured through mere attendance or asking questions in class. Even if topics will be presented in the classroom in groups of two, students will be individually assessed on their critical understanding of the topic, how they introduce and explain the topic to their peers, and their knowledge of specific trends and issues linked to the eHealth topic they have selected.

2) Digital Health Assignment (group assignment: 35%)

The purpose of this assignment is:

- a. to review the literature on the use of digital health tools to promote a selected public health issue
- b. to review existing mobile apps addressing a selected public health issue, and
- c. to propose alternative digital health solutions.

In groups of 3-4, students will:

- carry out a literature review of digital health tools related to a specific public health issue,
- conduct a rapid review of mobile apps identified through a pre-defined search strategy and selection process (which will be explained in the classroom practical sessions),
- develop a set of recommendations for developing a new digital solution for the problem.

Note: For support on how to carry out a literature review, please book an appointment ahead of time with the subject librarian Mrs. Nabila Shehabeddine ns24@aub.edu.lb ; ext. 2629.

A detailed instruction sheet for this assignment will be provided at least two weeks before the due date, and will be posted on Moodle. The digital health assignment needs to be submitted through the Moodle Turn it In portal.

3) Exam (individual assignment 45%): This is a written in-class exam which will cover the course essentials, through which students will demonstrate their proficiency (knowledge and skills) in addressing current digital health trends and issues, and discuss the benefits and risks associated with the use of digital health tools.

AUB/FHS policies



Attendance

Attendance will be taken and recorded. You need to be ready and attend classes **on time**; if you cannot attend a class, you should notify the instructor beforehand through formal email communication. Any late arrival (after 15min of start of class) will be considered an absence. If you miss more than one-fifth of the online sessions of any course in the first ten weeks of the semester you may be dropped from the course.



Academic Integrity

Cheating and plagiarism will not be tolerated. Review [the Student Code of Conduct](#) in your handbook and familiarize yourself with definitions and penalties. If you are in doubt about what constitutes plagiarism, ask your instructor because it is your responsibility to know. The American University of Beirut has a strict anti-cheating and anti-plagiarism policy. Penalties include failing marks (zero) on the assignment in question, suspension or expulsion from University and a permanent mention of the disciplinary action in your records.

Note on use of AI (artificial intelligence) tools in the course: There are situations and contexts within this course where you will be asked to use AI tools to explore how they can be used. Outside of those circumstances, you are discouraged from using AI tools to generate content (text, video, audio, images) that will end up in any student work (assignments, activities, responses, etc.) that is part of your evaluation in this course.



Non-Discrimination – Title IX – AUB

AUB is committed to facilitating a campus free of all forms of discrimination including sex/gender-based harassment prohibited by Title IX. The University’s non-discrimination policy applies to, and protects, all students, faculty, and staff. If you think you have experienced discrimination or harassment, including sexual misconduct, we encourage you to tell someone promptly. If you speak to a faculty or staff member about an issue such as harassment, sexual violence, or discrimination, the information will be kept as private as possible, however, faculty and designated staff are required to bring it to the attention of the University’s Title IX Coordinator. Faculty can refer you to fully confidential resources, and you can find information and contacts at www.aub.edu.lb/titleix. **To report an incident**, contact the University’s Title IX Coordinator Ms. Mitra Taouk at 01-350000 ext. 2514, or titleix@aub.edu.lb. An anonymous report may be submitted online via EthicsPoint at www.aub.ethicspoint.com.



Accessible Education Office (AEO)

The Accessible Education Office (AEO) coordinates academic accommodations and services for all eligible AUB students with disabilities (such as ADHD, learning difficulties, mental health conditions, chronic or temporary medical conditions, and others). If you have a disability for which you wish to request accommodations at the department, faculty or university level, please contact AEO as soon as possible. Once you register with our office, we will assist you in receiving appropriate accommodations and will liaise with your instructors and any related entity to best support your needs. AEO is located in West Hall room 314, and can be reached by phone at 1-350000 ext. 3246 or by email: accessibility@aub.edu.lb. Information about our services can be found at: <https://www.aub.edu.lb/SAO/Pages/Accessible-Education.aspx>

Proposed course outline

Sessions (dates)	Topics Covered and Activities	Readings	Learning Objectives
Module 1			
Session 1 22-Jan-2024	<i>Course Overview: What is eHealth?</i> <i>Why is it important for Health?</i>	Eysenbach, 2001; Oh et al., 2005	LO6.1, LO6.4a

