Gluco Coach—A Self-Management Application for Type 2 Diabetes Mellitus

User testing to understand comfort levels and sustained patient engagement

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- PhD in Health Science, background in ICT
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  - Research: Use of ICT for health
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https://inpaqt.nl/glucocoach/

- Providing Artificial Intelligence Solutions for enhancing vitality of individuals, teams and organizations.
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- Focused on providing digital health care solutions for healthy aging in elderly adults.

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Dr. Felix Janszen

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- 1990-2009: Professor in Management of Technology and Innovation at Rotterdam School of Management
- 1973-1977: PhD in Biochemistry at Erasmus University of Rotterdam
- Focus areas: Innovation, Organization Management, AI, Health & Vitality

Background

- Type 2 diabetes mellitus (T2DM)
  - By 2040, the number of people with T2DM will increase to 642 million globally [1].
  - Obesity, cardiovascular issues, and renal issues – low quality of life [2].
  - Remote self-management of lifestyle behaviors [3].
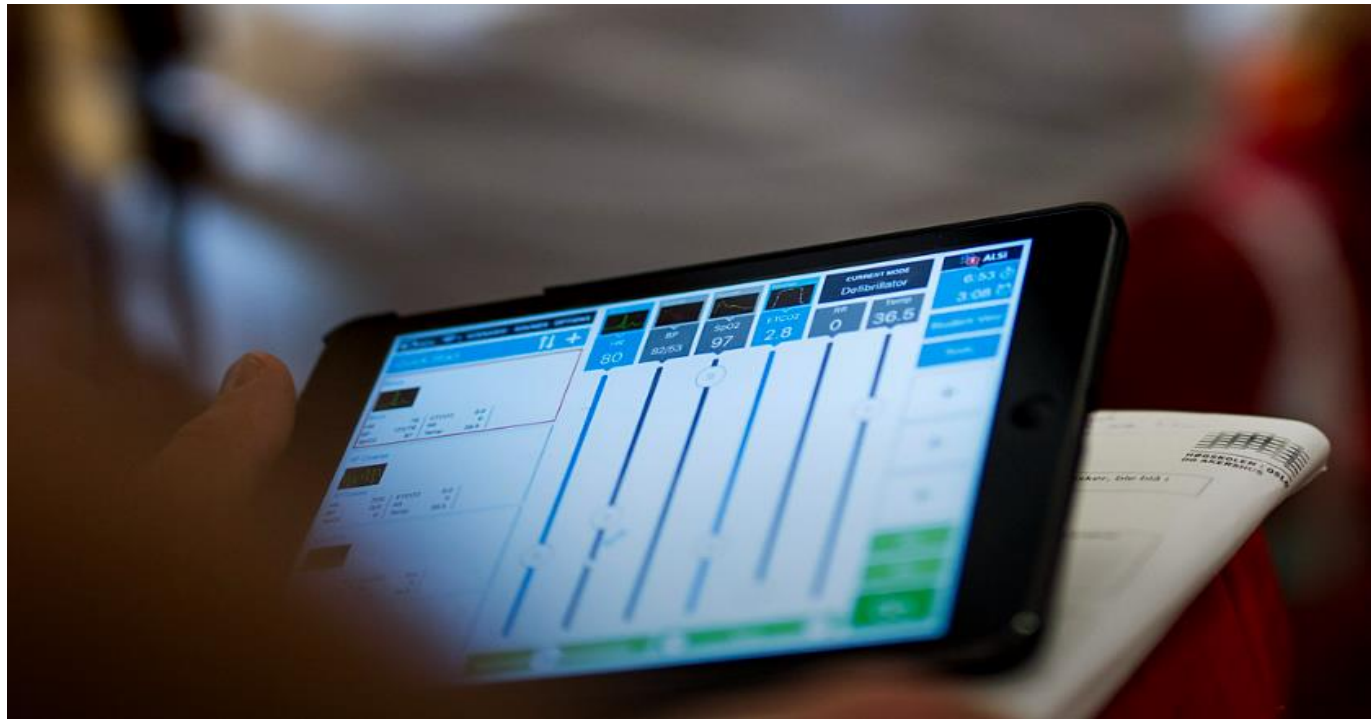
Background

- Using information and communications technologies (ICT) – mHealth

  - Benefits of mHealth in chronic disease management [4][5].
  - However, lack of focus in clinical perspectives [6][7] & sustained user engagement [8][9].

Research aim

- Gluco Coach
  - A T2DM self-management app focusing on supporting T2DM patients to achieve healthy lifestyle behaviors.
  - Science- and evidence-based concerning the aim of sustaining the patients' user engagements through personalization.

- In this position paper: user testing conducted among T2DM patients to understand their comfort levels and interest in using Gluco Coach.

