ALAPP 2015

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ICTs for the medical profession: an application in chronic care

Sarah Bigi & Maria Grazia Rossi
Emails:
sarah.bigi@unicatt.it
mariagrazia.rossi@unicatt.it

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Project: "Positive Technology and Active Ageing"

PI: Giuseppe Riva, Catholic University, Milan

Members: Dept. of Psychology, Dept. of Sociology, Dept. of Linguistic Sciences, School of Medicine (Catholic University)

Topic: role and functions of PT devices for active and healthy ageing; development and test of PT devices aimed at citizens' wellbeing

Positive technology (PT):
focuses on bio-psycho-social aspects of cognition, emotions, and positive experiences. Suggests how to foster positive emotions, promote personal growth, and support creativity through technology (Riva et al., 2014)

PTs are classified according to their effects on personal experience:

- **Hedonic**, induce pleasant experiences
- **Eudaimonic,** support achievement of engaging experiences
- **Social/Interpersonal**, improve social integration and/or connectedness

(Riva et al., 2014)

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Research Unit: Linguistic Sciences

Coordinator: Sarah Bigi, Catholic University, Milan
Members:

- Fabrizio Macagno, Universidade Nova de Lisboa
- Maria Grazia Rossi, Catholic University, Milan
- Ilaria Ciullo, A.O. Istituti Clinici di Perfezionamento. Milan
- Michelangelo Chasseur, Touchware

touchwa.re

Our goal: development of a mobile application for diabetes patients; test of the prototype.
Main app functions: improve patient self-management and adherent behaviors

Role of education in chronic care

What can doctors use to achieve **patient adherence** and **self-management** through dialogue?

EDUCATION
intended as the purposeful combination of:

- ✓ **Information**

BUT ALSO

- ✓ **Critical thinking**
- ✓ **Practical skills**

Selected references:
Kahneman, 1991; Heisler et al., 2002; Epstein & Street, 2011; El-Gayar et al., 2013; Epstein & Gramling, 2013; Felton et al., 2015.

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Education in chronic care through technology

Existing ICTs for patient support: telemedicine, phone calls, text messages, decision aids, web apps, **mobile apps**

Our assumption: mobile apps are appropriate tools to strengthen understanding and critical thinking

Methodology:

1) Review of research articles
2) Review of mobile apps
3) Design of a prototype for patient education
4) Intervention study to test prototype's usability and effects

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A review of research articles & mobile applications for Italian diabetes patients

Review of research articles

SEARCH CRITERIA

Keywords:

- diabetes AND Italy OR Italian AND app OR application
- diabetes AND mobile AND Italy OR Italian

RESULTS

The review of the literature reveals **a lack of data regarding Italy**. The five articles selected are not studies on mobile apps (Castelnuovo et al., 2009; Lanzola et al., 2007) or studies that include interventions with Type 2 diabetes patients (Rossi et al. 2009, 2013; Vuattolo et al., 2012).

Review of mobile applications

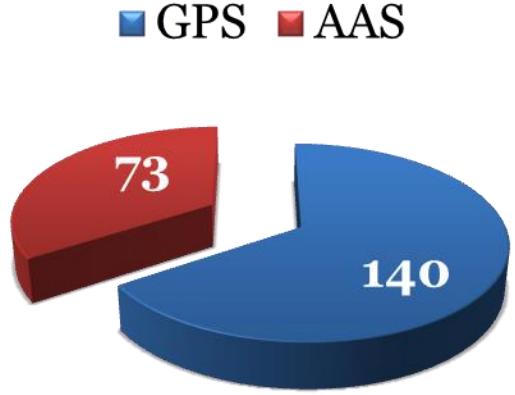
SEARCH CRITERIA

Keywords:

- diabete (diabetes)
- diabete glicemia (diabetes glycemia)
- diabete educazione (diabetes education)
- diabete sport (diabetes sport)
- diabete movimento (diabetes exercise)
- diabete dieta (diabetes diet)
- diabete alimentazione (diabetes nutrition)

ANDROID APP ON Google play

Available on the App Store



Inclusion & exclusion criteria

Inclusion criteria:

- Apps that have Italian user interface
- Apps used for blood glucose monitoring
- Apps designed to be used primarily by patients (whether with or without the intervention of health care professionals, such as doctors, nurses, etc.)
- Apps designed (also) for patients with Type 2 diabetes

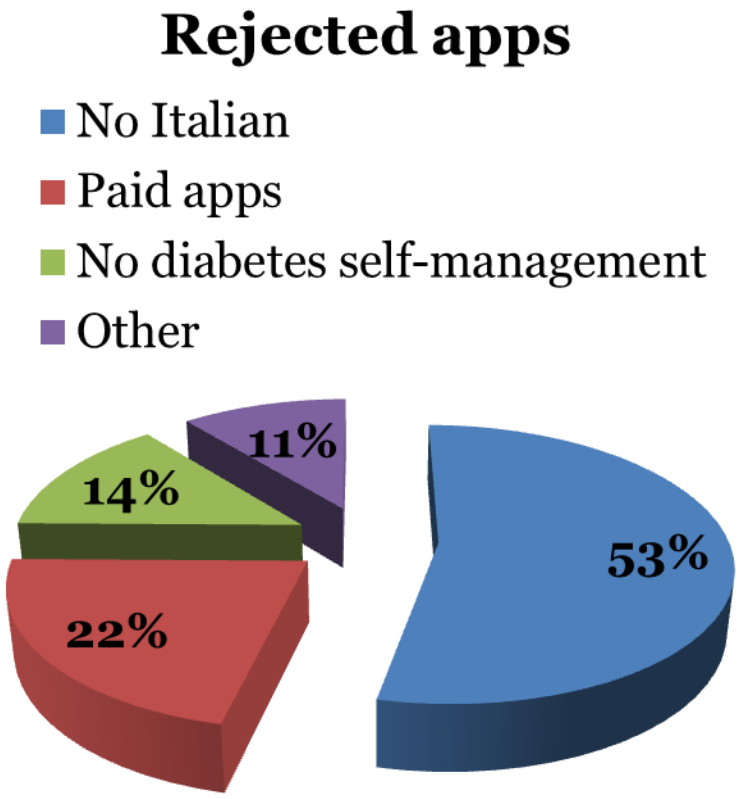
Exclusion criteria:

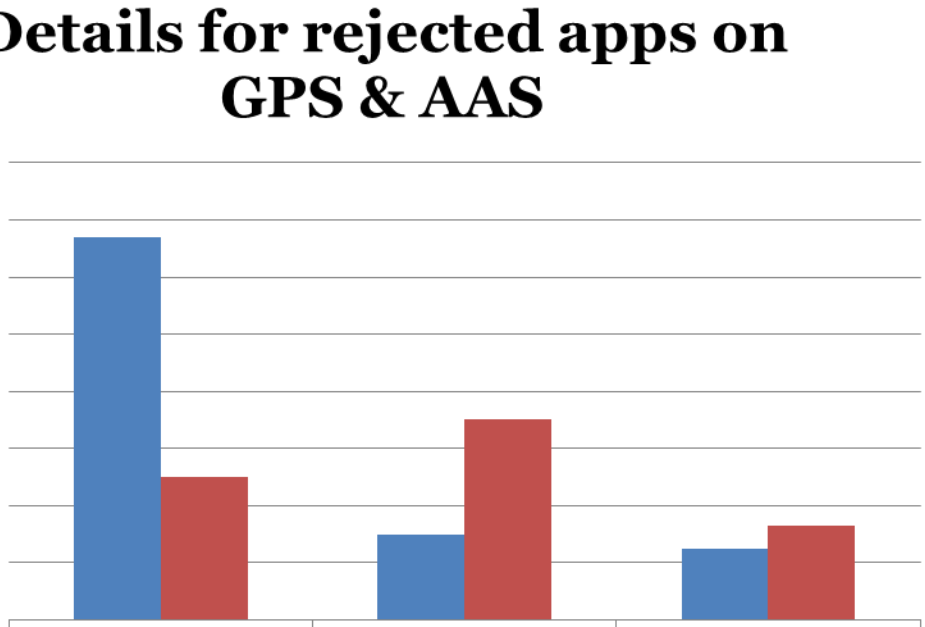
- Apps that have non-Italian user interface
- Apps designed to be used by doctors and/or other health care professionals
- Apps that are not primarily designed for diabetes self-management (e.g. recipe apps; sport apps, such as pedometers)
- Apps that are not specifically designed for diabetes
- Duplicated apps
- Paid apps
- Apps requiring login

