Received: 24 October 2024 | Revised: 15 January 2025 | Accepted: 7 March 2025 | Published online: 27 March 2025

RESEARCH ARTICLE

International Journal of Changes in Education
2025, Vol. 00(00) 1–13
DOI: 10.47852/bonviewIJCE52024606

BON VIEW PUBLISHING

Lessons Learned Co-creating a Massive Open Online Course (MOOC) on Refugees' Health Integration

Ioanna Dratsiou[1,*], Annita Varella[1], Anastasia Gkrimoura[2], Iraklis Tsoupouroglou[1], Stathis Konstantinidis[3], Natalia Stathakarou[4], Klas Karlgren[4], Maxine G. Harjani[4], Maria Segura Segura[5], Vicente Traver Salcedo[5] and Panagiotis D. Bamidis[1]

[1]*Medical Physics and Digital Innovation Laboratory, School of Medicine, Faculty of Health Sciences, Aristotle University of Thessaloniki (AUTH), Thessaloniki, Greece*

[2]*EU Project Implementation Department, IEK EUROTraining, Greece*

[3]*School of Health Sciences, University of Nottingham, UK*

[4]*Department of Learning, Informatics, Management and Ethics, Karolinska Institutet, Sweden*

[5]*Institute of Information and Communication Technologies, Polytechnic University of Valencia, Spain*

Abstract: Refugee integration into healthcare is a global challenge, with millions facing barriers in accessing healthcare services due to language, cultural differences, and limited health literacy. In response to these challenges, this study explores the experiences and recommendations contributed by individuals directly involved in the co-design and co-creation of a massive open online course (MOOC) and its effectiveness in addressing refugees' integration into the European healthcare system. A bimodal research approach was employed, combining qualitative insights from individuals involved in the design and development of the MOOC and quantitative data from refugees and professionals engaged in the MOOC's evaluation. Stakeholder discussions were conducted to explore experiences, challenges, and recommendations related to MOOC development. Additionally, a Computer System Usability Questionnaire (CSUQ) was administered to evaluate the MOOC's usability, quality, and interface. Stakeholder discussions emphasized the importance of collaboration, cultural sensitivity, and participatory design in MOOC development. Involving stakeholders and refugees in this participatory process ensured that the MOOC addressed real-world needs and experiences. Additionally, CSUQ results indicated high participant satisfaction with the MOOC, with digital users' literacy level and educational background influencing their perceptions. In summary, this study contributes to the ongoing discussion on refugee healthcare integration and the role of digital education in this context.

Keywords: massive open online courses (MOOCs), refugees' health education, healthcare integration, best practices, digital health awareness, e-learning, participatory approach, co-creation, ASPIRE framework, focus group

1. Introduction

Refugees, forced to leave their home countries due to conflicts or other adverse conditions, face numerous challenges in adapting to new societies and accessing essential public services [1, 2]. Barriers to healthcare services include difficulties in accessing appropriate healthcare services, language barriers, low health literacy, unfamiliarity with health systems, and cultural differences [3, 4]. The availability and quality of healthcare for refugees in Europe vary significantly [5]. Addressing these challenges involves universal health coverage, social support, and access to education. Access to education [6, 7] and healthcare is vital for refugees' successful integration. Equipping refugees with knowledge and skills helps them navigate new environments effectively, improving their overall quality of life [8].

However, integration, a multidimensional and bidirectional process involving both refugees and host countries, is particularly challenging for refugees due to barriers such as residency uncertainty and discrimination [8]. Unlike other migrants, refugees often have little control over their destinations or futures, further complicating their integration [9]. Barriers faced by refugees and migrants in accessing healthcare services include provision of care and obtaining medicines [4], language, health literacy, unfamiliarity with health systems, and cultural beliefs and practices [3]. Furthermore, the status of refugees' health and their ability to access healthcare in Europe varies widely, making it challenging to make direct comparisons or come to definitive conclusions due to the limited amount of evidence available [5]. The task of providing and maintaining high-quality services on a large scale continues to be an

***Corresponding author:** Ioanna Dratsiou, Medical Physics and Digital Innovation Laboratory, School of Medicine, Faculty of Health Sciences, Aristotle University of Thessaloniki (AUTH), Thessaloniki, Greece. Email: dratsiou@auth.gr

immense challenge, despite the commendable efforts made by host countries [10]. Equipping them with the necessary skills and knowledge will allow them to better navigate their new environments and ultimately enhance their overall well-being [11].

Innovative solutions, such as digital learning platforms like massive open online courses (MOOCs), offer opportunities to support refugees. MOOCs provide accessible, flexible, and cost-effective education, including training on healthcare systems and practices [12–14]. Indeed, MOOCs focusing on healthcare topics can equip students with the necessary knowledge and understanding of the local health system, health practices, and healthcare resources [12, 13]. This multifaceted approach to content delivery fosters engagement and helps learners grasp complex healthcare concepts effectively [14]. By enhancing knowledge and skills, these platforms can reduce disparities in healthcare access and enhance refugee well-being [15]. They hold potential for delivering flexible learning tailored to the needs of displaced populations [16, 17].

2. Literature Review

According to the United Nations High Commissioner for Refugees, there were over 120 million forcibly displaced people worldwide by May 2024 as a result of persecution, conflict, violence, human rights violations, and events seriously disturbing public order [6]. The increase in recent years in displaced populations can be largely attributed to ongoing conflicts, such as the armed conflict in Syria [7], Ukraine [18], and many other places in the world. The increase in recent years in displaced populations can be largely attributed to ongoing conflicts, such as the armed conflict in Syria, where approximately six million individuals have become refugees, and another six million are internally displaced within the country [6, 7]. Additionally, a sudden influx of migrants and war refugees from Ukraine into various European countries has further contributed to this trend. According to the United Nations Children's Fund, during a single month of conflict in Ukraine, around 4.3 million children were displaced, with 1.8 million seeking refuge across borders [18]. Amidst these crises, certain critical and interconnected issues have come to the forefront. Mental health and psychosocial support, gender-based violence, and risk communication and community engagement have consistently emerged as essential, multisectoral concerns [19, 20]. Considering the specific vulnerabilities of refugees from Ukraine, including inadequate shelter, overcrowded living conditions, and additional stressors like malnutrition and exposure to cold weather, their situation is compounded. Consequently, the anticipation of outbreaks of respiratory and diarrheal infections is reasonable [21].

Multiple barriers faced by refugees and migrants in accessing healthcare services, including provision of care and obtaining medicines [4], language, health literacy, unfamiliarity with health systems, and cultural beliefs and practices [3, 22]. Furthermore, the status of refugees' health and their ability to access healthcare in Europe vary widely, making it challenging to make direct comparisons or come to definitive conclusions due to the limited amount of evidence available [5]. While refugees face numerous challenges in accessing healthcare and integrating into new societies, there is still much that can be done to help overcome these challenges [9]. Universal health coverage and access to high-quality healthcare [21] and social support, which aid in adapting more smoothly to their new environment [9], while equipping them with the necessary skills and knowledge and raising awareness, will allow them to better navigate their new health and social care environments and ultimately enhance their overall well-being [11].

Addressing refugees' integration into healthcare systems through education is imperative [23]. Education serves as a transformative force that empowers refugees with essential knowledge, skills, and capacities to navigate complex environments and make informed decisions about their well-being in their new context [6, 24]. By focusing on education, refugees are equipped with an understanding of their rights and entitlements, empowering them to assert their access to healthcare services and advocate for equitable treatment [25]. Concurrently, language courses tailored to the local context foster effective communication with healthcare professionals [26], ensuring that refugees can accurately express their health concerns and comprehend medical information [27]. The importance of education is further underlined in addressing cultural differences [28]. Cultural competence bridges the gap between refugees and healthcare providers, enabling the latter to provide culturally sensitive care that respects different health beliefs and practices. In this way, a more inclusive and respectful healthcare environment is fostered, which promotes trust between refugees and healthcare professionals, further enhancing the health integration process [3]. Undoubtedly, education and training that address challenges faced by refugees, along with a few educational programs specifically tailored to meet their needs, foster a more inclusive and respectful healthcare environment [28]. Individuals who are migrants or refugees tend to favor certain methodologies and strategies and the inclusion of support mechanisms [29].