Gluco Coach

Gluco Coach
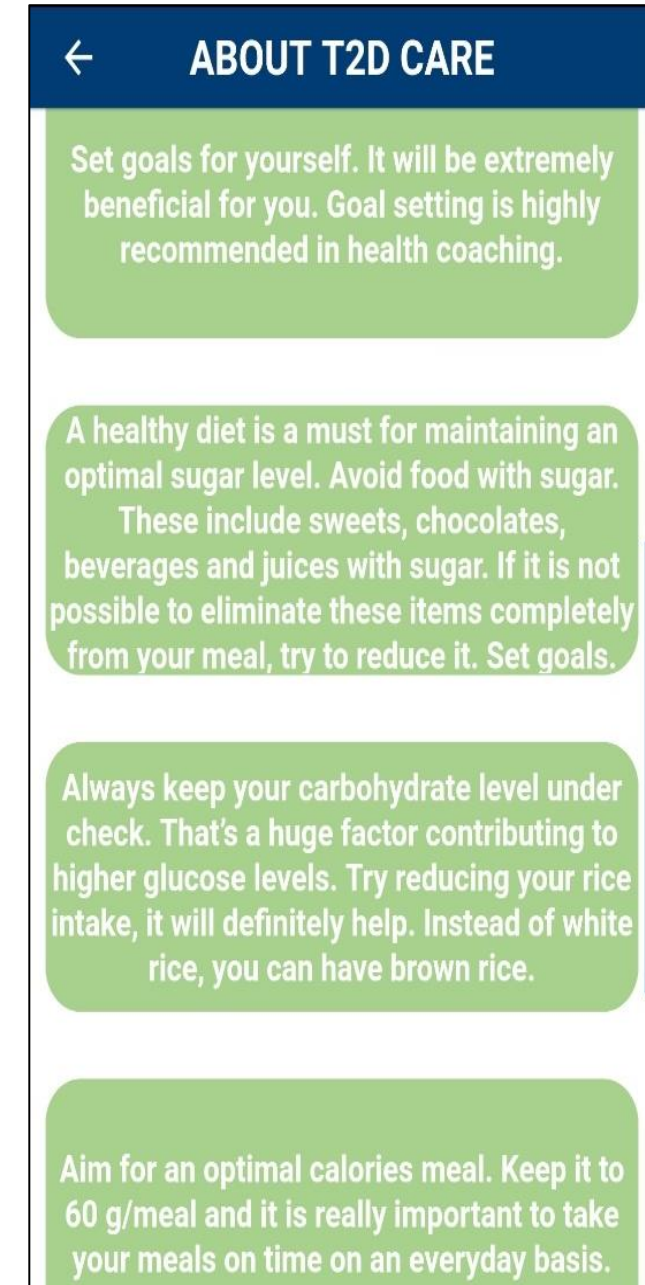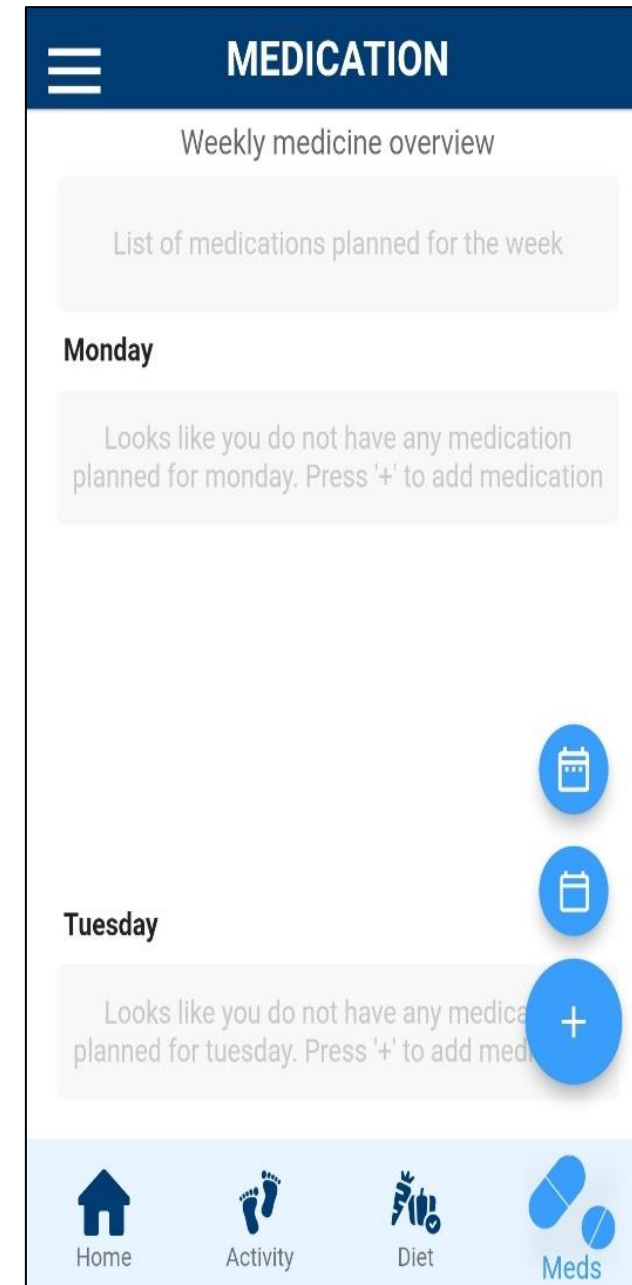