A Computer Assistant Support of Diabetes Self-Care and Improvement of Health Literacy

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Diabetes

246 million people worldwide

20 million in the United States

Cost in the US: $132 billion

Other countries are equally impacted

- China: 41m diabetics
- India: 39m diabetics
- Russia: 10m diabetics

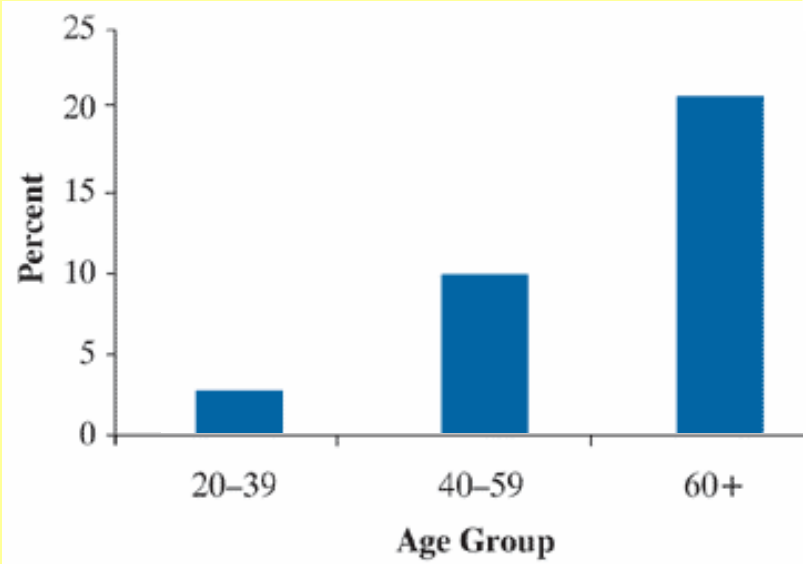
American Diabetes Association, 2002

Older Adults

Older adults more prone to diabetes type II

- Organ functioning decline
- Physical activities become challenging

20% of individuals over 60 have diabetes



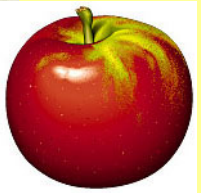
Diabetes by age group

Diabetes Type II

Lydia (aged 62) experiences increased thirst, frequent urination at night, fatigue, and blurred vision

She visits her physician who sends her to the clinic. Test results indicate that she suffers from **diabetes type II**

The physician prescribes her a treatment, which exists of a number of **complex tasks** including: performing exercise, maintaining a healthy diet, and taking medication.



Key issues for Lydia are **learning self-care tasks** and combining them with her daily routines while maintaining a good quality of life

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Computer Assistants for Supervision of Older Diabetics' Self-Care

Computer assistant

- Monitors self-care
- Provides feedback

Goals to improve

- Health literacy
- Medical adherence

Computer Assistant

Feedback Styles

Assistant and User Characteristics

	Cooperative Feedback Style	Directive Feedback Style
Assistant	Coaching	Directing
	Educating	Reporting
	Advising	Dictating
	Oriented towards satisfaction and long-term development	Oriented towards quick problem solving
User	High participation level	Low participation level
	Committing	Complying

Computer Assistant

Feedback Styles

Advantages and Disadvantages

	Cooperative Feedback Style	Directive Feedback Style
Advantages	Learn new competencies and develop understanding Better performance in long-term User-assistant complementing	User needs few competencies Better performance in short-term Vigorous acting due to expert assistant
Dis-advantages	Assistant support can become tedious and patronizing	Vulnerable to mistakes when participation is required User loses idea of control

Computer Assistants for Improvement of Health Literacy

Computer assistant feedback

- Different situations
- Different feedback styles

Adaptive computer assistant

Does an adaptive computer assistant contribute to health literacy of older diabetics?