In recent years, the utilization of digital educational resources, specifically MOOCs, has acquired significant popularity within the education sector, fundamentally transforming the methods of knowledge acquisition and learning [30]. MOOCs are freely accessible web-based courses that are available to individuals worldwide and have the opportunity to revolutionize education by increasing the accessibility and reach of education to unlimited numbers of participants [31]. MOOCs have been successfully implemented in various educational domains, including healthcare, person-centered health education [12], and refugees' online education [32]. Indeed, MOOCs that focus on healthcare topics can equip participants with the necessary knowledge and understanding of the health system, health practices, and healthcare resources [12, 13] and have the potential to minimize disparities in healthcare provision access and improve overall well-being among multiple populations [15].

For example, the One Health program in Kakuma Refugee Camp deployed an MOOC to equip refugees with knowledge about global health challenges and build local capacity [16]. Similarly, a basic medical training course in Kakuma and Dadaab refugee camps used MOOCs and online resources, such as Khan Academy videos. The Kakuma version, with enhanced support, showed better learning outcomes, demonstrating refugees' ability to improve healthcare in their communities with adequate resources [16]. The MOOCs4Inclusion project, a European policy study, highlighted the importance of tailored, blended, and facilitated approaches for effectively engaging refugees and migrants in digital learning [29]. Yet, despite these promising initiatives, there is still a real gap in the development of MOOCs specifically focused on refugees' health integration. Although the existing programs do show how MOOCs can effectively address health knowledge and capacity-building among displaced populations, more targeted and scalable solutions are required to ensure refugees' access to tailored health education and support systems.

The quality of digital educational resources plays a vital role in reaching the learning objectives, and it is not new that participatory design with various stakeholders can enhance the quality of the resource and the value for the participants [33]. Many co-creation frameworks have been proposed, including the ASPIRE framework, which involves not only the stakeholders in the design process but also encompasses experts' reviews and piloting in an iterative process [34]. ASPIRE is underpinned by Carver's derivation of experiential learning theory [35], Wenger's communities of practice theory [36], and multimedia learning theory [37, 38], enabling experts and

potential future users of the resources, together with pedagogists and learning technologists, to co-create high-quality resources. While MOOCs have been co-created in the past [39], including health-related topics [12], to the best of our knowledge, there are limited efforts engaging refugees in the design, development, and evaluation of educational resources and MOOCs specifically.

2.1. Rationale of the study

This study was implemented as part of the ReHIn European research project on refugees' health integration, which seeks to raise awareness and provide support for the integration of refugees into European healthcare systems through the development of digital educational resources [40]. Among others, the study incorporates six reusable learning objects (RLOs) [41], in conjunction with supplementary training materials, which were co-created based on the ASPIRE framework, to construct an MOOC. This MOOC is dedicated to fostering refugees' understanding and rights regarding health, sexual and reproductive health, mental health, and well-being.

The primary objective of this study is to illuminate the invaluable experiences and recommendations contributed by individuals directly involved in the co-design and co-creation of the MOOC. Furthermore, the study endeavors to assess the usability and acceptability of the MOOC titled "ReHIn: Refugees' Integration to Healthcare" in addressing the educational requirements of refugees concerning healthcare integration within the European context. Thus, the lesson learned, good or "to avoid" practices identified by the exploration of co-creators' experiences can be demonstrated through the pilot findings toward a high-quality, acceptable, and usable resource. Within this scope, the following research questions were explored in this study:

1) What are the perceptions, feedback, and reflections of individuals involved in the co-design and development of the MOOC?
2) What challenges emerged during the co-design and development of the MOOC?
3) What key findings and best practices were derived from the involvement of individuals in the co-design and development process of the MOOC?
4) To what extent does the MOOC contribute to the facilitation of healthcare access for refugees, considering its effectiveness, usefulness, and acceptance?

3. Research Methodology

3.1. Research design and participants

This study has employed a mixed-methods approach, combining participatory co-creation methods with evaluative quantitative and qualitative techniques. A bimodal research approach was employed, involving two distinct participant groups: one group consisted of stakeholders who actively participated in the co-design and development of the MOOC with stakeholders (refugees, support workers, clinicians, etc.) exploring their experiences on co-creation, while the other comprised individuals engaged in the evaluation of the MOOC. Ten participants (N = 10) who were involved in the co-creation representing a diverse array of disciplines such as computer sciences, engineering, medicine, psychology, and education participated in a focus group discussion. Participants consisted of 40% males and 60% females.

The second group assessing the MOOC consisted of both refugees and people working in support of refugees (N = 40). Participants in this group were recruited by sharing an invitation in various refugee camps across Greece through existing contacts with individuals and organizations working in refugee support. They comprised 45% (N = 18) males and 55% (N = 22) females. The age distribution indicated that 32.5% (N = 13) fell between the ages of 18 and 29, 30% (N = 12), 30% (N = 12) between the ages of 30–39, 22.5% (N = 9) was 40–49 years old, while the remaining 15% (N = 6) was between the ages of 50–59. Regarding the education level, 15% (N = 6) of participants had completed primary or lower secondary education (elementary school, middle school), 2.5% (N = 1) had an upper secondary school certificate, 2.5% (N = 1) a certificate from a vocational training institute, 50% (N = 20) a bachelor's degree, while 30% (N = 12) a postgraduate degree. In terms of self-reported digital technology literacy, 47.5% (N = 19) of participants were classified as advanced users (Level 3), 40% (N = 16) were intermediate users (Level 2), and 12.5% (N = 5) were identified as basic users (Level 1) of digital technologies. Professional occupations included 45% (N = 18) working in the private or public sector, 37.5% (N = 15) were classified as educators, 10% (N = 4) were unemployed, while 7.5% (N = 3) declared other.

3.1.1. Instruments

1) Focus group discussion

A focus group discussion was conducted with the aim of gathering data and insights regarding significant topics that arose during the co-design and development of the MOOC, thus illuminating the diverse perspectives and experiences of the participants, which were co-created together with refugees, refugees' support workers, and other stakeholders. This approach highlights the collaborative and participatory nature of this study, emphasizing how the collective wisdom and experiences of the participants were instrumental in shaping guidance for future initiatives in digital educational resource development.

As a first step, a targeted literature review was performed to identify the most adequate evaluation axes for the focus group semi-structured guide. The review encompassed studies, reports, and systematic reviews, aiming to gain a broad understanding of the topic and identify current gaps and challenges in the field. Drawing upon the insights from the literature review, a focus group session was organized, inviting participants who possessed expertise and experience in designing and developing educational resources that address the needs of refugees in healthcare integration and support. The focus group discussion session aimed to verify and expand upon the thematic axes identified in the literature review. Specifically, the discussion centered around three main thematic categories, which served as central axes for in-depth examination:

Design experience and expertise: This category explored the co-creation experience and expertise of the participants involved in the development of digital educational resources and the specific MOOC under evaluation. The goal was to discuss the unique perspectives, insights, and lessons learned from each participant's experience, providing valuable input to inform the co-design and development process.

Challenges and mitigation practices: In this category, the focus group participants identified and discussed the difficulties and challenges encountered during the development of the MOOC. These challenges were examined in the context of cultural and linguistic diversity, different backgrounds and technologies, educational material development, curriculum design, and course implementation. Participants also shared strategies and solutions

they employed to effectively address these challenges, offering examples that highlighted successful approaches in overcoming barriers.

Recommendations and best practices: Drawing upon the insights obtained from the literature review, the focus group session adopted a participatory approach specifically in the context of generating recommendations and best practices. During this phase, participants representing diverse multidisciplinary backgrounds each contributed their unique experiences and perspectives to the process. They brought their extensive expertise in designing and developing educational resources for refugee healthcare integration, ensuring a rich and multifaceted collaborative effort in shaping the recommendations and best practices.