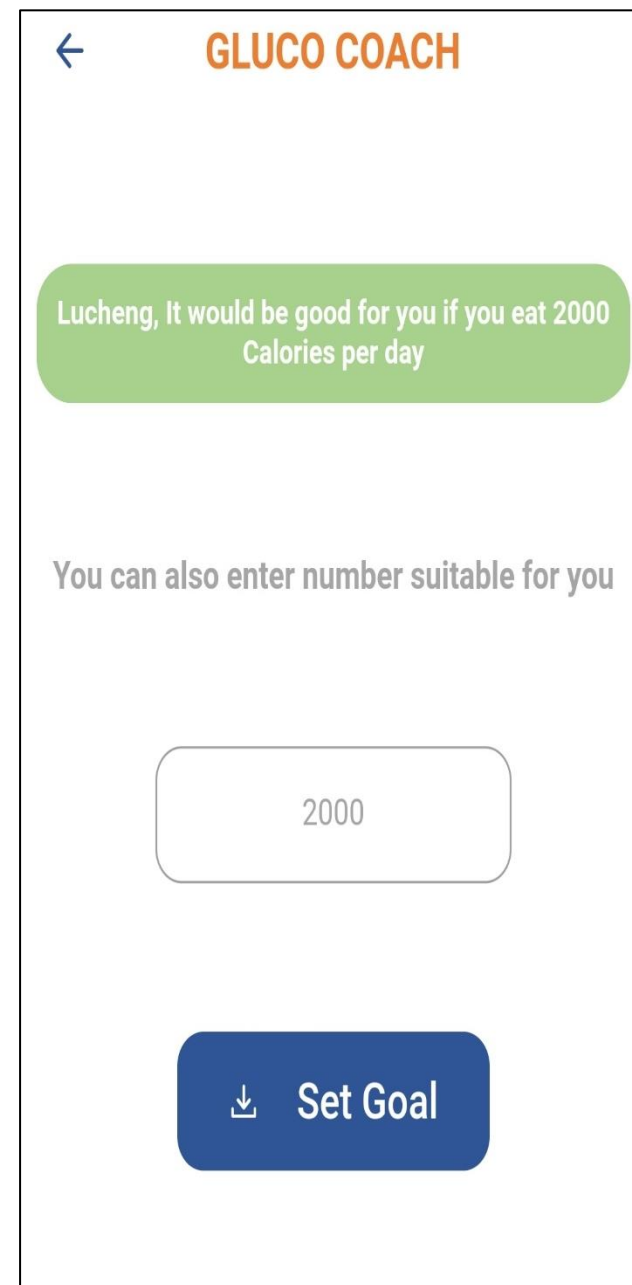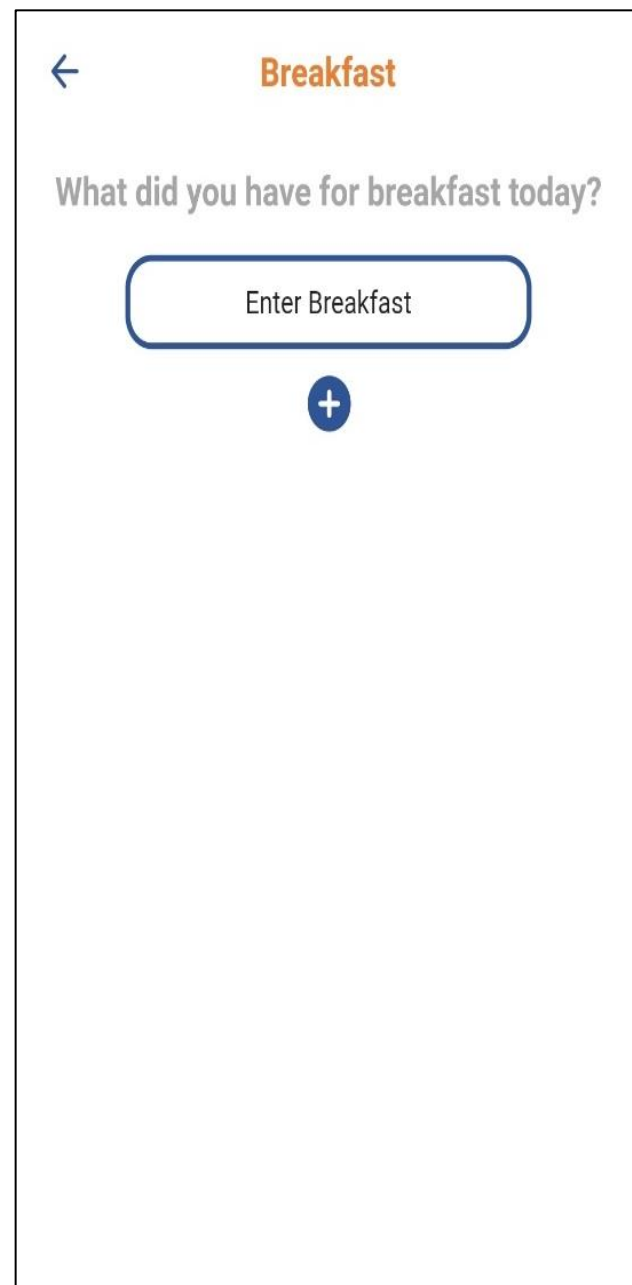
Methodology