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	<i>eHealth definitions, research and applications</i>	Shaw et al., 2017 Booger et al. 2015	
Session 2 29-Jan-2024	<i>The Medical Internet of Things and Big Data</i>	da Fonseca et al. (2021) Thilakarathne et al. (2020) Dimitrov, D. V. (2016). Sun, W., Cai, Z., Li, Y., Liu, F., Fang, S., & Wang, G. (2018)	LO6.1, LO6.4a
Session 3 3-Feb-24 (Saturday)	<i>mHealth, telehealth and the Quantified Self</i>	El-Miedany, Y. (2017). Scott, R. E., & Mars, M. (2015). Rowland, S. P., Fitzgerald, J. E., Holme, T., Powell, J., & McGregor, A. (2020). Ben-Zeev, D., Schueller, S. M., Begale, M., Duffecy, J., Kane, J. M., & Mohr, D. C. (2015). *Swan, M. (2013).	LO6.1, LO6.4a
Session 4 5-Feb-24	<i>Artificial Intelligence (AI) and health</i>	Thilakarathne, N.N., Priyashan, W.D.M. (2022) Chang, A. (2023). Trocin, C., Mikalef, P., Papamitsiou, Z. <i>et al.</i> (2023) Joerin, A., Rauws, M., Fulmer, R., & Black, V. (2020)	LO6.1, LO6.4a
Session 5 12-Feb-24	<i>Consumer Health and e-patients: Guest speaker</i>	Black, A. D., Car, J., Pagliari, C., Anandan, C., Cresswell, K., Bokun, T., ... & Sheikh, A. (2011). Rolls, K., Hansen, M., Jackson, D., & Elliott, D. (2016)	LO6.1, LO6.4a

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Session 6 19-Feb-24	<i>Infoveillance, Infodemiology and social media</i>	Eisenbach (2009) Eisenbach (2020) Townsend, A., Leese, J., Adam, P., McDonald, M., Li, L. C., Kerr, S., & Backman, C. L. (2015).	LO6.1, LO6.4a
Session 7 26-Feb-24	<i>Health and eHealth Literacy</i>	Norman, C. D., & Skinner, H. A. (2006) Norman (2011) El Benny, M., Kabakian-Khasholian, T., El-Jardali, F., & Bardus, M. (2021). van Kessel, R., Wong, B. L. H., Clemens, T., & Brand, H. (2022).	LO6.1, LO6.4a
Session 8 4-Mar-24	<i>Digital Health Interventions and Health Promotion</i>	Welch, V., Petkovic, J., Pardo, J. P., Rader, T., & Tugwell, P. (2016). Wienert, J., Jahnel, T., & Maaß, L. (2022). Gunasekeran, D. V., Tseng, R. M. W., Tham, Y. C., & Wong, T. Y. (2021). Aggarwal, A., Tam, C. C., Wu, D., Li, X., & Qiao, S. (2023).	LO6.1, LO6.4a
Session 9 11-Mar-24	Exam		LO6.4a, LO6.1
Module 2			
Session 10 18-Mar-24	<i>Working on a review of health apps: Developing searches, Inclusion criteria, app selection</i>		LO6.4a, LO6.4
	Latin Easter vacation		
Session 11 8-Apr-24	<i>Working on a review of apps: data extraction and quality appraisal</i>	Azad-Khaneghah et al. (2021) WHO (2016)	LO6.4a, LO6.4

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Session 12 15-Apr-24	<i>Working on a review of apps: data analysis</i>		LO6.4a, LO6.4
Session 13 22-Apr-24	<i>Working on a review of apps: developing recommendations and app framework</i>		LO6.4a, LO6.4
29-Apr-24	<i>Reading period</i>		
29-Apr-24	Digital Health Assignment deadline		LO6.4a, LO6.4

Readings in order of appearance

Session 1 – What is eHealth? Definitions, research, and applications

- Eysenbach, G. (2001). What is e-health?. *Journal of medical Internet research*, 3(2).
- Oh, H., Rizo, C., Enkin, M., & Jadad, A. (2005). What is eHealth (3): a systematic review of published definitions. *Journal of medical Internet research*, 7(1).
- Shaw, T., McGregor, D., Brunner, M., Keep, M., Janssen, A., & Barnet, S. (2017). What is eHealth (6)? Development of a Conceptual Model for eHealth: Qualitative Study with Key Informants. *Journal of Medical Internet Research*, 19(10), e324.
- Boogerd, E. A., Arts, T., Engelen, L. J., & van De Belt, T. H. (2015). "What is eHealth": time for an update?. *JMIR research protocols*, 4(1).