2) Computer system usability questionnaire (CSUQ)

To assess the usability and acceptability of the MOOC with the second group of participants, the CSUQ was chosen since it has a high level of reliability and is suitable in the context of this research. The original items (N=19) by Lewis [42], which had gone through the reliability and validity process, were modified to suit the context of this study. Additional items were also added to further understand users' impressions, satisfaction, and expectations of the MOOC content. A total of 28 items were used in this research, using a five-point Likert scale anchored on "1 = strongly disagree" to "5 = strongly agree" and were categorized into three key dimensions:

MOOC usability: This dimension focuses on how intuitive and easy to navigate the MOOC is, covering the clarity of instructions and how efficient the platform will be for users.

MOOC quality: This category looks at the relevance, accuracy, and value of the MOOC content. It looks at whether the material met users' learning needs and expectations.

MOOC interface: This dimension refers to the visual and functional appearance of the platform, including layout, presentation, and esthetics of the MOOC.

3.1.2. Research procedures

The study followed a multiphase research design grounded in the ASPIRE participatory framework (Analyze, Stakeholders, Plan, Implement, Review, Evaluate), integrating key stakeholders' inputs throughout the MOOC development process while also conducting empirical evaluations to assess its effectiveness and relevance. The development of the MOOC "ReHIn: Refugees' Integration to Healthcare," followed an adapted ASPIRE participatory approach. First, a stakeholder's participatory workshop to identify the relevant topics was conducted at Karolinska Institutet in Sweden, followed by a modified Delphi study [43] to further define topics for refugees' health integration. The Delphi study included participants who were recruited by purposive sampling, with a focus on active researchers or people working with refugees because they are knowledgeable about the health needs of this population. The analysis of participants' responses to the initial survey identified key themes and were categorized into general themes, such as rights to health, access to healthcare, social inclusion, health literacy, self-care, and digital skills, and COVID-19-related themes such as prevention measures, public guidance, access to services, and misinformation. These themes led to the development of sixteen (16) learning objectives that would foster an understanding of healthcare cultures and systems in a holistic approach toward refugee health integration. These objectives were further refined through a collaborative process among multiple authors, based on survey insights and broader integration perspectives as well as a consultation meeting within the ReHIn team decided on the final topics which were categorized into six categories: (1) self-care and preventative health, (2) social inclusion, (3) rights to health and confidentiality, (4) health literacy, (5) access to healthcare, and (6) digital skills. RLOs co-created following the ASPIRE process as assets for the MOOC, which was developed by the ReHIn team and evaluated by experts and followed by stakeholders (refugees and people working in support of refugees) evaluation as described in Figure 1.

A three-week course was developed to address the above topics and support refugees' integration in the EU healthcare system. The MOOC was developed and hosted in the Open edX platform called UPVx (Figure 2). The content created included introductory information, videos, RLOs, and learning activities including multiple-choice questions, case-based formative assessments, learning-focused assessments, and a forum where the participants can interact. Subtitles in the Arabic language have been produced and provided along with the materials of the MOOC as Arabic was identified to be representative of the majority of refugees. The structure of the MOOC is presented below:

1) Week 1: Accessibility and rights to health;
2) Week 2: Sexual and reproductive health;
3) Week 3: Mental health and well-being.

3.1.3. Implementation

The research procedure involved both qualitative and quantitative methods, allowing for a comprehensive understanding of experts' experiences and recommendations on co-creating an MOOC on refugees' health integration and exploring the impact of

Figure 1
Modified ASPIRE process for REHIN MOOCs co-creation

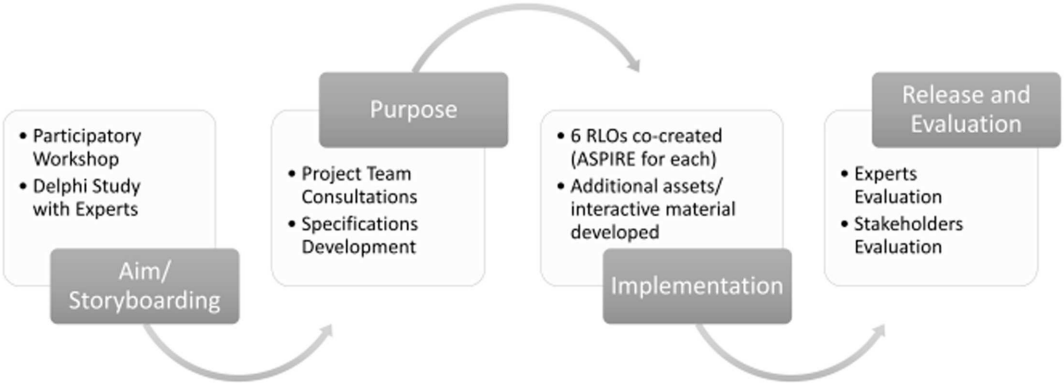
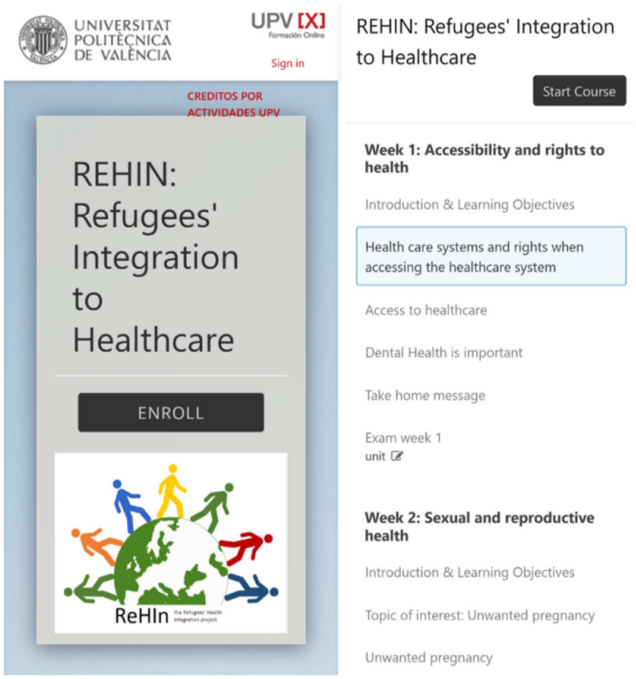


Figure 2
REHIN MOOC interface



the developed MOOC. The qualitative data were gathered through a focus group discussion with the participants, exploring three key thematic axes: design experience and expertise, challenges and mitigation practices, and recommendations for best practices. The quantitative data were collected using a questionnaire to evaluate the usability, quality, and interface of the MOOC.

More specifically, a two-hour focus group discussion was held at the Laboratory of Medical Physics and Digital Innovation, Aristotle University of Thessaloniki (AUTH), involving 10 participants who actively contributed to the co-design and development of the MOOC. The insights and discussions from this session played a crucial role in analyzing and documenting valuable input for refining best practices and guiding future initiatives in the development of educational resources tailored to the specific needs of refugees in healthcare integration. The session was recorded, and the transcribed discussion served as the foundation for a meticulous, deductive thematic analysis, aligning with predetermined thematic axes. Next, refugees and people working in support of refugees (N = 40) were provided with the opportunity to interact with the MOOC "ReHIn: Refugee' Integration to Healthcare," allowing them to navigate and explore the different sections and instances of the MOOC. Following that, they were requested to evaluate the MOOC in terms of its usability, quality, and interface. Data collection was conducted through an electronically distributed questionnaire available in both Greek and English languages.

The study followed General Data Protection Regulation (GDPR) and received bioethics approval (approval number: 5.168.18/12/2019) from the Aristotle University of Thessaloniki Bioethics Committee. All participants provided informed consent, understanding the study's scope and their rights. Privacy was ensured by anonymizing focus group participants in transcriptions, and online questionnaire data were securely stored and encrypted to protect personal information.

3.1.4. Data collection and analysis

A correlation analysis was performed to explore the relationships between the variables. The correlation analysis aimed to determine the strength and direction of the associations among the variables in the study. Therefore, Pearson's correlation coefficient was used to assess the linear relationship between two continuous variables. A predetermined significance level of p = 0.05 was used as the threshold for determining the statistical significance of the correlations. Correlation coefficients with associated p-values below p = 0.05 were considered statistically significant, indicating a meaningful relationship between the variables. In the focus group discussion analysis, a thematic approach was employed to meticulously identify and categorize the key themes that emerged from the discussions within the focus group.