- User testing with four T2DM patients
- Convenience sampling
- Briefed, gave consent

	Age (years)	Gender	Self-rated ICT skills (1 is very bad and 10 is very good)	Highest education obtained
P1	56	Male	2	High school
P2	34	Male	9	Master's
P3	58	Female	4.5	High school
P4	43	Male	8	Bachelor's

Methodology

- Demographic info
- Testing tasks + Observation & clarifications

1) Sign up (using a username and one-time code).
2) Enter physiological information, i.e., weight, height, blood pressure, BGL, and presence of other comorbidities.
3) Type in a medicine name and time for intake (dosage was not required).
4) Change the medication time for intake reminders.
5) Delete the medicine.
6) Inspect the navigation function.
7) Inspect the home page.
8) Insert the goal for the step count.
9) Log diet.
10) Investigate the T2DM care function.

- System Usability Scale (SUS)
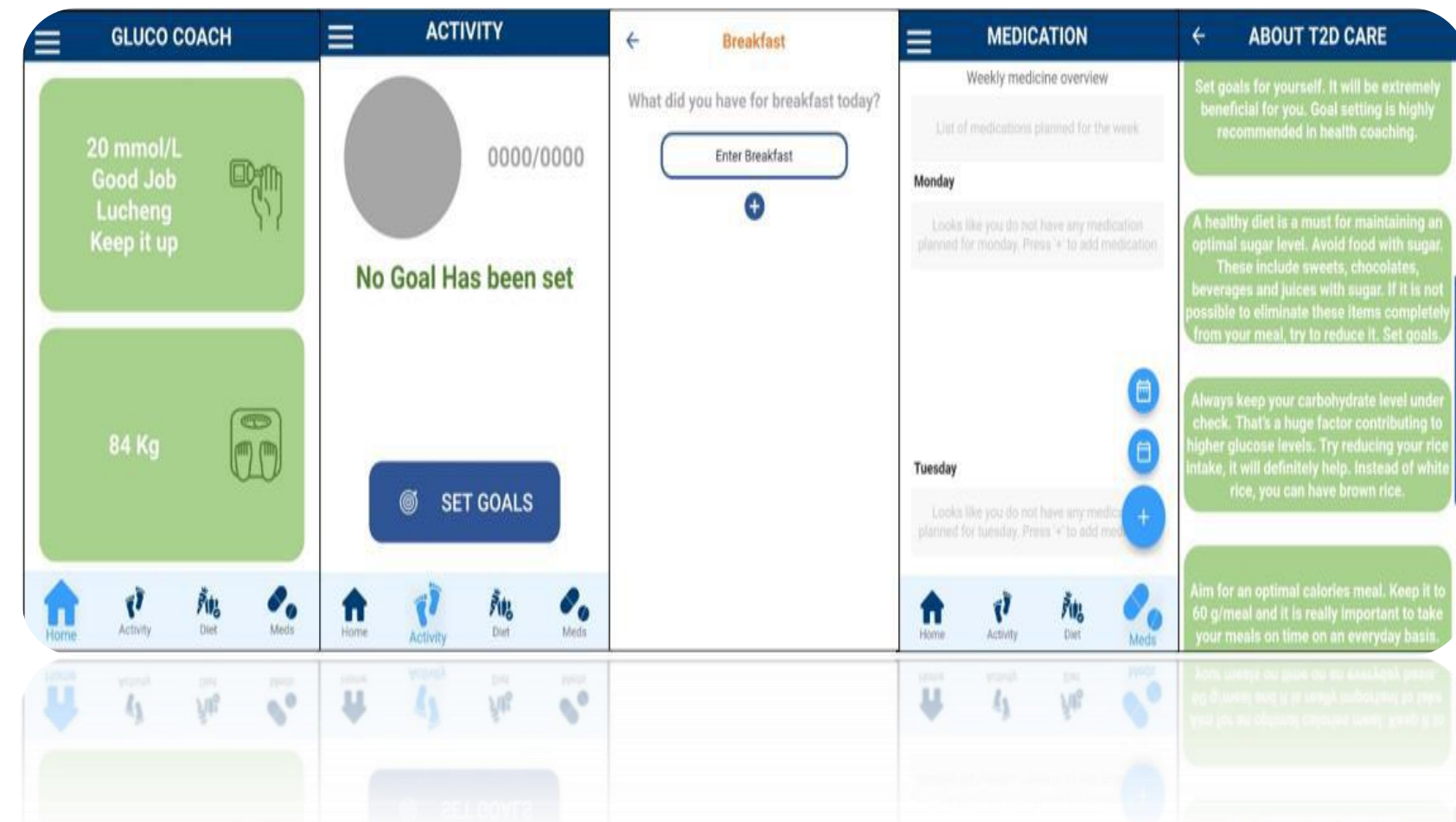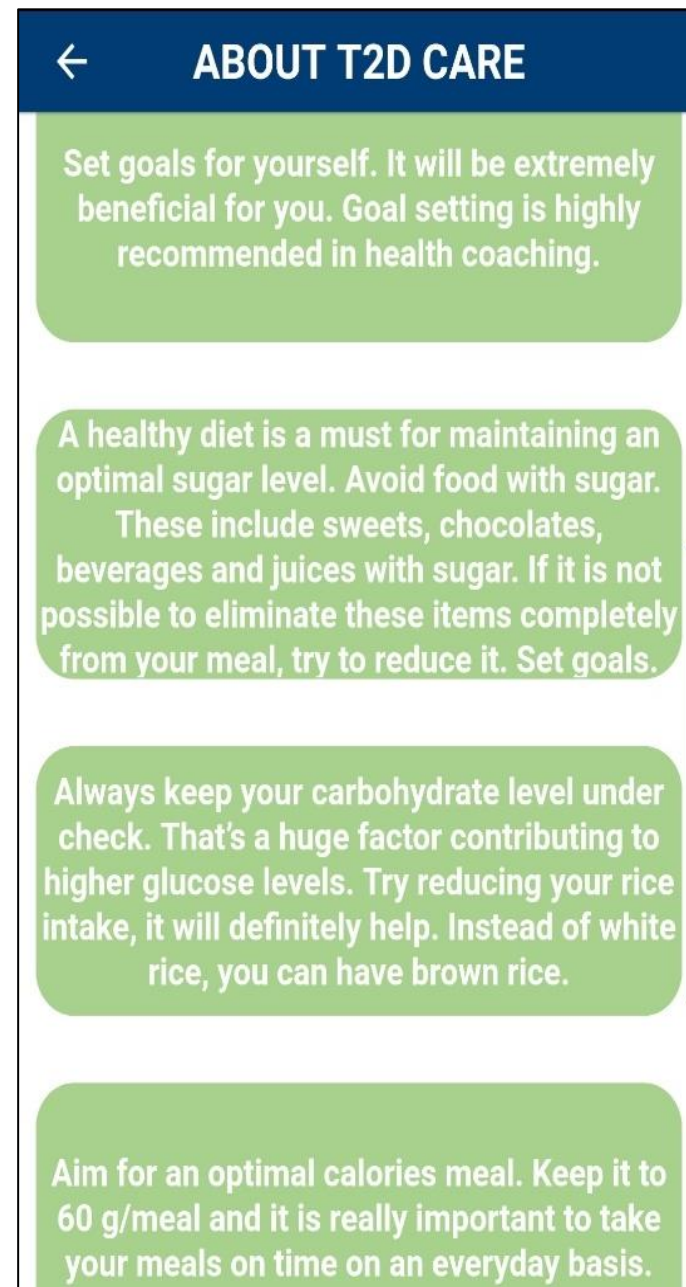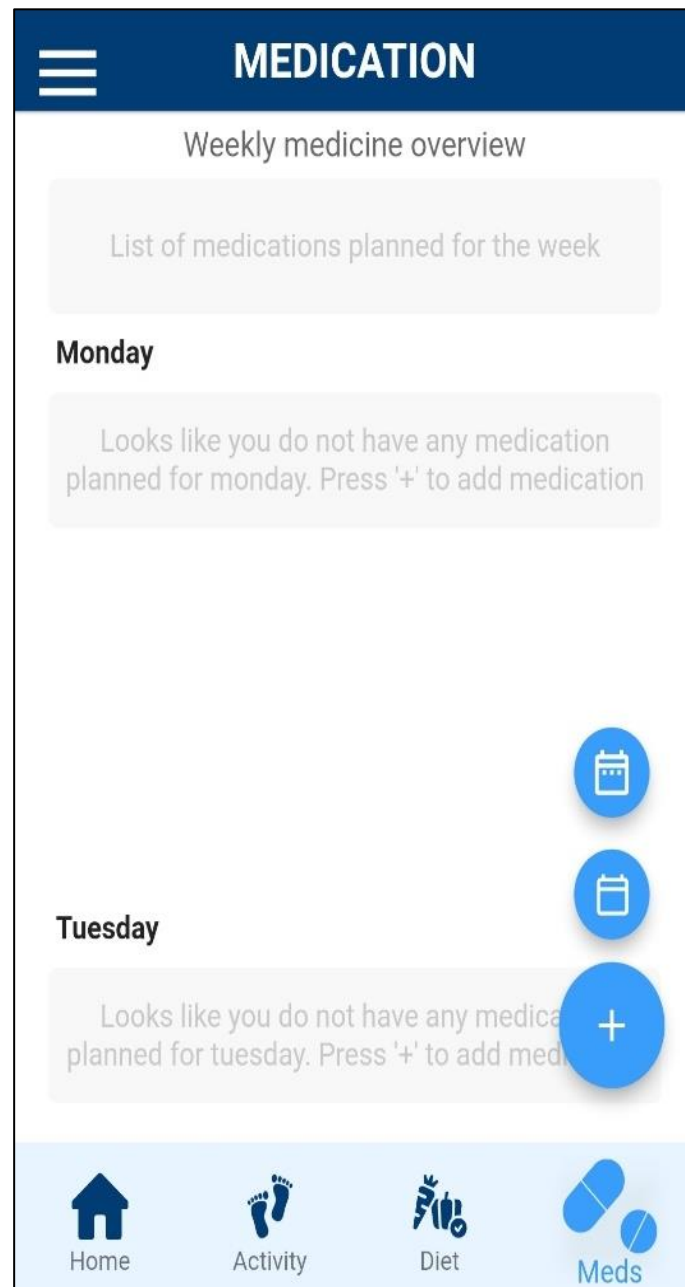
Results