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Computer Assistant for supervision of older diabetics' self-care

Adaptive computer assistant

Patient Situation
- Normal
- Health-Critical

Assistant Type
- Fixed
- Adaptive

Assistant Type	Patient Situation: Normal Situation	Patient Situation: Health-Critical Situation
Fixed	Cooperative feedback style	Cooperative feedback style
Adaptive	Cooperative feedback style	Directive feedback style

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Smart Home Laboratory

Georgia Tech AwareHome

Home like atmosphere for easy assessment of natural behavior

Addresses independent living fundamentals

- Technical
- Design
- Social challenges

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Method
Design

28 older adults

8 Scenarios

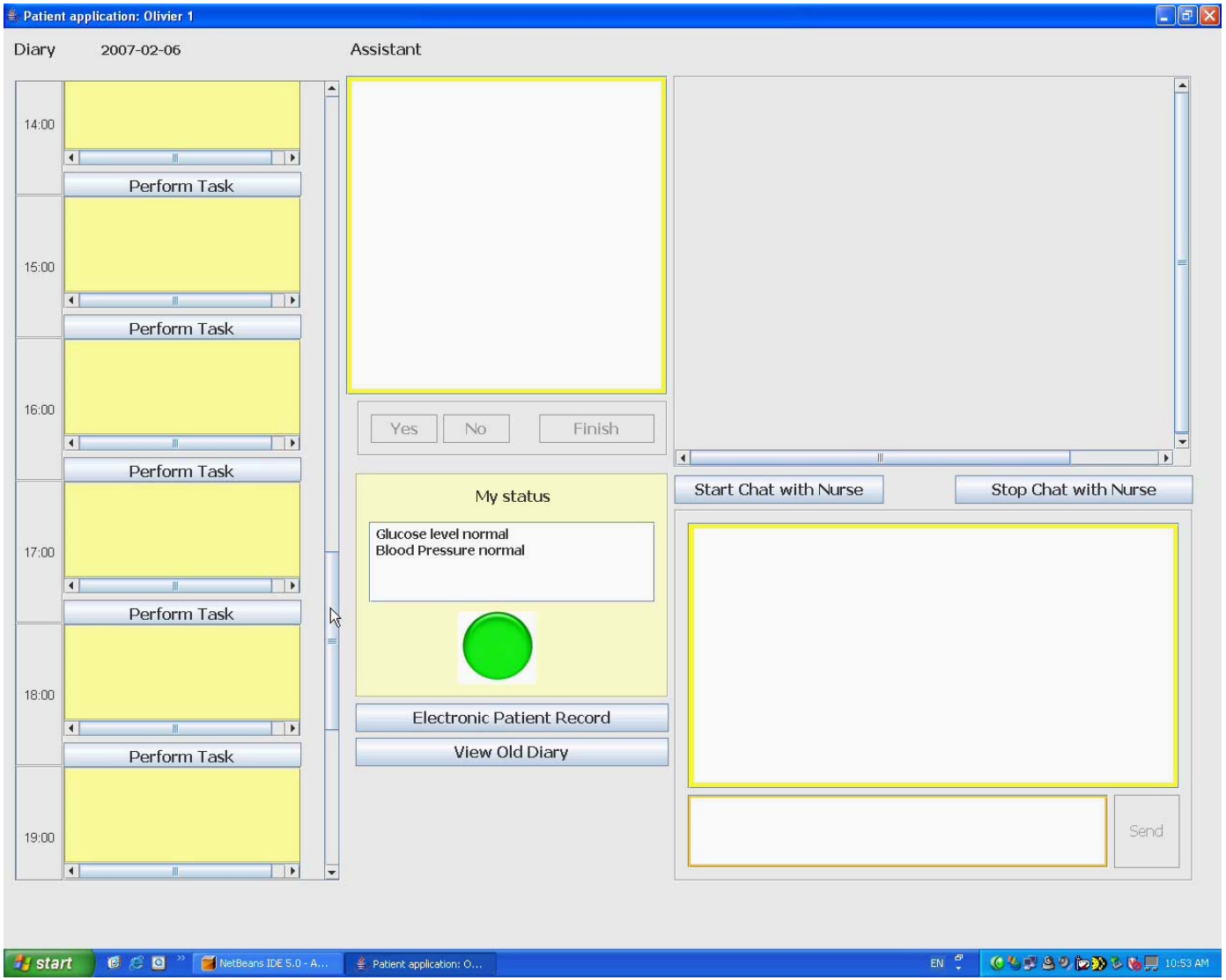
- Within design
- 4 Fixed, 4 Adaptive
- Patient situation varies from normal to health-critical