Selection & results (1)

	Google Play Store		Apple App Store	
Keywords	**Selected**	**Rejected**	**Selected**	**Rejected**
diabetes	6/20	10 No Italian 2 No diabetes self-management 2 Not open	7/20	4 No Italian 5 No diabetes self-management 2 Other 2 Not opens
diabetes & glycemia	8/20	10 No Italian 1 No diabetes self-management 1 Paid app	5/20	2 No Italian 2 No diabetes self-management 7 Paid apps 3 Other 1 Not available
diabetes & education	0/20	10 No Italian 4 No diabetes self-management 5 Paid apps 1 Not available	0/1	1 Other
diabetes & sport	4/20	10 No Italian 5 Paid apps 1 Not available	0/20	7 No Italian 1 No diabetes self-management 8 Paid apps 2 Other 1 Not open 1 Impossible to test
diabetes & exercise	1/20	14 No Italian 1 No diabetes self-management 3 Paid apps 1 Not open	0/1	1 No diabetes self-management
diabetes & diet	0/20	13 No Italian 5 No diabetes self-management 2 Paid apps	0/6	1 No Italian 1 No diabetes self-management 4 Paid apps
diabetes & nutrition	1/20	14 No Italian 2 No diabetes self-management 2 Paid apps 1 Impossible to test	1/5	1 No Italian 2 Paid apps 1 Other

Selection & results (2)





	No Italian	Paid apps	No diabetes self-management
GPS	67%	15%	12,50%
AAS	25%	35%	16,50%

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Selected apps

Google Play Store	Apple App Store
Total apps 20	Total apps 13
Duplicate 10	Duplicate 6 (3 in commonwith Play Store selection)
Play store final selection 10	Apple store final selection 7
General final selection 17	

Characteristics and functions of the tested apps:

- **Technical information:** Store (GPS/AAS), Version number, Average rating
- **Data upload:** Blood glucose, Exercise, Diet, Medication, Blood pressure, Weight, Notes, Export/data sharing
- **Education:** Decision support, Messages, Contents, Visual aids, Goal setting, Social

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Education as a composite category

Decision support: functions aimed at providing a feedback or a suggestion on medication dosage, food dosage, and so on.

Messages: verbal messages used as alerts or reminders.