- Tasks completion
  - The participants could complete most of the tasks without much guidance.
  - Tasks 2 (Enter physiological information, i.e., weight, height, blood pressure, BGL, and presence of other comorbidities) and 9 (Log diet) needed the most help.
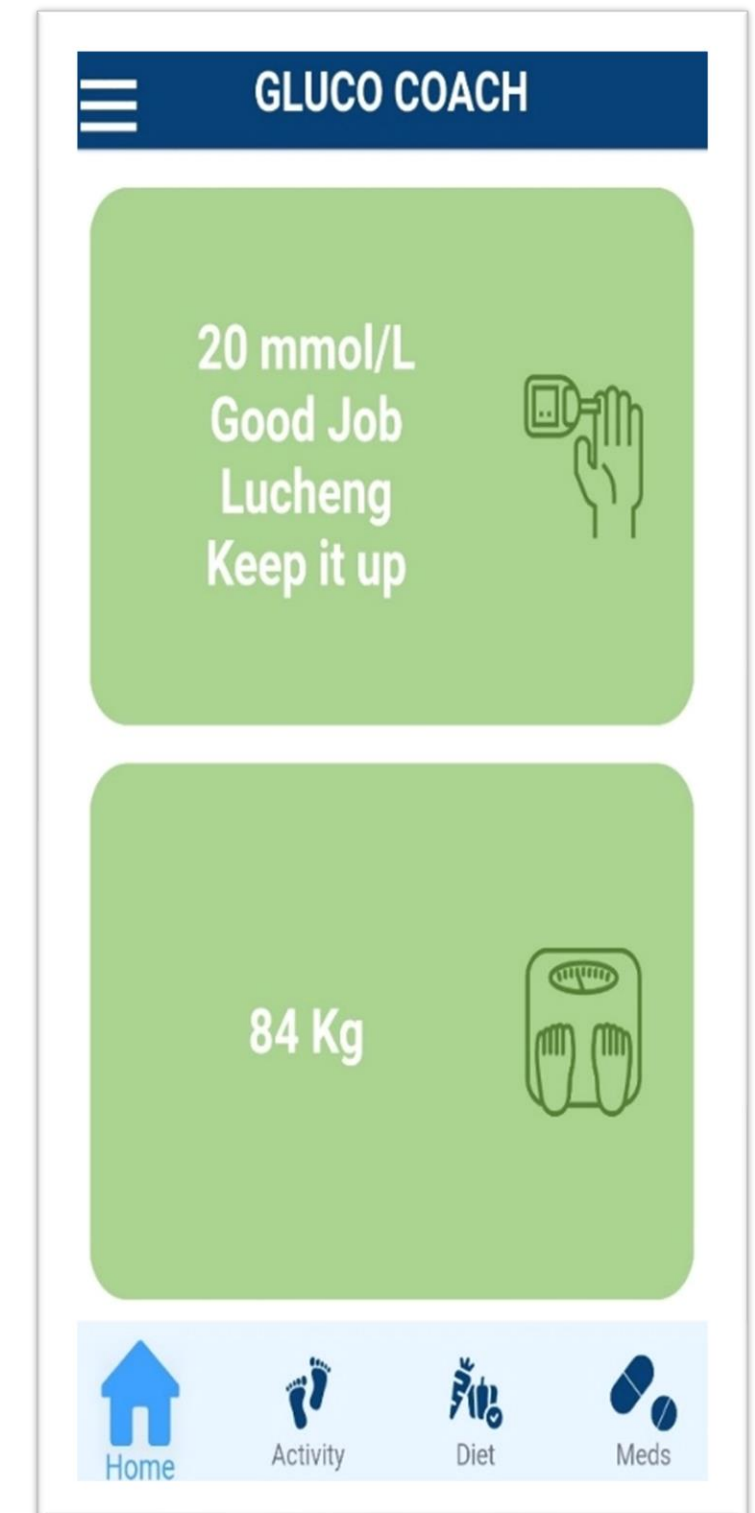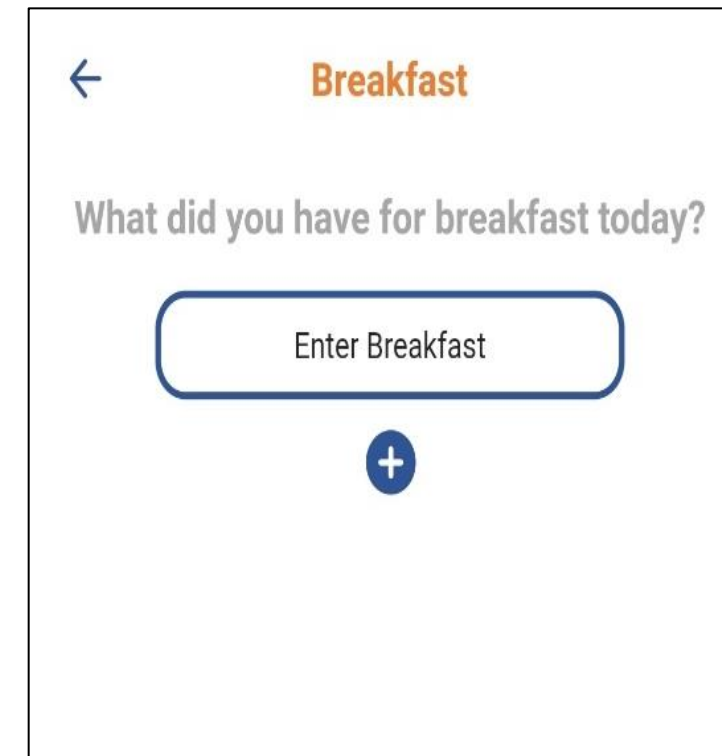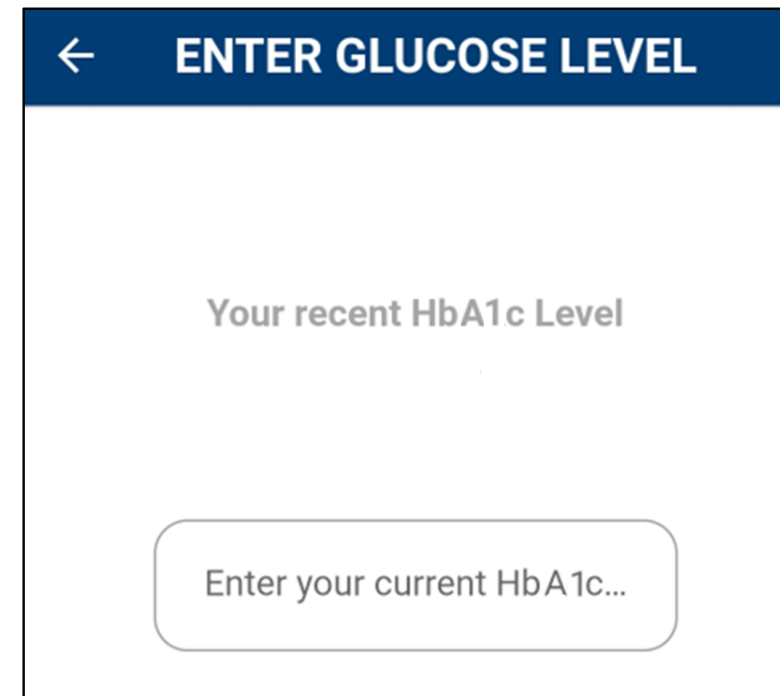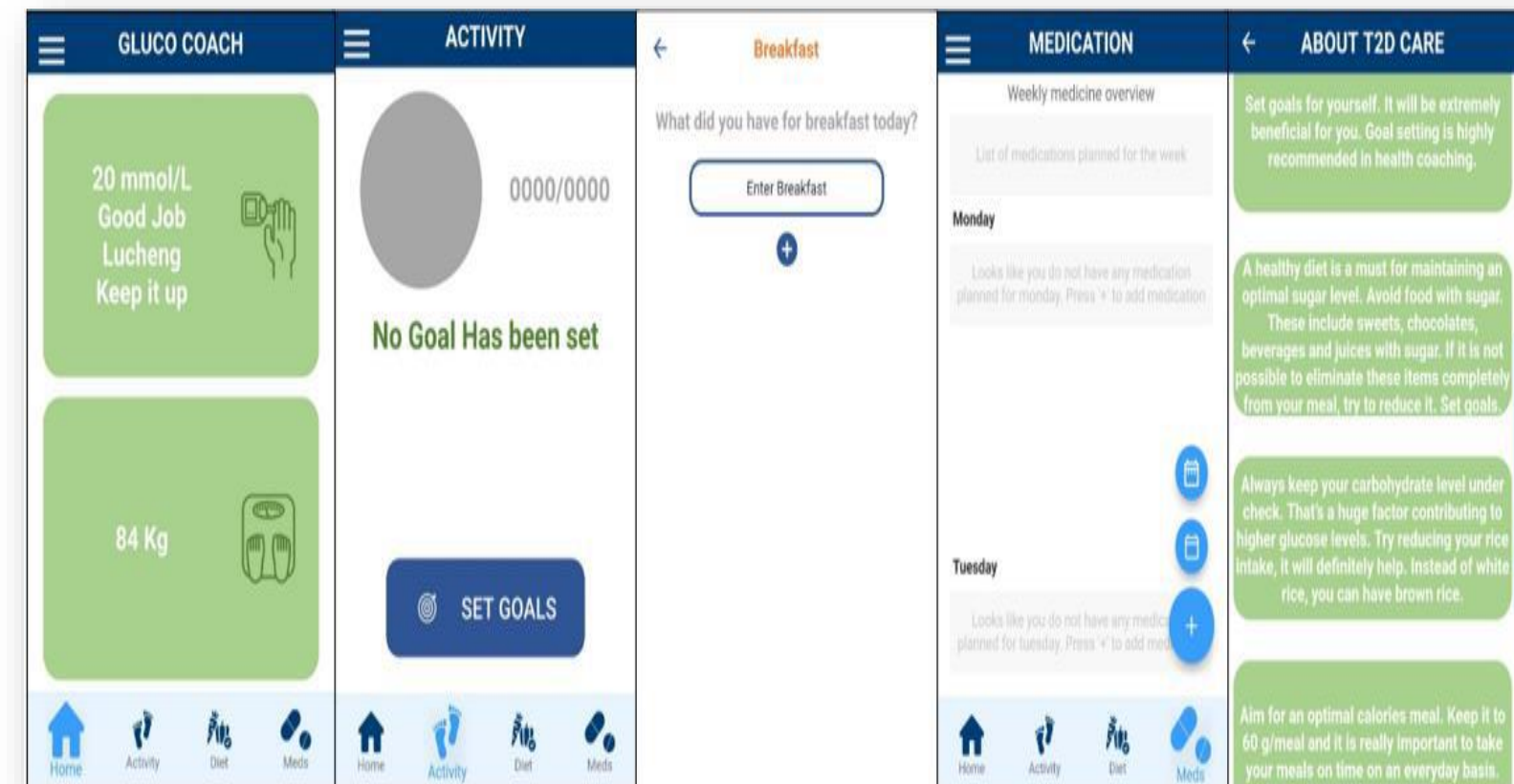
Results