In analyzing the qualitative data from the focus group discussion, a thematic analysis was employed to identify and categorize the key themes that emerged within the predetermined thematic axes. The transcribed data were analyzed systematically, aligning with the thematic framework of (1) design experience and expertise, (2) challenges and mitigation practices, and (3) recommendations for best practices. Qualitative data analysis was done manually, with no support of qualitative analysis software, allowing contextual details and nuances of the participants' insights to remain preserved for in-depth examination.

4. Findings

4.1. Focus group discussion analysis

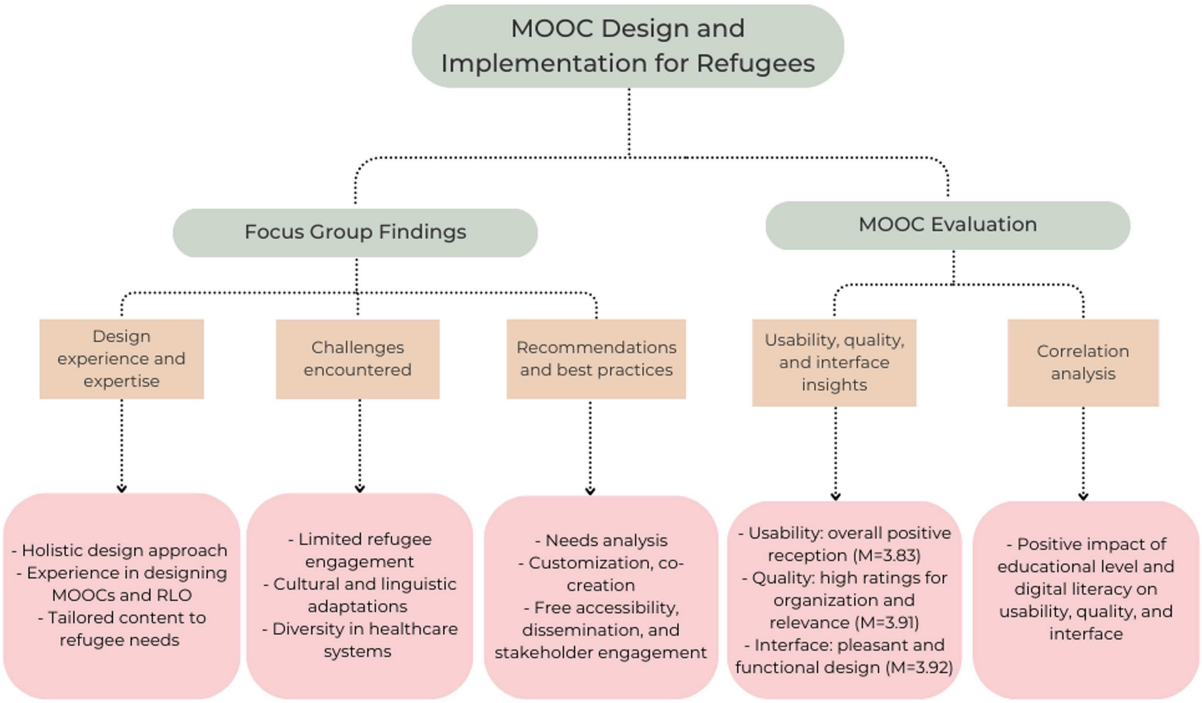
To explore the perspectives and experiences of the participants during the design and development of the MOOC, data obtained from the focus group discussion offer valuable insights into their experiences, challenges encountered, and recommendations regarding best practices for enhancing the design process, which is key to the effectiveness of the course (Figure 3).

4.1.1. Design experience and expertise

During the discussion, participants stressed the significance of considering multiple factors, including language considerations, availability of educational resources, alignment with learners' needs, sociocultural aspects, and the incorporation of interactive activities when designing digital educational resources. These insights highlight the importance of adopting a holistic approach when designing and developing RLOs and MOOCs, ensuring their effectiveness and efficacy in promoting refugees' healthcare support and integration. It was also reported that participants had prior experience and expertise in working with refugees and co-designing and developing digital educational resources.

> "We have prior experience of more than 15 years in designing and developing other MOOCs. It is important that we take into consideration the language barriers, the availability of educational resources for the specific target group, the sociocultural differences, and the kind of interactive activities that could facilitate their learning experience."
>
> "I have had previous experience in designing RLOs and we have successfully created two MOOCs with a significant number of participants. The design phase proved to be the most challenging, followed by the development phase. Collaboration with various individuals was essential to bring the projects to fruition."

Figure 3
Visual representation of findings



"More or less, all of us have experience in using or designing educational resources."

Additionally, participants focused on the need to design educational resources that are tailored to meet the specific needs of refugees, particularly in relation to healthcare. They acknowledged the challenges associated with developing essential content that is addressed to refugees' unique needs. It was also mentioned that refugees might require multiple means of documentation to provide the information required but also simplify complex concepts and ensure that information is communicated in a way that is easy to understand.

"There were several challenges, i.e., it was essential to find a balance between discussing the seriousness of the topic and making sure it is accessible and comprehensible to everyone addressed."

"Designing materials specifically tailored to address the healthcare needs of refugees was also a significant concern."

Overall, the results highlight the need for prior experience in designing and developing digital educational resources for refugees through focusing on addressing their unique needs when accessing healthcare systems in the EU. Thus, these insights can act as the basis for effectively designing digital educational resources for refugees, aiming to better facilitate their integration into EU healthcare systems.

4.1.2. Challenges and mitigation practices

Discussion on challenges that emerged during the co-creation of the MOOC reveals that participants encountered difficulties in directly engaging with refugees themselves, despite having access to nongovernmental organizations (NGOs) and subject-matter experts. This posed a constraint on their ability to directly interact with the refugee population, limiting their level of engagement.

"We had access to NGOs, and they were really helpful, but it was difficult to approach the refugees themselves. We could find experts in this field but not approach them directly."

"Also, we should communicate with the NGOs in order to provide us with information about the content and translate the language."

Furthermore, participants recognized the difficulties associated with designing the MOOC while considering cultural and linguistic factors. They emphasized the importance of creating content that is not only generic but also adaptable to various languages. The translation of content into multiple languages proved to be a significant challenge, as during the translation process, participants encountered issues, particularly when translating most of the content would be sufficient.

"In other cases, if we had the most content translated, we assume that we would not face problems in the process."

"Translators were needed to facilitate communication with the population of refugees, which were not from Europe."

"An issue was about the cultural and linguistic aspects of designing the MOOC, separate from the content itself, and ensuring its usability. Apart from the content that should be a little generic to be reusable we also had to consider language factors. So, we develop most of the content in English, and another problem was to find individuals proficient in other languages for translation purposes."

Moreover, the participants placed significant emphasis on the value of collaboration, regular meetings, and transparent communication

within their own group. Additionally, the participants encountered challenges in the provision of resources tailored to the diverse healthcare systems across different countries. Consequently, they recognized the necessity to comprehend and account for the distinct healthcare approaches and customary medical practices prevalent among refugees. Demonstrating respect for refugees' cultural methods emerged as a pivotal factor in establishing trust and professionalism.

> "It was also difficult to provide resources catered to the unique healthcare systems of each country, so you had to know the healthcare system of each country, avoiding a one-size-fits-all approach."
>
> "Balancing the need for generic elements, effective communication, and minimizing significant differences in approaches proved to be complex."
>
> "They use more traditional ways of medicine in some countries, and we had to let them know what we are doing in Europe. Another important point was about respecting them and their methods. If you don't respect them, they don't trust your professionalism, and they can't accept the way that we are doing it in Europe. "

Overall, the results highlight various challenges encountered during the design process, including difficulties in approaching refugees, generalization at the European level, language barriers, cultural considerations, and the need for cooperation and problem-solving. The participants provided insights into the mitigation practices employed to address these challenges and create effective educational resources for refugees' understanding of European health systems.

