AMERICAN UNIVERSITY OF BEIRUT | GLOBAL HEALTH INSTITUTE AUB

EHMA 2025

Taking action to improve health for all

UNIVERSITY OF SHARJAH

Utilizing Gamification & Artificial Intelligence for the Professional Development of Maternal Care Providers – The GAIN MHI APP

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Maternal Health in Numbers

800 women die on daily basis from preventable causes related to pregnancy and childbirth with

95% of global deaths occurring in low and lower-middle income countries (LLMICs)

and

57 maternal deaths per 100,000 livebirths

occurring in the Middle East and North Africa (MENA) region

Barriers and Challenges:

Limited continuing education programs for healthcare providers

Shortage in healthcare providers (HCPs)

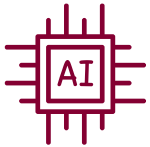
Suboptimal quality of antenatal care (ANC) services

Professional Development of Health Human Resources

With the substantial increase in the usage of mobile phones in LLMICs, mLearning emerges as a promising approach for professional development through:

Gamification of Learning

defined as “the practice of introducing “game-like” dynamics into routine activities to engage users”



Artificial Intelligence

that assists in the personalization of the learning experience of the healthcare provider

The development of the GAIN MHI App

ABOUT GAIN MHI

Gamification, Artificial Intelligence
& mHealth Network for Maternal Health Improvement

- Multi-component mHealth intervention
- Aimed at improving maternal health outcomes and uptake of antenatal care services
- Implemented at 20 primary healthcare centers across Lebanon
- In partnership with Ministry of Public Health & UNRWA

GAIN MHI - Intervention

Intervention Sites

- **5 UNRWA PHCs serving** Palestinian refugees
- **5 non-UNRWA PHCs** serving disadvantaged Lebanese and refugees of all nationalities

Intervention Component A

Spouses of enrolled pregnant women were targeted by the following on a weekly basis:

- General knowledge on psychosocial and emotional paternal support during pregnancy.
- Main ANC visits and tests that pregnant women should do based on gestational age.

Intervention Component B

Pregnant women visiting these PHCs during their first trimester received:

- **Gestational age-specific weekly antenatal care (ANC) informative mobile-based** messages (text and voice) in Arabic.
- **Reminders** of necessary ANC appointments.

Intervention Component C

Physicians and **midwives** providing **obstetrics services** at these intervention PHC sites **used a GAIN MHI App,** which employed:

Gamification strategies to enhance user participation, including a trivia-like structure, monthly recognitions such as "Most Improved Player (MIP)" and "Most Valuable Player (MVP)," as well as monetary incentives.

Artificial Intelligence algorithms to identify patterns of knowledge gaps from incorrect answers, enabling the delivery of personalized learning content across five areas of maternal health: prevention, diagnostics, management, miscellaneous topics, and COVID-19-related information.

GAMIFICATION & ARTIFICIAL INTELLIGENCE

- The gamification component in the App included ‘trivia-like’ concept and the monthly recognition as most valuable player (MVP) and most improved player (MIP) coupled with monetary incentives

- Artificial Intelligence algorithms were used to identify areas with knowledge gaps based on the incorrect answers of health providers

GAIN MHI APP

- The GAIN MHI App was developed by the Global Health Institute (GHI) at the American University of Beirut (AUB), as part of the **Gamification, Artificial Intelligence and mHealth Network for Maternal Health Improvement** (GAIN MHI) project

- The GAIN MHI App aims to contribute to the professional development of maternal health providers in low resource settings

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GAMIFICATION and AI in LEARNING

- The questions fell under 5 categories related to maternal health: **Prevention, Diagnostic, Management, Miscellaneous, and COVID-19**
- The category selection process relies on a randomized spin of a wheel, and each user is allocated a maximum of 30 attempts per month
- Artificial Intelligence (AI) algorithms were used to identify knowledge gaps based on providers' incorrect answers, tailoring subsequent questions to individualize learning

Project Implementation

Creation of the GAIN MHI App **database** by a group of medical consultants specialized in obstetrics and gynecology

Generation of an **Arabic** version of the App to cater for the Arabic speaking healthcare providers

Performance of a **validation** process in which questions dedicated to OBGYNs and midwives were validated by specialists from the same field

Adjustments of the intervention's components based on the participants' inputs and suggestions

Population and Setting

The study took place over a period of twenty-one months in six primary healthcare centers (PHCs) in Lebanon

Among these PHCs, three were affiliated with the United Nations Relief and Works Agency (UNRWA) and the others with the Ministry of Public Health (MOPH)

A total of fifteen HCPs (OBGYN specialists and midwives) in maternal health were enrolled in the intervention, from which nine were midwives and six were OBGYN specialists

