Development of a smarthphone dietary assessment application among 15 year olds in Sweden

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Challenges when obtaining diet information from children and adolescents:

1) Rapid change in eating habits due to growth.
2) Unstructured eating.
3) Eating away from home frequently.

Traditional methods
- FFQ
- 24h recalls
- Diet history interviews

- **Laborious and time consuming ➔**
  - ↓ Participation
  - ↑ Drop out
  - ↓ Validity
- **High administrative and analysis cost.**

Methods using new technology
Web/computer programs
Digital camera photos
PDA
Smartphone applications

”There is a preference among 11-15 y using a method based on new technology to keep food diaries compared with traditional pen and paper”

(Boushey C et al 2009)



- PDA or disposable camera were preferred over the pen and paper food record by 11 and 15-y olds (Boushey et al 2009).

Statements of 11 and 15 y olds testing six dietary assessment methods:

+ less hassle	- Difficult in finding foods/unfamiliar food names
+ lot easier	- Program bugs
+ fun	- Some embarrassment but less than audio recording

Digital camera photos

Photographs of dietary intake can be used:

1) As memory aid.
2) To quantify portion sizes.

To photograph foods with a digital camera could possibly:

1) Be easily adopted by young people.

2) Be a way to make the recording of dietary intake easier and more attractive for children.

3) Facilitate documentation of what and how much is being consumed e.g. at home, in school and at friend´s.

Swedish study of camera food record among overweight children

• The aim was to evaluate overweight and obese children´s ability to report reproducible and valid estimates of EI using digital camera food records during a 2-year study.

Children were equipped with:

- digital camera
- measuring tape
- paper food diary
- Booklet with pictures of common foods of different portion sizes and known weights

8-12 y olds.

73 overweight/obese children.

Six 2-d records and one 4-d record.

16 days on 7 occasions during 2 y.

TEE measured with SWA.

(Svensson Å 2012)

- Number of included assessment days was 583.
- Children recorded on average 17±5 foods per day and photographed 65 % of these.
- For 74 % of recorded foods estimated amounts of intake was given in the paper food diary.

Results

EI/TEE: 76% sig. under estimation

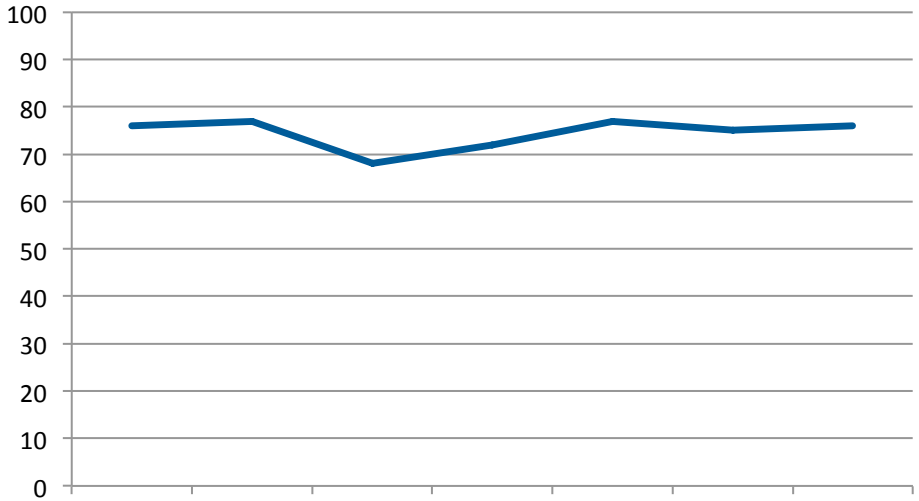
Correlation EI and TEE: 0.23 (p=0.051)

Variables negatively associated with reporting accuracy relative to TEE were increased age and BMI z-score.

Reporting accuracy relative to TEE was lower for girls than boys and on weekdays compared with weekend days.

Svensson Å et al 2012

Reproducibility of a camera food records



Assessment occasion	1 (n=73)	2 (n=46)	3 (n=41)	4 (n=42)	5 (n=31)	6 (n=28)	7 (n=27)
EI/TEE	0.76 (0.19)	0.77 (0.19)	0.68 (0.19)	0.72 (0.15)	0.77 (0.19)	0.75 (0.23)	0.76 (0.27)
Correlation coefficient of EI and TEE	0.23 [0.00, 0.44]	0.19 [-0.11, 0.46]	0.16 [-0.16, 0.45]	0.34 [0.04, 0.58]	0.35 [-0.004, 0.63]	-0.02 [-0.39, 0.36]	-0.16 [-0.51, 0.23]

No sig. Differens between the seven occations (p=0.15)

(Svensson Å 2012)

High subject burden for children and adolescent

High administrative and analysis cost

New Swedish method?