4.1.3. Recommendations and best practices

Based on the recommendations and good practices identified, participants emphasized the significance of customization to adequately address the specific needs of refugees. They suggested proactively involving refugees in the iterative process of co-creation as a means to enhance their comprehension and engagement. Additionally, the participants highlighted the importance of conducting a comprehensive needs analysis prior to the development of educational resources. This emphasis was placed carefully, considering the most effective means of transmitting messages to facilitate better understanding and improved engagement with the content.

> "Customization is necessary to engage refugees more actively in the interaction [with educational material]."
>
> "Personalization and customization are good practices to address many issues and create a MOOC that will have an impact. You need to do good research to find a valuable resource."
>
> "I think that running a needs analysis is crucial prior to resource development, as it allows for a comprehensive understanding of requirements. It is also important to consider effective methods for knowledge sharing."

Moreover, a noteworthy suggestion introduced by a participant pertained to the incorporation of personalized content within MOOCs targeted specifically toward NGOs and social support associations. This recommendation underlines the significance of tailoring the course material to align with the unique requirements and contextual nuances encountered by refugees. It also highlights the collaborative efforts required by pertinent organizations to guarantee the accuracy and relevance of the content provided and, additionally, to reach as many people as possible.

> "Technology is a valuable instrument to discover reliable resources and at the same time consider effective methods of transmitting the gathered information."

Furthermore, most participants focused on the importance of promoting knowledge to refugees regarding the healthcare culture, particularly emphasizing the need to move beyond exclusive reliance on traditional medical practices. They stated the significance of ensuring that refugees are well-informed about the prevalent healthcare culture in Europe. This highlights the imperative of delivering accurate and pertinent information to facilitate a comprehensive understanding and seamless integration into the European healthcare system. The following compilation of best practices and recommendations has emerged:

1) User needs and requirements analysis prior to the design.
2) Performance state-of-the-art research and exploration of trends in policies and practices.
3) Personalization and customization of content based on end-users' needs.
4) Clear and straightforward content and resources.
5) Direct and constant collaboration with all related stakeholders during all the phases of design and development of resources (co-creation).
6) Translation of content and interface.
7) Interdisciplinarity. People come from different backgrounds, bringing different perspectives and experiences.
8) Keep it free and accessible.
9) Appropriate dissemination and target group reach-out; engagement from the early beginning.
10) Establishment of essential synergies with NGOs and related organizations.

4.2. Descriptive statistics: Overview of usability, quality, and interface of the MOOC

The internal consistency of the measurement instrument was assessed using Cronbach's alpha coefficient. The obtained Cronbach's alpha coefficient for the usability subscale was 0.91; for the quality subscale, it was 0.96, while for the interface subscale, it was 0.76. The overall reliability of the tool was 0.97, indicating a high level of internal consistency.

Descriptive statistics were calculated to analyze the variables related to usability, quality, and interface of the MOOC. To interpret the quantitative data obtained from the questionnaire, the mean and standard deviation of each item were studied using descriptive analysis. A mean score between 1.00 and 2.33 was interpreted as low, 2.34 to 3.66 as medium, and 3.67 to 5.00 as high. Concerning the usability variable, participants' responses showed a mean score of $M = 3.83 \pm 0.84$, suggesting a moderately positive perception (Table 1).

Similarly, in terms of the quality variable, the mean score was $M = 3.91 \pm 0.82$, indicating that participants generally assessed the quality slightly above the midpoint of the evaluation spectrum (Table 2).

Likewise, for the interface variable, the mean score was $M = 3.92 \pm 0.75$, suggesting that participants perceived the interface slightly above the midpoint of the evaluation scale (Table 3).

Table 1
MOOC usability results

No	Items	N	Mean	Std. Deviation
U1	Overall, I am satisfied with how easy it is to use this MOOC.	40	3.65	1.00
U2	It is simple to use this MOOC.	40	3.80	.82
U3	I can learn the topic better when using this MOOC.	40	4.40	.77
U4	I can learn the topic faster when using this MOOC.	40	4.20	.79
U5	I feel comfortable using this MOOC.	40	3.70	.04
U6	It was easy to learn to use this MOOC.	40	3.67	.99
U7	I believe I am able to learn the topic productively when using this MOOC.	40	4.22	.69
U8	I have fun learning the topic through this MOOC.	40	3.40	.81
U9	I can share my knowledge with my friends through this MOOC.	40	3.55	.84
U10	I gain additional information from my friends through this MOOC.	40	3.4	.70
U11	Overall, I am satisfied with this MOOC.	40	4.1	.76
Overall usability score		40	3.83	.84

Table 2
MOOC quality results

No	Items	N	Mean	Std. Deviation
U1	The duration it took to complete this MOOC is just right.	40	3.75	.95
U2	The MOOC gives me messages for me to correct my mistake.	40	3.47	.55
U3	Whenever I make a mistake, I can recover easily and quickly.	40	3.97	.91
U4	The information provided in this MOOC is clear.	40	3.67	.79
U5	The information provided is easy to understand.	40	3.77	.94
U6	The content provided meets the requirement of the course syllabus.	40	4.05	.81
U7	The content is well-organized.	40	4.05	.78
U8	The video lecture provided is useful for me.	40	3.72	.81
U9	The notes provided are useful for me.	40	4.10	.77
U10	The practice questions are useful for me.	40	3.92	.91
U11	The practice questions are clear and easy to understand.	40	4.00	.81
U12	The number of practice questions is enough.	40	4.02	.80
U13	The hints given when I got incorrect answer are helpful.	40	3.85	.92
U14	This MOOC is effective in helping me learn the topic.	40	4.37	.77
Overall quality score		40	3.91	.82

Table 3
MOOC interface results

No	Items	N	Mean	Std. Deviation
U1	The interface of this MOOC is pleasant.	40	3.92	.65
U2	I like using the interface of this MOOC.	40	3.97	.76
U3	This MOOC has all the functions and capabilities I expect it to have.	40	3.85	.83
Overall quality score		40	3.91	.75

4.3. Correlation analysis: Pearson's correlation coefficients

The results of Pearson's correlation coefficient analysis showed a significant positive correlation between the variables educational level and usability of the MOOC ($p = 0.001$) along with the quality of the MOOC ($p = 0.002$). These findings suggest that as participants' educational levels increase, they tend to rate the usability and quality of the MOOC more positively, implying that individuals with higher levels of education may find the MOOC more user-friendly and of better quality compared to those with lower educational backgrounds.

Additionally, the variable digital literacy was positively correlated with the variables usability ($p < 0.001$), quality ($p < 0.001$), and interface ($p < 0.001$). These results indicate that participants with higher levels of digital literacy tend to rate the MOOC more favorably in terms of usability, quality, and interface. This suggests that individuals who are more digitally proficient find the MOOC to be easier to use, of higher quality, and more user-friendly compared to those with lower digital literacy levels (Table 4).

Table 4
Correlation analysis

Variables		Usability	Quality	Interface
Educational level	Pearson correlation	0.500*	0.465*	0.411*
	Sig. (2-tailed)	0.001	0.002	0.008
Digital literacy	Pearson correlation	0.563*	0.600*	0.583*
	Sig. (2-tailed)	<0.001	<0.001	<0.001
N		40	40	40

*$p < 0.05$.

Overall, the findings from the focus group discussion and the MOOC evaluation provide valuable insights into the design, challenges, and effectiveness of the educational resources. Figure 3 summarizes the key results from both the focus group and the MOOC evaluation.

5. Discussion

The present study explored the experiences and the viewpoints of the co-creators of the MOOC and the acceptability and usability of the end results by refugees and workers with refugees. It presented the lessons learned about co-creating a high-quality, acceptable, and usable MOOC, practices to follow, but also challenges met during the co-creation. The value of these practices lies down to the success of the end resource for refugees. And while a large-scale trial should follow, the piloting stage of the co-creation process, assessing the acceptability and usability of refugees and professionals working in support of refugees, revealed a high-quality, usable, and acceptable MOOC.