Data Collection

- 12 participants (8 midwives and 4 OBGYN specialists) maintained their participation whereas three participants dropped out
- Likert scale was used to assess the level of satisfaction of healthcare providers with the characteristics of the App, their level on engagement, and their evaluation of the Gamification and the Artificial Intelligence components of the App
- Open-ended questions explored feedbacks on the favorite aspect of the App, preferred types of reward, maternal health topics that should be added, other health topics where this App could be applied, as well as suggestions for future improvement

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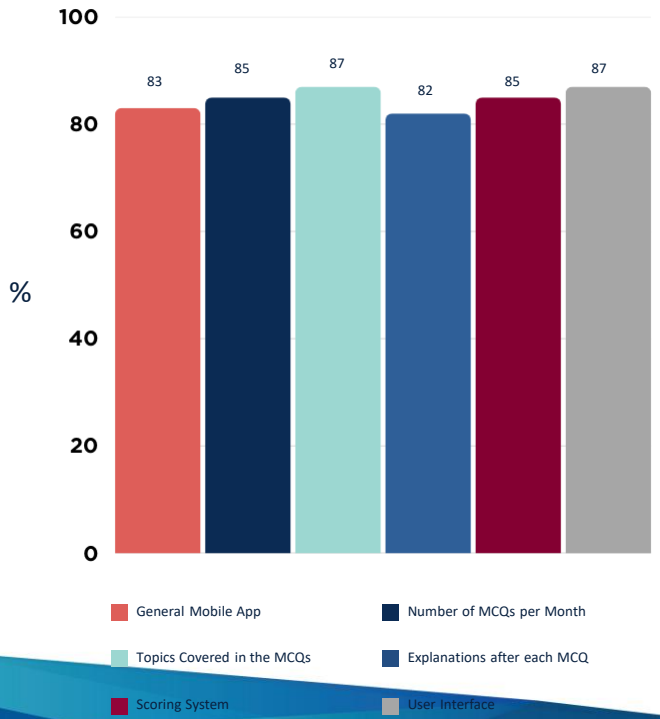
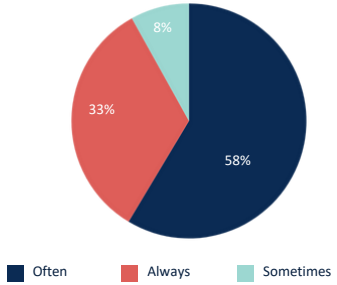
FACE TO FACE FEEDBACK SURVEYS
WERE COMPLETED WITH HCPS

Results

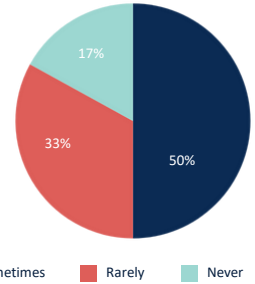
Satisfaction with the GAIN MHI Mobile App