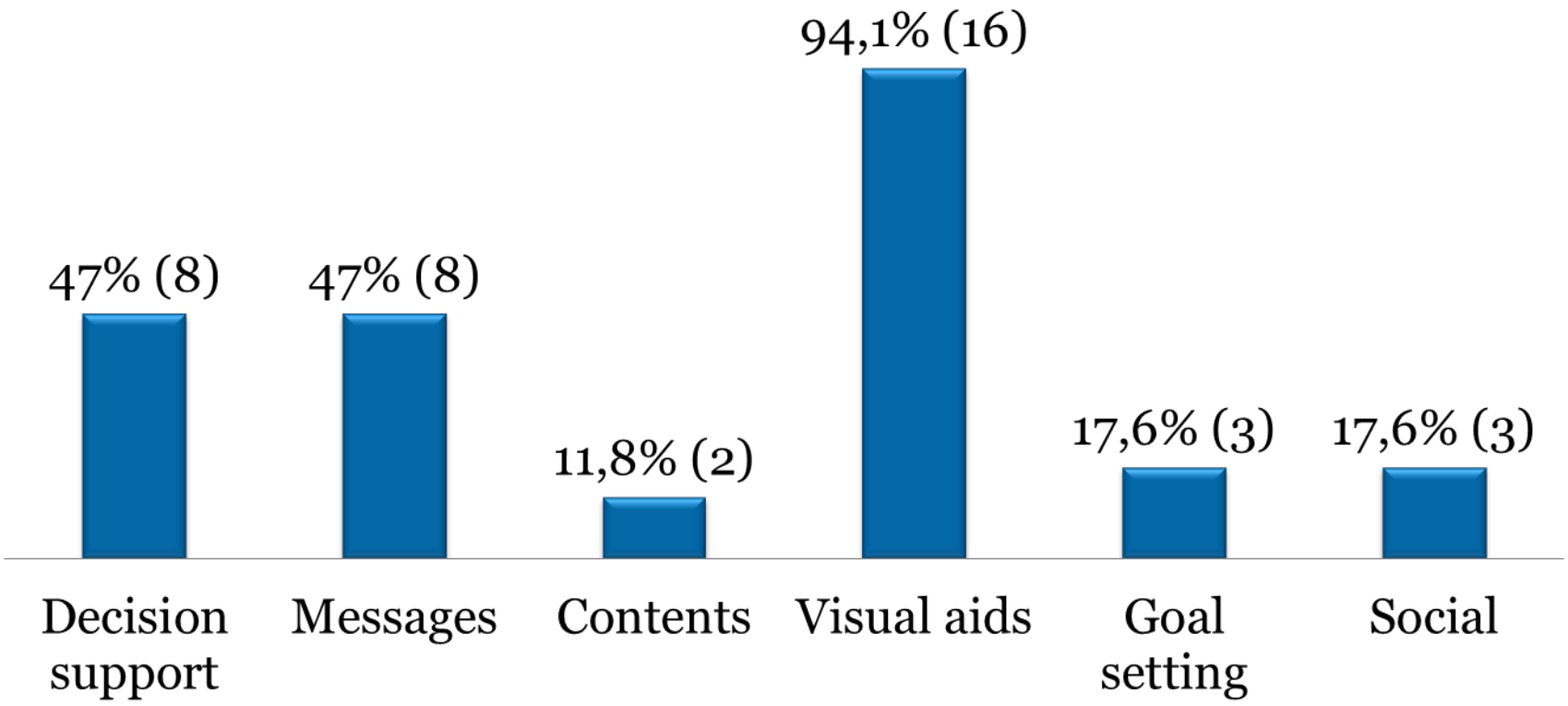
Contents: educational content about what is diabetes *stricto sensu* and why it is important to have healthy life styles.

Visual aids: functions aimed at providing a visual feedback on the trend of patients self-management.

Goal setting: functions designed for planning activities and used by patient to work on a particular aspect of self-management.

Social: functions designed for sharing ideas, doubts and information on social networks or social communities of diabetes patients.

Education as a composite category



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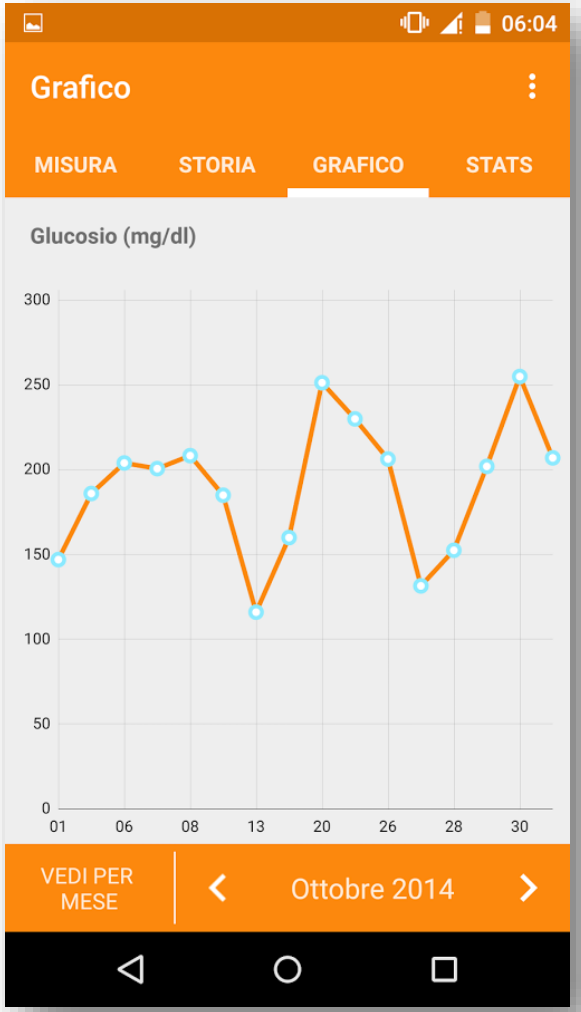
Focus on Education & Visual aids



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Design of a prototype for patient education and intervention study

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Design of a prototype for patient education

Limitations of reviewed apps:

- lack of explicit theoretical models
- weak educational component
- functions of information giving and critical thinking are poorly linked

How to strengthen the educational component of a mobile application for patient education?