The focus group discussion shed light on the experiences and perspectives of the individuals involved in the design and development of the MOOC. This qualitative data underlined the importance of collaboration and partnership among different stakeholders (refugees, NGO workers, clinicians, academics, pedagogists, etc.) in creating effective digital educational resources for refugees' integration into healthcare. Moreover, the discussion highlighted the enduring value of participatory design and co-creation, a principle well-established in the literature [41, 43]. Participants emphasized the critical need to address challenges arising from cultural and linguistic diversity, differing backgrounds, and the development of educational materials. These findings resonate with existing literature that emphasizes the need for inclusive and culturally sensitive approaches in the design and implementation of educational interventions for refugee populations [41, 44–49].

Moreover, the focus group analysis emphasized the importance of adopting a holistic approach in designing digital educational resources for refugees. Factors such as language considerations, alignment with learners' needs, sociocultural aspects, and participatory design were identified as crucial elements. Participants highlighted the need for tailoring educational materials to address the specific healthcare needs of refugees while also acknowledging the challenges of creating comprehensive and easily understandable content. They stressed the significance of providing multiple means of documentation to facilitate access to information. Furthermore, the analysis revealed challenges in directly engaging with refugees, language translation, and understanding diverse healthcare systems. The recommendations derived from the analysis underlined comprehensive needs analysis, accurate delivery of information about European healthcare culture, collaboration with NGOs, tailored content and customization, accessibility, and interdisciplinary approaches. These insights highlight the importance of understanding user needs and promoting stakeholder collaboration in designing effective educational resources [34, 49, 50] for refugees.

Drawing upon participants' robust and diverse collaborative efforts, the data collected from the participatory workshop with stakeholders, in conjunction with insights gathered during the ReHIn Delphi Study, followed Wenger's community of practice theory [50] and played a pivotal role in informing the content and materials of the MOOC, thereby laying the foundation for its subsequent assessment. One of the key findings of the current study was the positive acceptance of the MOOC in addressing refugees' educational needs and, consequently, the potential to supporting their access to healthcare. Quantitative analysis indicated high participant satisfaction with the MOOC's usability, quality, and interface. These findings align with previous studies highlighting the effectiveness of digital tools and digital health interventions in promoting healthcare access among refugee populations [51, 52]. MOOCs and other free digital learning resources provide accessible and flexible learning opportunities that can overcome barriers related to language, culture, and geographical location and facilitate inclusion, civic integration, and re-engagement in formal or non-formal education and employment [29, 53, 54].

Additionally, the study stressed the role of digital technology proficiency among participants. The results indicated a diverse range of proficiency levels, with some participants categorized as basic users and others as intermediate or advanced users. Notably, individuals who are more digitally proficient find the MOOC to be easier to use, of higher quality, and more user-friendly compared to those with lower digital literacy levels. Taking these findings into consideration, the evaluation of the MOOC suggests the need for tailored online digital resources designed specifically for refugees with lower digital skills. To enhance their comprehension and usability, it is essential to make these resources more accessible and user-friendly for individuals with low digital literacy skills. This is in line with previous research, consistently emphasizing the significance of digital literacy and the necessity for tailored approaches that accommodate the varying levels of technological proficiency observed within refugee populations [55, 56]. At the same time, the educational level of individuals played a pivotal role in positively accepting the MOOC. Participants with higher educational levels

demonstrated a more favorable attitude toward the MOOC, positively evaluating its content, structure, and learning opportunities. This aligns with previous research, which highlights that college degree holders often constitute the majority of MOOC learners and tend to actively engage with the material [57–59]. Conversely, participants with lower educational levels may face challenges in fully grasping the MOOC potential, which can have an impact on their overall acceptance of the MOOC. This emphasizes the significance of considering participants' educational backgrounds and tailoring the MOOC content and materials accordingly, enhancing participants' engagement with the MOOC.

6. Conclusions, Implications, and Suggestions

While this study makes an important contribution to the growing body of literature in the field of digital educational interventions for refugee healthcare integration, it stands out as the first to offer a robust collection of best practices and recommendations for the design and development of digital educational resources. What sets it apart is its inclusive approach, involving both the refugee population and a diverse group of stakeholders who collaboratively participated in the co-creation of the MOOC. This combined effort ensures that the insights provided are not only innovative but also deeply rooted in the real-world needs and experiences of those directly impacted by the healthcare integration process.

In discussing the findings of the current study, it is important to acknowledge some limitations. The sample size, although representative, was relatively small, which may affect the generalizability of the results. Additionally, the study focused on the evaluation of a specific MOOC, limiting the scope to the ReHIn project. Future research could explore the effectiveness of other digital educational tools and resources in supporting refugee integration into healthcare systems, extending the sample size.

Acknowledgments

The authors would like to express their sincere gratitude to the refugees and professionals who participated in this research, providing invaluable insights and data that formed the foundation of our analysis. Your willingness to share your experiences and perspectives has been pivotal to the outcomes of this study.

Funding Support

This work is supported by the ERASMUS+ Strategic Partnership for Adult Education "Refugee Health Integration" (ReHIn) (reference number: 2019-1-SE01-KA204-060563) project of the European Union.

Ethical Statement

The study followed GDPR regulations and received bioethics approval (Approval Number: 5.168.18/12/2019) from the Aristotle University of Thessaloniki Bioethics Committee. All participants provided informed consent, understanding the study's scope and their rights. Privacy was ensured by anonymizing focus group participants in transcriptions, and online questionnaire data was securely stored and encrypted to protect personal information.

Conflicts of Interest

The authors declare that they have no conflicts of interest to this work.

Data Availability Statement

The data that support this work are available at reasonable request to the corresponding author.

Author Contribution Statement

Ioanna Dratsiou: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Writing – original draft, Writing – review & editing, Visualization, Project administration. **Annita Varella:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Writing – original draft, Writing – review & editing, Visualization. **Anastasia Gkrimoura:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Writing – original draft, Writing – review & editing. **Iraklis Tsoupouroglou:** Methodology, Validation, Investigation, Resources, Writing – review & editing. **Stathis Th. Konstantinidis:** Methodology, Resources, Writing – original draft, Writing – review & editing, Visualization, Supervision, Project administration, Funding acquisition. **Natalia Stathakarou:** Methodology, Rresources, Writing – review & editing, Project administration. **Klas Karlgren:** Methodology, Resources, Writing – review & editing, Project administration, Funding acquisition. **Maxine G. Harjani:** Methodology, Resources, Writing – review & editing. **Maria Segura Segura:** Methodology, Software, Resources, Writing – review & editing. **Vicente Traver Salcedo:** Methodology, Software, Resources, Writing – review & editing, Project administration, Funding acquisition. **Panagiotis D. Bamidis:** Conceptualization, Methodology, Validation, Investigation, Resources, Writing – review & editing, Project administration, Funding acquisition.

References

[1] Brell, C., Dustmann, C., & Preston, I. (2020). The labor market integration of refugee migrants in high-income countries. *Journal of Economic Perspectives*, *34*(1), 94–121. https://doi.org/10.1257/jep.34.1.94

[2] Ryom, K., Simonsen, C. B., Rau, S. R., Maindal, H. T., & Agergaard, S. (2022). Newly arrived refugees' perception of health and physical activity in Denmark. *Journal of Migration and Health*, *6*, 100111. https://doi.org/10.1016/j.jmh.2022.100111

[3] Filmer, T., Ray, R., & Glass, B. D. (2023). Barriers and facilitators experienced by migrants and refugees when accessing pharmaceutical care: A scoping review. *Research in Social and Administrative Pharmacy*, *19*(7), 977–988. https://doi.org/10.1016/j.sapharm.2023.02.016

[4] Stevenson, M., Guillén, J. R., Bevilacqua, K. G., Arciniegas, S., Ortíz, J., & López, J. J., ... & Wirtz, A. L. (2023). Qualitative assessment of the impacts of the COVID-19 pandemic on migration, access to healthcare, and social well-being among Venezuelan migrants and refugees in Colombia. *Journal of Migration and Health*, *7*, 100187. https://doi.org/10.1016/j.jmh.2023.100187

[5] Lebano, A., Hamed, S., Bradby, H., Gil-Salmerón, A., Durá-Ferrandis, E., & Garcés-Ferrer, J., ... & Linos, A.. (2020). Migrants' and refugees' health status and healthcare in Europe: A scoping literature review. *BMC Public Health*, *20*, 1–22. https://doi.org/10.1186/s12889-020-08749-8