- Medication – Want to be reminded until medicine is taken.
- T2DM care – Thought it was too much text

Results

- Slightly complicated
- Inconsistency
- Well-integrated
- Easy to use - confident

SUS statements (to rate from 1 to 5; 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)	Avg
1) I think that I would like to use this system frequently.	2.25
2) I found the system unnecessarily complex.	3.25
3) I thought the system was easy to use.	2.25
4) I think that I would need the support of a technical person to be able to use this system.	3
5) I found the various functions in this system were well integrated.	3.25
6) I thought there was too much inconsistency in this system.	3.75
7) I would imagine that most people would learn to use this system very quickly.	2.5
8) I found the system very cumbersome to use.	2.5
9) I felt very confident using the system.	3.5
10) I needed to learn a lot of things before I could get going with this system.	2

Design that will sustain user engagement [7][10][11].

1. Offer personalized messages in the form of small tips that cover the three main areas of lifestyle, i.e., physical activity, diet, and medication adherence.
2. Provide necessary guidance or interactive education regarding T2DM.
3. Have a consistent design across pages in the app.
4. Make reminders more solid, e.g., persistent alarms and strong visuals on the app screen.
5. Suggest what to eat, besides logging the meals.
6. Offer a more user-friendly way to log diets, e.g., taking photos.

Conclusion

- Potential of Gluco Coach
- Limitation: Number of participants
- Future work:
  - Further improve the design to sustain user engagement
  - More participants, testing in a longer period of time

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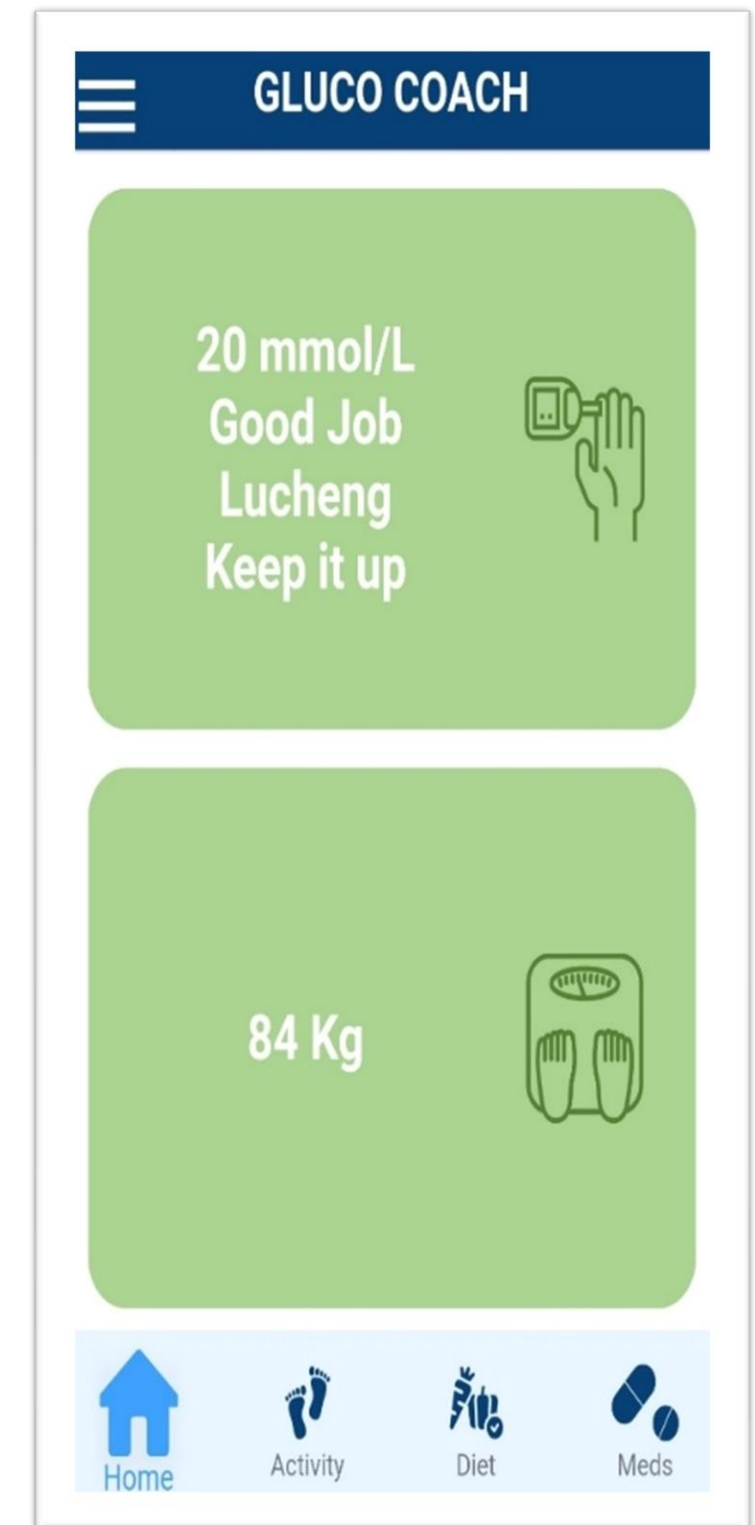
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Thank you!