- Solid theoretical models about clinical practice, professional dialogue, and the cognitive dimension
  - **Messages:** not only alerts/reminders, but motivation boosters (Walton & Krabbe, 1995; Bigi, 2014, 2015; Bigi & Macagno, submitted)
  - **Goal setting:** not a task in isolation, but a cooperative activity performed by health care professionals and patients (Street, Elwyn & Epstein, 2012; Baca-Motes et al., 2013)
  - **Decision support:** triggers and nudges are not persuasion tricks out of context (Fogg, 2003), but incorporated in a long-term relationship (doctor-patient) and in an engaging experience (Kaptein et al., 2010)

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Intervention study

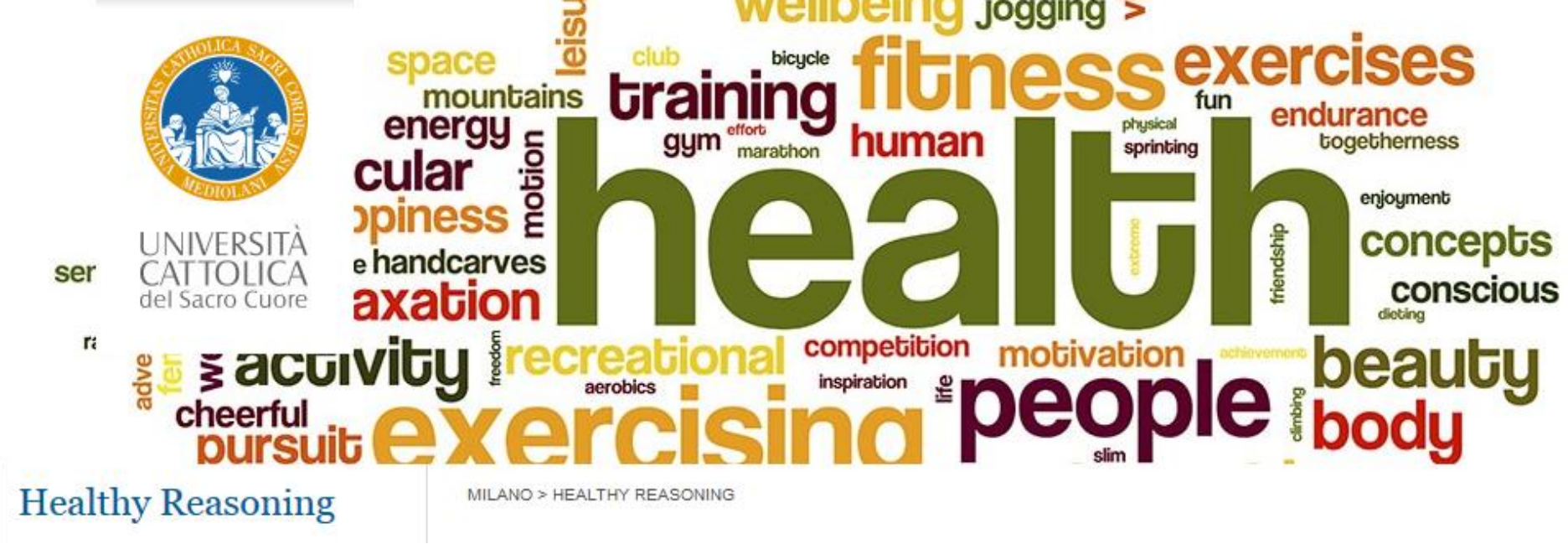
Participants: 60 Type 2 diabetes patients
Duration: 12 months
Assessment methods: qualitative interviews, questionnaires

Aims of the study

To assess the following parameters:

- app usability (questionnaires)
- improvement of patients' awareness of their disease (questionnaires)
- improvement of patients' self-management abilities (monitoring of HbA1c; correct performance of self-monitoring)

Current stage of the study: identification of outpatient clinic and preparation of assessment materials



THANK YOU!

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