[6] United Nations High Commissioner for Refugees (UNHCR). (2024). *UNHCR refugee education report 2023: Unlocking potential: The right to education and opportunity*. Retrieved

from: https://www.unhcr.org/media/unhcr-education-report-2023-unlocking-potential-right-education-and-opportunity#:~:text=Its%20findings%20reveal%20that%20despite,chance%20to%20fulfil%20their%20potential

[7] United Nations High Commissioner for Refugees (UNHCR). (2024). *Global trends: Forced displacement in 2023*. Retrieved from: https://www.unhcr.org/global-trends-report-2023

[8] Walther, L., Rayes, D., Amann, J., Flick, U., Ta, T. M. T., Hahn, E., & Bajbouj, M. (2021). Mental health and integration: A qualitative study on the struggles of recently arrived refugees in Germany. *Frontiers in Public Health*, *9*, 576481. https://doi.org/10.3389/fpubh.2021.576481

[9] Liamputtong, P., & Kurban, H. (2018). Health, social integration and social support: The lived experiences of young Middle-Eastern refugees living in Melbourne, Australia. *Children and Youth Services Review*, *85*, 99–106. https://doi.org/10.1016/j.childyouth.2017.12.020

[10] Akik, C., Asfahani, F., Elghossain, T., Mesmar, S., Rabkin, M., El Sadr, W., . . . , & Ghattas, H. (2022). Healthcare system responses to non-communicable diseases' needs of Syrian refugees: The cases of Jordan and Lebanon. *Journal of Migration and Health*, *6*, 100136. https://doi.org/10.1016/j.jmh.2022.100136

[11] Gunst, M., Jarman, K., Yarwood, V., Rokadiya, S., Capsaskis, L., Orcutt, M., & Abbara, A. (2019). Healthcare access for refugees in Greece: Challenges and opportunities. *Health Policy*, *123*(9), 818–824. https://doi.org/10.1016/j.healthpol.2019.06.003

[12] Álvarez-Pérez, Y., Perestelo-Pérez, L., Rivero-Santanta, A., Torres-Castaño, A., Toledo-Chávarri,A., Duarte-Díaz, A., ... & Ic-Health Project Consortium. (2022). Co-creation of massive open online courses to improve digital health literacy in pregnant and lactating women. *International Journal of Environmental Research and Public Health*, *19*(2), 913. https://doi.org/10.3390/ijerph19020913

[13] Castillo, N. M., Lee, J., Wagner, D. A., & Zahra, F. T. (2015). MOOCS for development: Trends, challenges, and opportunities. *International Technologies & International Development*, *11*(6), 35–42.

[14] Lambert, S. R. (2020). Do MOOCs contribute to student equity and social inclusion? A systematic review 2014–18. *Computers & Education*, *145*, 103693. https://doi.org/10.1016/j.compedu.2019.103693

[15] Longhini, J., De Colle, B., Rossettini, G., & Palese, A. (2021). What knowledge is available on massive open online courses in nursing and academic healthcare sciences education? A rapid review. *Nurse Education Today*, *99*, 104812. https://doi.org/10.1016/j.nedt.2021.104812

[16] Bolon, I., Mason, J., O'Keeffe, P., Haeberli, P., Adan, H. A., & Karenzi, J. M., ... & de Castañeda, R. R.. (2020). One health education in Kakuma refugee camp (Kenya): From a MOOC to projects on real world challenges. *One Health*, *10*, 100158. https://doi.org/10.1016/j.onehlt.2020.100158

[17] Lovey, T., O'Keeffe, P., & Petignat, I. (2021). Basic medical training for refugees via collaborative blended learning: Quasi-experimental design. *Journal of Medical Internet Research*, *23*(3), e22345. https://doi.org/10.2196/22345

[18] Lewtak, K., Kanecki, K., Tyszko, P., Goryński, P., Kosińska, I., Poznańska, A., ... & Nitsch-Osuch, A. (2022). Hospitalizations of Ukrainian migrants and refugees in Poland in the time of the Russia-Ukraine conflict. *International Journal of Environmental Research and Public Health*, *19*(20), 13350. https://doi.org/10.3390/ijerph192013350

[19] Kaufman, K. R., Bhui, K., & Katona, C. (2022). Mental health responses in countries hosting refugees from Ukraine. *BJPsych Open*, *8*(3), 1–10. https://doi.org/10.1192/bjo.2022.55

[20] Murphy, A., Fuhr, D., Roberts, B., Jarvis, C. I., Tarasenko, A., & McKee, M. (2022). The health needs of refugees from Ukraine. *BMJ*, *377*, o864. https://doi.org/10.1136/bmj.o864

[21] World Health Organization. (2016). *Universal health coverage: Moving towards better health action framework for the Western Pacific Region*. Switzerland: WHO Press.

[22] Coumans, J. V. F., & Wark, S. (2024). A scoping review on the barriers to and facilitators of health services utilisation related to refugee settlement in regional or rural areas of the host country. *BMC Public Health*, *24*(1), 199. https://doi.org/10.1186/s12889-024-17694-9

[23] Saleh, S., Ibrahim, S., Diab, J. L., & Osman, M. (2022). Integrating refugees into national health systems amid political and economic constraints in the EMR: Approaches from Lebanon and Jordan. *Journal of Global Health*, *12*, 03008. https://doi.org/10.7189%2Fjogh.12.03008

[24] Kalocsányiová, E., Bîlici, N., Jenkins, R., Obojska, M., & Samuk Carignani, Ş. (2024). What works to facilitate displaced and refugee-background students' access and participation in European higher education: Results from a multilingual systematic review. *Educational Review*, *76*(6), 1722–1743. https://doi.org/10.1080/00131911.2022.2085670

[25] Laverack, G. (2018). The challenge of promoting the health of refugees and migrants in Europe: A review of the literature and urgent policy options. *Challenges*, *9*(2), 32. https://doi.org/10.3390/challe9020032

[26] Hanemann, U. (2018). *Language and literacy programmes for migrants and refugees: Challenges and ways forward (Background paper prepared for the 2019 Global education monitoring report: Migration, displacement and education: Building bridges, not walls)*. Retrieved from: https://unesdoc.unesco.org/notice?id=p::usmarcdef_0000266077

[27] Asif, Z., & Kienzler, H. (2022). Structural barriers to refugee, asylum seeker and undocumented migrant healthcare access. Perceptions of Doctors of the World caseworkers in the UK. *SSM: Mental Health*, *2*, 100088. https://doi.org/10.1016/j.ssmmh.2022.100088

[28] Cerna, L. (2019). *Refugee education Integration models and practices in OECD countries*. France: OECD Publishing. https://doi.org/https://doi.org/10.1787/a3251a00-en

[29] Colucci, E., Smidt, H., Devaux, A., Vrasidas, C., Safarjalani, M., & Castaño Muñoz, J. (2017). *Free digital learning opportunities for migrants and refugees. An Analysis of current initiatives and recommendations for their further use*. Luxemburg: Publications Office of the European Union. https://doi.org/10.2760/684414

[30] Huang, H., Jew, L., & Qi, D. (2023). Take a MOOC and then drop: A systematic review of MOOC engagement pattern and dropout factor. *Heliyon*, *9*(4), e15220. https://doi.org/10.1016/j.heliyon.2023.e15220

[31] Goldberg, L. R., & Crocombe, L. A. (2017). Advances in medical education and practice: Role of massive open online courses. *Advances in Medical Education and Practice*, *8*, 603–609. https://doi.org/10.2147/AMEP.S115321

[32] Halkic, B., & Arnold, P. (2019). Refugees and online education: Student perspectives on need and support in the context of (online) higher education. *Learning, Media and*

Technology, *44*(3), 345–364. https://doi.org/10.1080/17439884.2019.1640739

[33] Thiele, T., & Homer, D. (2023). 'Trying to open the doors': The co-creation of digital resources for disadvantaged primary school pupils. *International Journal for Students as Partners*, *7*(2), 65–83. https://doi.org/10.15173/ijsap.v7i2.5166

[34] Wharrad, H., Windle, R., & Taylor, M. (2021). Designing digital education and training for health. In S. T. Konstantinidis, P. D. Bamidis & N. Zary (Eds.), *Digital innovations in healthcare education and training* (pp. 31–45). Academic Press. https://doi.org/10.1016/B978-0-12-813144-2.00003-9

[35] Carver, R. (1996). Theory for practice: A framework for thinking about experiential education. *Journal of Experiential Education*, *19*(1), 8–13. https://doi.org/10.1177/105382599601900102

[36] Wenger, E. (1998). Communities of practice: Learning as a social system. *Systems Thinker*, *9*(5), 2–3.