Dependent variables

- Preference for assistant type
- Diabetes knowledge

Method

Adaptive computer assistant



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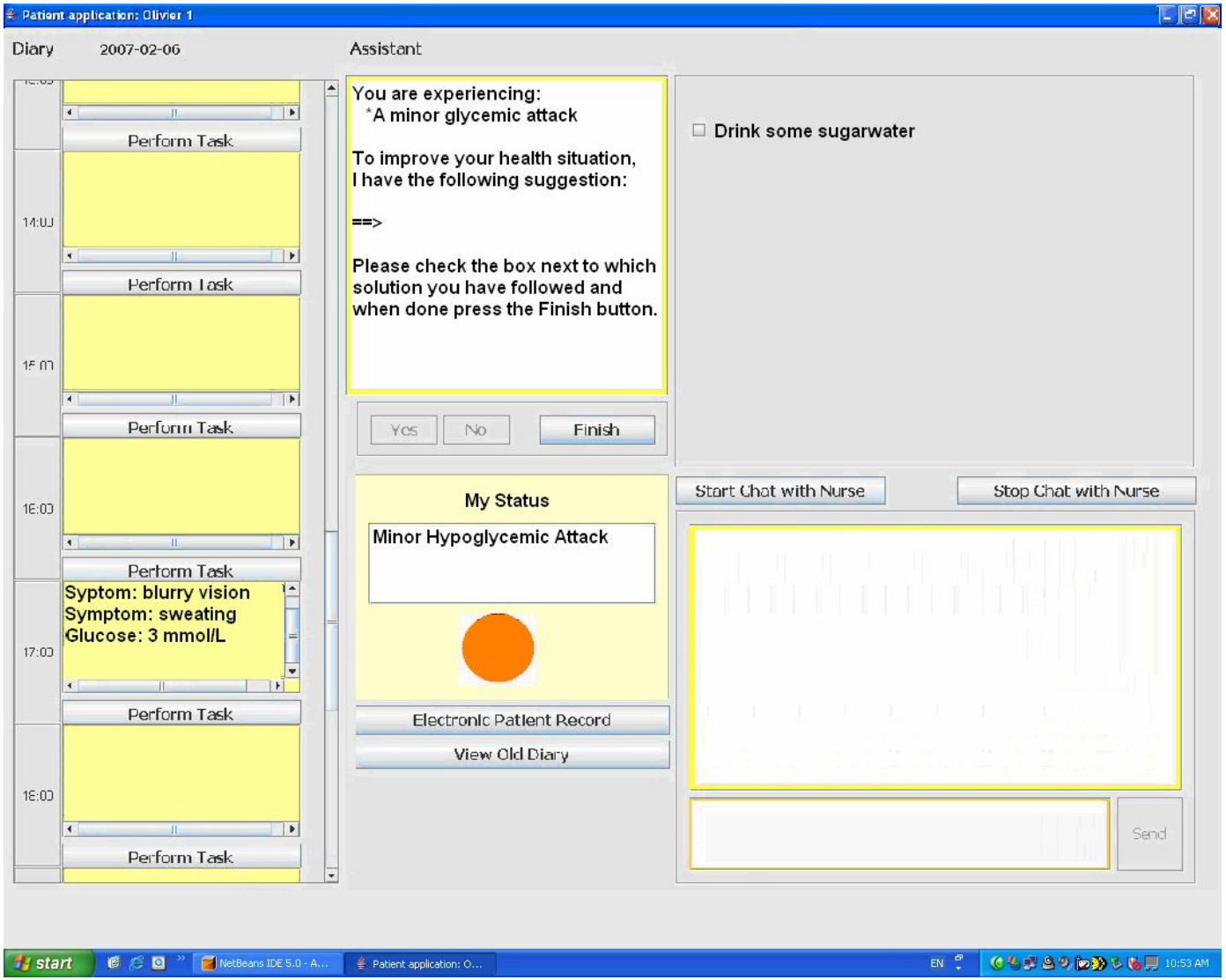
Method