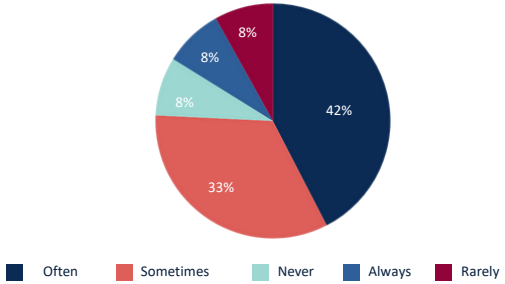
Level of Engagement



Increase in the theoretical knowledge because of using the App

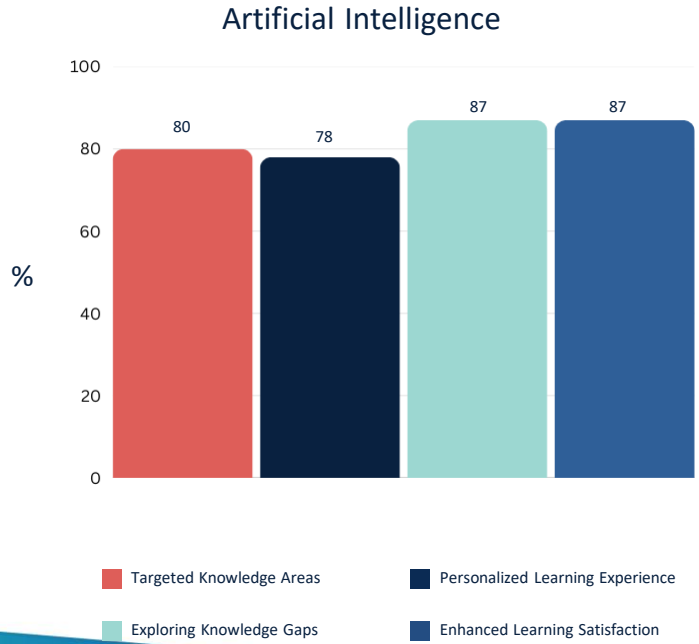


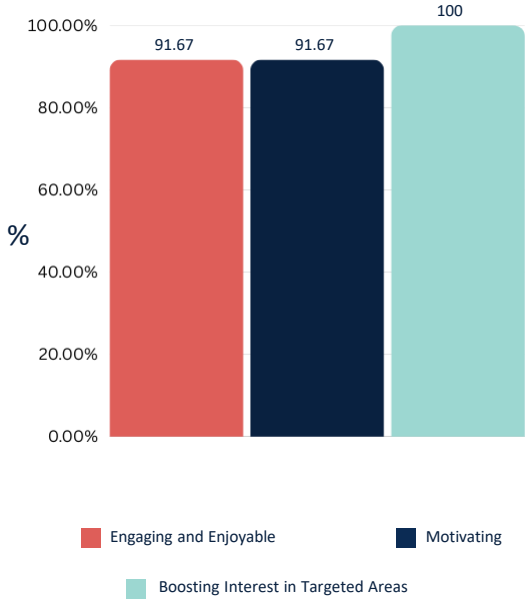
Visits and Access to the Knowledge Resource Center



Changes in Clinical Routines and Practices because of the App

Results


Artificial Intelligence
100
80
60
40
20
0
%
80
78
87
87
Targeted Knowledge Areas
Personalized Learning Experience
Exploring Knowledge Gaps
Enhanced Learning Satisfaction


Gamification of Learning
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
%
91.67
91.67
100
Engaging and Enjoyable
Motivating
Boosting Interest in Targeted Areas

Insights from the HCPs

> I liked the diversity of questions, the focus on wrong answers in the upcoming questions, and the way how the app refreshes our memory.

> **The application was easy to use...the App motivated us to learn more.**

Qualitative Analysis

The pilot test of the GAIN MHI App yielded insightful lessons with respect to user satisfaction and engagement. It revealed that users:

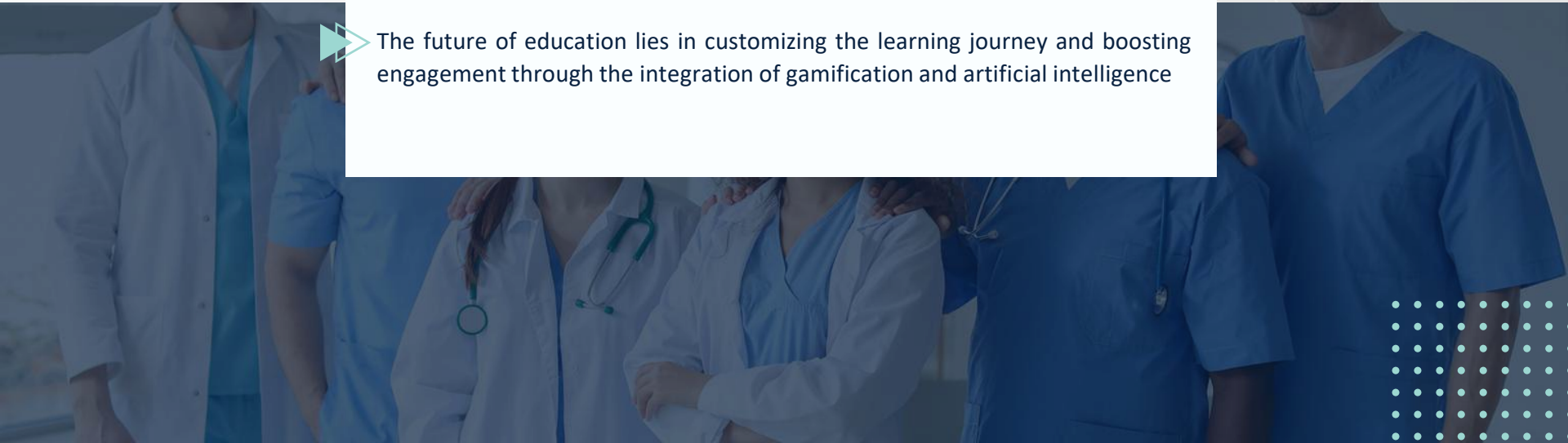
Recommended the App to their colleagues within the healthcare community

Expressed interest in exploring additional topics beyond the current scope of the App

Suggested the inclusion of workshops or conferences within the reward system

CONCLUSION

- The favorable feedback from the HCPs confirms the promise of integrating innovative and modern methods to support the improvement of their professional development
- The future of education lies in customizing the learning journey and boosting engagement through the integration of gamification and artificial intelligence



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Thank you!