Session 2 – The Medical Internet of Things and Big Data

- da Fonseca, M. H., Kovalski, F., Picinin, C. T., Pedroso, B., & Rubbo, P. (2021) 'E-health practices and technologies: a systematic review from 2014 to 2019', *Healthcare*, 9 (9), p. 1192
- Thilakarathne, N.N., Kagita, M.K. and Gadekallu, Dr.T. (2020) 'The role of the internet of things in Health Care: A systematic and comprehensive study', *International Journal of Engineering and Management Research*, 10(4), pp. 145–159
- Dimitrov, D. V. (2016). Medical internet of things and big data in healthcare. *Healthcare informatics research*, 22(3), 156-163.
- Sun, W., Cai, Z., Li, Y., Liu, F., Fang, S., & Wang, G. (2018). Security and privacy in the medical internet of things: a review. *Security and Communication Networks*, 2018, 1-9.

Session 3 – mHealth, Telehealth and the Quantified Self

El-Miedany, Y. (2017). Telehealth and telemedicine: how the digital era is changing standard health care. *Smart Homecare Technology and Telehealth*, 43-51.

Scott, R. E., & Mars, M. (2015). Telehealth in the developing world: current status and future prospects. *Smart Homecare Technology and TeleHealth*, 25-37.

Rowland, S. P., Fitzgerald, J. E., Holme, T., Powell, J., & McGregor, A. (2020). What is the clinical value of mHealth for patients?. *NPJ digital medicine*, 3(1), 4.

Ben-Zeev, D., Schueller, S. M., Begale, M., Duffecy, J., Kane, J. M., & Mohr, D. C. (2015). Strategies for mHealth research: lessons from 3 mobile intervention studies. *Administration and Policy in Mental Health and Mental Health Services Research*, 42, 157-167.

*Swan, M. (2013). The quantified self: Fundamental disruption in big data science and biological discovery. *Big Data*, 1(2), 85-99.

Session 4 – Artificial Intelligence and Health

Thilakarathne, N.N., Priyashan, W.D.M. (2022). The Medical Internet of Things: A Review of Intelligent Machine Learning and Deep Learning Applications for Leveraging Healthcare. In: Biswas, S., Chowdhury, C., Acharya, B., Liu, CM. (eds) Internet of Things Based Smart Healthcare. Smart Computing and Intelligence. Springer, Singapore.
https://doi.org/10.1007/978-981-19-1408-9_3

Chang, A. (2023). The Role of Artificial Intelligence in Digital Health. In: Meyers, A. (eds) Digital Health Entrepreneurship. Health Informatics. Springer, Cham.

Trocin, C., Mikalef, P., Papamitsiou, Z. *et al.* (2023) Responsible AI for Digital Health: a Synthesis and a Research Agenda. *Inf Syst Front* 25, 2139–2157

Joerin, A., Rauws, M., Fulmer, R., & Black, V. (2020). Ethical artificial intelligence for digital health organizations. *Cureus*, 12(3).

Session 5 – Consumer health and e-patients

Black, A. D., Car, J., Pagliari, C., Anandan, C., Cresswell, K., Bokun, T., ... & Sheikh, A. (2011). The impact of eHealth on the quality and safety of health care: a systematic overview. *PLoS medicine*, 8(1), e1000387.

Rolls, K., Hansen, M., Jackson, D., & Elliott, D. (2016). How health care professionals use social media to create virtual communities: An integrative review. *Journal of medical Internet research*, 18(6).

Session 6 – Infoveillance, Infodemiology and social media

Eysenbach, G. (2009). Infodemiology and infoveillance: framework for an emerging set of public health informatics methods to analyze search, communication and publication behavior on the Internet. *Journal of medical Internet research*, 11(1).

Eysenbach, G. (2020). How to fight an infodemic: the four pillars of infodemic management. *Journal of medical Internet research*, 22(6), e21820.

Townsend, A., Leese, J., Adam, P., McDonald, M., Li, L. C., Kerr, S., & Backman, C. L. (2015). eHealth, participatory medicine, and ethical care: a focus group study of patients' and health care providers' use of health-related internet information. *Journal of medical Internet research*, 17(6).

Welch, V., Petkovic, J., Pardo, J. P., Rader, T., & Tugwell, P. (2016). Interactive social media interventions to promote health equity: an overview of reviews. *Health promotion and chronic disease prevention in Canada: research, policy and practice*, 36(4), 63.