[37] Clark, R. C., & Mayer, R. E. (2016). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning* (4th ed.). USA: John Wiley & Sons.

[38] Mayer, R. E. (2014). *The Cambridge handbook of multimedia learning*. UK: Cambridge University Press. https://doi.org/10.1017/CBO9781139547369

[39] Qi, D., Zhang, M., & Zhang, Y. (2022). Influence of participation and value co-creation on learner satisfaction of MOOCs learning: Learner experience perspective. *The Asia-Pacific Education Researcher*, *31*(1), 61–70. https://doi.org/10.1007/s40299-020-00538-6

[40] Stathakarou, N., Konstantinidis, S., Wharrad, H., Spachos, D., Bamidis, P. D., Aparici Tortajada, L., & Karlgren, K. (2020). Co-Creating digital learning resources to enhance refugees' health integration. In *Europe 14th International Technology, Education and Development Conference Proceedings*, 3799–3803.

[41] Dratsiou, I., Varella, A., Stathakarou, N., Konstantinidis, S., & Bamidis, P. (2021). Supporting healthcare integration of refugees exploiting reusable learning objects: The ASPIRE framework. In J. Mantas, L. Stoicu-Tivadar, C. Chronaki, A. Hasman, P. Weber, P. Gallos, . . . , & O. S. Chirila (Eds.), *Public health and informatics* (pp. 565–569). IOS Press. https://doi.org/10.3233/shti210234

[42] Lewis, J. R. (1995). IBM computer usability satisfaction questionnaires: Psychometric evaluation and instructions for use. *International Journal of Human Computer Interactions*, *7*, 57–78. http://doi.org/10.1080/10447319509526110

[43] Antoniou, P. E., Pears, M., Schiza, E. C., Frangoudes, F., Pattichis, C. S., Wharrad, H., . . . , & Konstantinidis, S. T. (2023). Eliciting co-creation best practices of virtual reality reusable e-Resources. *Virtual Worlds*, *2*(1), 75–89. https://doi.org/10.3390/virtualworlds2010005

[44] Harjani, M. G., Stathakarou, N., Konstantinidis, S. T., Dratsiou, I., Varella, A., & Salcedo, V. T., ... & Karlgren, K. (2024). Identifying the health educational needs of refugees: Empirical evidence from a Delphi study. *Journal of Immigrant and Minority Health*, *26*(6), 984–997. https://doi.org/10.1007/s10903-024-01626-1

[45] Biasutti, M., Concina, E., & Frate, S. (2020). Working in the classroom with migrant and refugee students: The practices and needs of Italian primary and middle school teachers. *Pedagogy, Culture & Society*, *28*(1), 113–129. https://doi.org/10.1080/14681366.2019.1611626

[46] Haynes, D., Hughes, K. D., & Okafor, A. (2023). PEARL: A guide for developing community-engaging and culturally-sensitive education materials. *Journal of Immigrant and Minority Health*, *25*(3), 666–673. https://doi.org/10.1007/s10903-022-01418-5

[47] Herati, H., & Meyer, S. B. (2023). Mental health interventions for immigrant-refugee children and youth living in Canada: A scoping review and way forward. *Journal of Mental Health*, *32*(1), 276–289. https://doi.org/10.1080/09638237.2020.1818710

[48] Hassan, N., Sellappans, R., Chen, P. Y. V., Yap, W. H., Ayub, E., Konstantinidis, S. T., . . . , & Taylor, M. G. (2021). Participatory approach in reusable learning object (RLO) development using ASPIRE framework: Taylor's University's experience. In P. Nair, M. J. Keppell, C. L. Lim, T. Mari, & N. Hassan (Eds.), *Transforming curriculum through teacher-learner partnerships* (pp. 90–104). IGI Global. https://doi.org/10.4018/978-1-7998-6445-5.ch006

[49] Manning, J. C., Carter, T., Latif, A., Horsley, A., Cooper, J., & Armstrong, M. (2017). 'Our Care through Our Eyes'. Impact of a co-produced digital educational programme on nurses' knowledge, confidence and attitudes in providing care for children and young people who have self-harmed: A mixed-methods study in the UK. *BMJ open*, *7*(4), e014750. https://doi.org/10.1136/bmjopen-2016-014750

[50] Wenger, E. (2010). Communities of practice and social learning systems: The career of a concept. In C. Blackmore (Ed.), *Social learning systems and communities of practice* (pp. 179–198). Springer. https://doi.org/10.1007/978-1-84996-133-2_11

[51] Benson, J., Brand, T., Christianson, L., & Lakeberg, M. (2023). Localisation of digital health tools used by displaced populations in low and middle-income settings: A scoping review and critical analysis of the participation revolution. *Conflict and Health*, *17*(1), 20. https://doi.org/10.1186/s13031-023-00518-9

[52] Narla, N. P., Surmeli, A., & Kivlehan, S. M. (2020). Agile application of digital health interventions during the COVID-19 refugee response. *Annals of Global Health*, *86*(1), 135. https://doi.org/10.5334/aogh.2995

[53] Castrillo, M. D., & Sedano, B. (2021). Joining forces toward social inclusion: Language MOOC design for refugees and migrants through the lens of maker culture. *CALICO Journal*, *38*(1), 79–102. https://doi.org/10.1558/cj.40900

[54] Husna Hafiza, R. A., & Roslina, I. (2019). Development and evaluation of massive open online course (MOOC) as a supplementary learning tool: An initial study. *International Journal of Advanced Computer Science and Applications*, *10*(7), 532–537. https://doi.org/10.14569/IJACSA.2019.0100773

[55] AlQaidoom, H., & Shah, A. (2020). Digital literacy of educators and their attitude towards MOOC platform in Arab world. In *2020 IEEE 7th International Conference on Engineering Technologies and Applied Sciences*, 1–6. https://doi.org/10.1109/ICETAS51660.2020.9484170

[56] Castaño-Muñoz, J., Kreijns, K., Kalz, M., & Punie, Y. (2017). Does digital competence and occupational setting influence MOOC participation? Evidence from a cross-course survey. *Journal of Computing in Higher Education*, *29*(1), 28–46. https://doi.org/10.1007/s12528-016-9123-z

[57] Bayeck, R. (2016). Exploratory study of MOOC learners' demographics and motivation: The case of students involved in groups. *Open Praxis*, *8*(3), 223–233.

[58] Despujol, I. M., Turró, C., Busquéis, J., & Cañero, A. (2014). Analysis of demographics and results of student's opinion

survey of a large scale MOOC deployment for the Spanish speaking community. In *2014 IEEE Frontiers in Education Conference (FIE) Proceedings*, 1–8. https://doi.org/10.1109/FIE.2014.7044102

[59] Ding, Y., Wang, M., He, Y., Ye, A. Y., Yang, X., & Liu, F. (2014). "Bioinformatics: Introduction and methods," a bilingual massive open online course (MOOC) as a new example for global bioinformatics education. *PLoS Computational Biology*, *10*(12), e1003955. https://doi.org/10.1371/journal.pcbi.1003955

How to Cite: Dratsiou, I., Varella, A., Gkrimoura, A., Tsoupouroglou, I., Konstantinidis, S., Stathakarou, N., …, & Bamidis, P. D. (2025). Lessons Learned Co-creating a Massive Open Online Course (MOOC) on Refugees' Health Integration. *International Journal of Changes in Education*. https://doi.org/10.47852/bonviewIJCE52024606