Adaptive computer assistant



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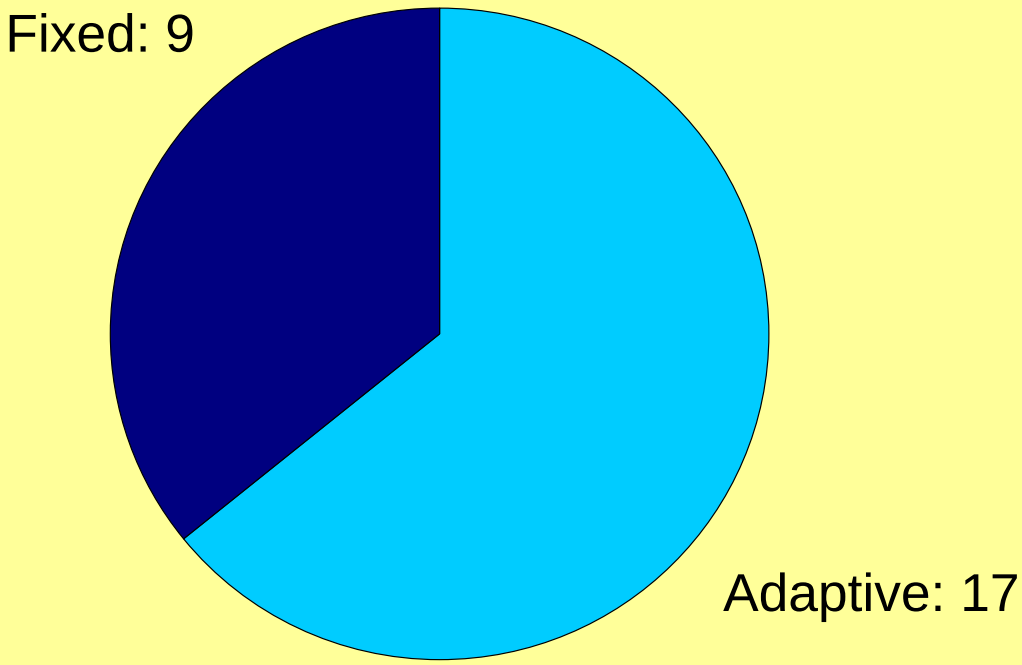
Results

Satisfaction measured by Preferences for a Fixed or Adaptive Assistant



Majority prefers the adaptive computer assistant

Questions diabetes questionnaire

Survey to assess diabetes knowledge

Halfway (Q1) and at the end (Q2) of experiment

- Q1 and Q2 were identical
- 8 multiple-choice questions

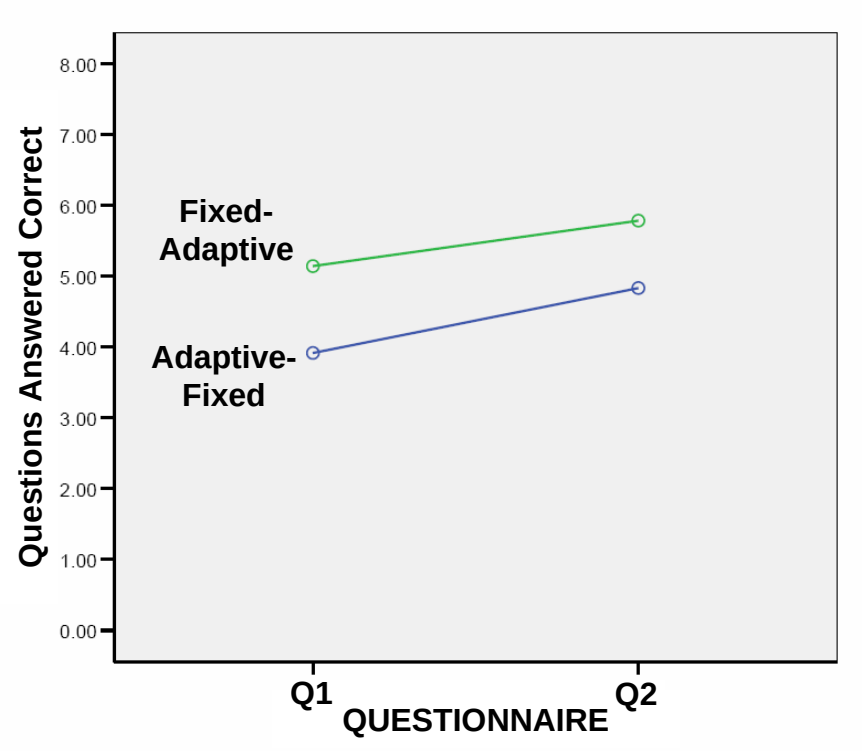
Examples:

If your glucose level is too low, which symptoms will you experience?

The best way to prevent hyper- and hypoglycemic attacks is by?

Results

Educational Value Measured by Increases in Diabetes Knowledge



The assistant types did not influence the growth of diabetes knowledge

Growth of diabetes knowledge with the use of computer assistant

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Discussion

Preference for adaptive assistant

General increase in knowledge of diabetes, regardless of assistant type

Future directions

- Actual diabetes patient
- Field study

Acknowledgments

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Questions?

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