Session 7 – eHealth literacy and information processing

Norman, C. D., & Skinner, H. A. (2006). eHealth literacy: essential skills for consumer health in a networked world. *Journal of medical Internet research*, 8(2).

Norman, C. (2011). eHealth literacy 2.0: problems and opportunities with an evolving concept. *Journal of medical Internet research*, 13(4).

El Benny, M., Kabakian-Khasholian, T., El-Jardali, F., & Bardus, M. (2021). Application of the eHealth Literacy Model in Digital Health Interventions: Scoping Review. *Journal of Medical Internet Research*, 23(6), e23473.

van Kessel, R., Wong, B. L. H., Clemens, T., & Brand, H. (2022). Digital health literacy as a super determinant of health: More than simply the sum of its parts. *Internet interventions*, 27.

Session 8 – Digital Public Health Interventions and Health Promotion

Welch, V., Petkovic, J., Pardo, J. P., Rader, T., & Tugwell, P. (2016). Interactive social media interventions to promote health equity: an overview of reviews. *Health promotion and chronic disease prevention in Canada: research, policy and practice*, 36(4), 63.

Wienert, J., Jahnel, T., & Maaß, L. (2022). What are digital public health interventions? First steps toward a definition and an intervention classification framework. *Journal of Medical Internet Research*, 24(6), e31921.

Gunasekeran, D. V., Tseng, R. M. W. W., Tham, Y. C., & Wong, T. Y. (2021). Applications of digital health for public health responses to COVID-19: a systematic scoping review of artificial intelligence, telehealth and related technologies. *NPJ digital medicine*, 4(1), 40.

Aggarwal, A., Tam, C. C., Wu, D., Li, X., & Qiao, S. (2023). Artificial Intelligence–Based Chatbots for Promoting Health Behavioral Changes: Systematic Review. *Journal of Medical Internet Research*, 25, e40789.

Examples of Health Apps Reviews

Bardus, M., van Beurden, S. B., Smith, J. R., & Abraham, C. (2016). A review and content analysis of engagement, functionality, aesthetics, information quality, and change techniques in the most popular commercial apps for weight management. *International Journal of Behavioral Nutrition and Physical Activity*, 13(1), 35.

Grainger, R., Townsley, H., White, B., Langlotz, T., & Taylor, W. J. (2017). Apps for People With Rheumatoid Arthritis to Monitor Their Disease Activity: A Review of Apps for Best Practice and Quality. *JMIR mHealth and uHealth*, 5(2).

McKay, F. H., Cheng, C., Wright, A., Shill, J., Stephens, H., & Uccellini, M. (2016). Evaluating mobile phone applications for health behaviour change: A systematic review. *Journal of telemedicine and telecare*, 1357633X16673538.

Evaluating the quality of mobile apps

Stoyanov, S. R., Hides, L., Kavanagh, D. J., Zelenko, O., Tjondronegoro, D., & Mani, M. (2015). Mobile app rating scale: a new tool for assessing the quality of health mobile apps. *JMIR mHealth and uHealth*, 3(1), e3422.

Stoyanov, S. R., Hides, L., Kavanagh, D. J., & Wilson, H. (2016). Development and validation of the user version of the Mobile Application Rating Scale (uMARS). *JMIR mHealth and uHealth*, 4(2), e5849.

Bardus, M., Awada, N., Ghandour, L. A., Fares, E. J., Gherbal, T., Al-Zanati, T., & Stoyanov, S. R. (2020). The Arabic version of the Mobile App Rating Scale: development and validation study. *JMIR mHealth and uHealth*, 8(3), e16956.

*Azad-Khaneghah, P., Neubauer, N., Miguel Cruz, A., & Liu, L. (2021). Mobile health app usability and quality rating scales: a systematic review. *Disability and Rehabilitation: Assistive Technology*, 16(7), 712-721.

World Health Organization. (2016). Monitoring and evaluating digital health interventions: a practical guide to conducting research and assessment. **Chapter 6: Reporting your findings: the mHealth Evidence Reporting and Assessment (mERA) checklist.**

Resources for mobile apps design frameworks

<https://technostacks.com/blog/mobile-app-development-frameworks>

<https://aws.amazon.com/mobile/mobile-application-development/>

<https://buildfire.com/mobile-app-design/>

<https://www.cerdonis.tech/blogs/the-process-of-mobile-app-designing/>