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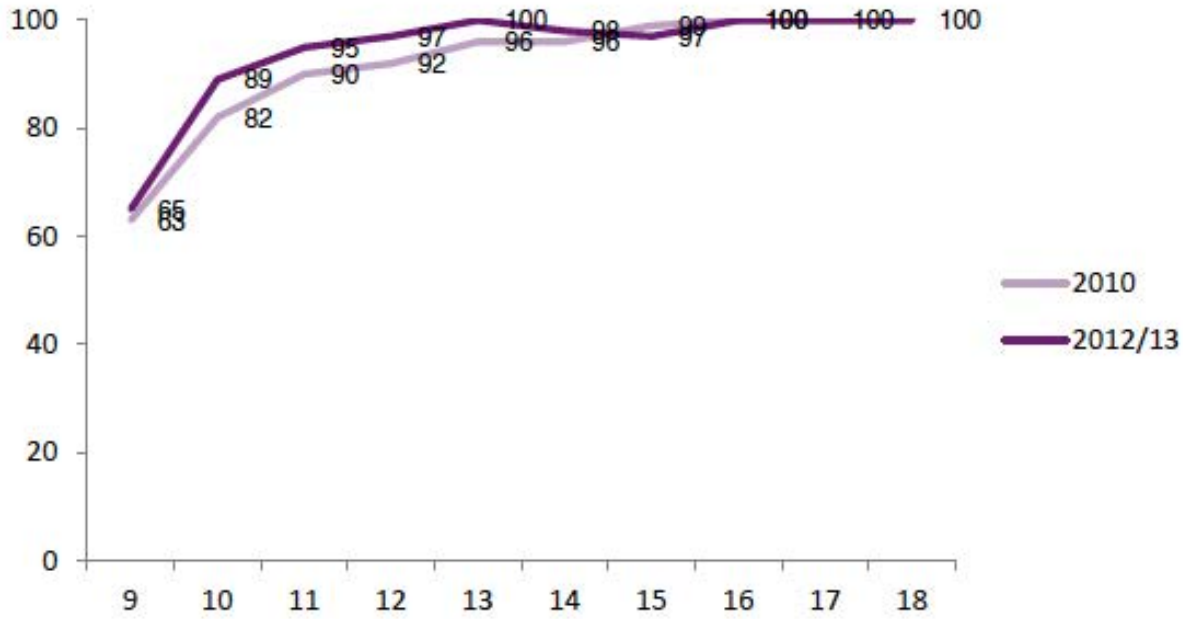
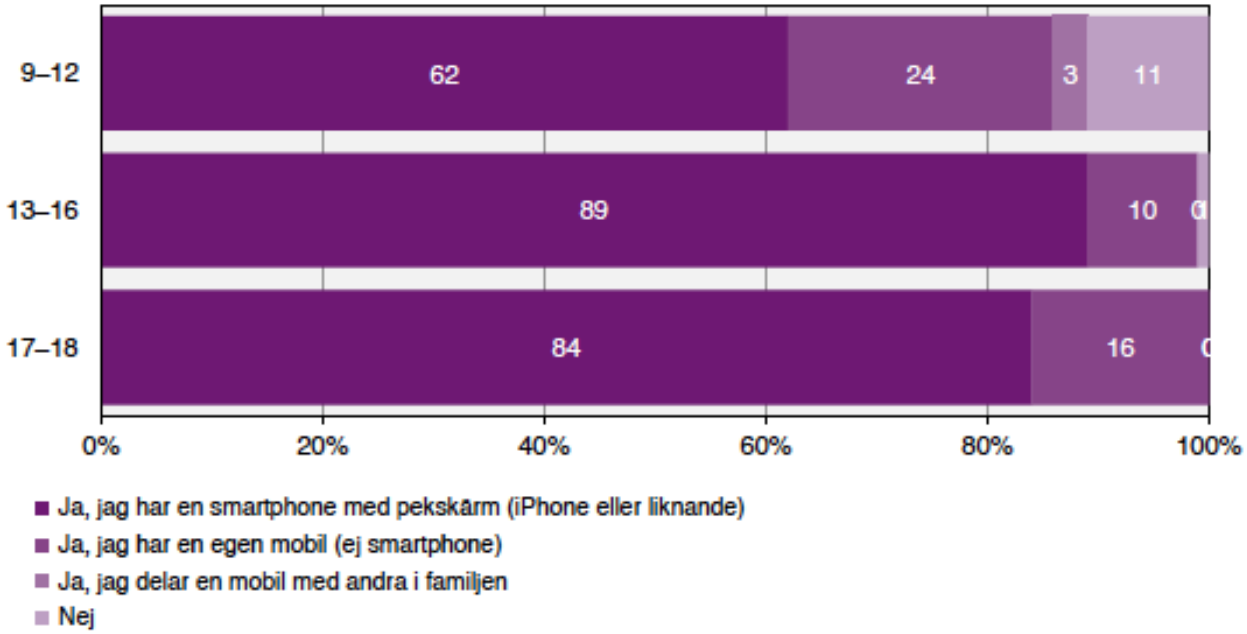
Having a mobilephone 2010 compared with 2012/13



- Today 10 and 13 y olds more often have a mobile phone than in 2010.
- Almost 100% of the teenagers have a mobile phone.
- Smartphones are more common than old versions, also among 9-12 y olds.
- Girls in all age groups have smartphone in a higher extent than boys.

Statens medieråd Unga & Medier 2012/13

Mobile phone among Swedish children and adolescents



- 99% of 13–16-year-olds in Sweden own a mobile phone and of these 89% have a smartphone.

Statens medieråd Unga & Medier 2012/13

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Smarthphone dietary assessment application

+ Is with them most of the time.
+ Allows instant registration of food intake.
+ Allows picture taken of foods and meals as memory aid.
+ Allows to add reminders to record.
+ Allows saved meals to be re-recorded.
+ Allows instant transmission of information.

? May be regarded as more feasible and attractive.
? May improve participation rate and compliance
? May improve completeness and accuracy

Procedure

- Year 2008 proposal of fundings.

- Year 2010 recrutiment of PhD student.
- Year 2011-2012 development of app and testing.

- Year 2013 implementation and data collection.
- Year 2014 evaluation.

Swedish Application for Smartphone

The application comprise:

- A search feature so that foods can be found by entering partial food names.
- A nutrient database by the National Food Agency.

- Pictures on foods of known weights (National Food Agency)
- Feature to take digital image of foods eaten as a memory aid.
- Feedback approach.

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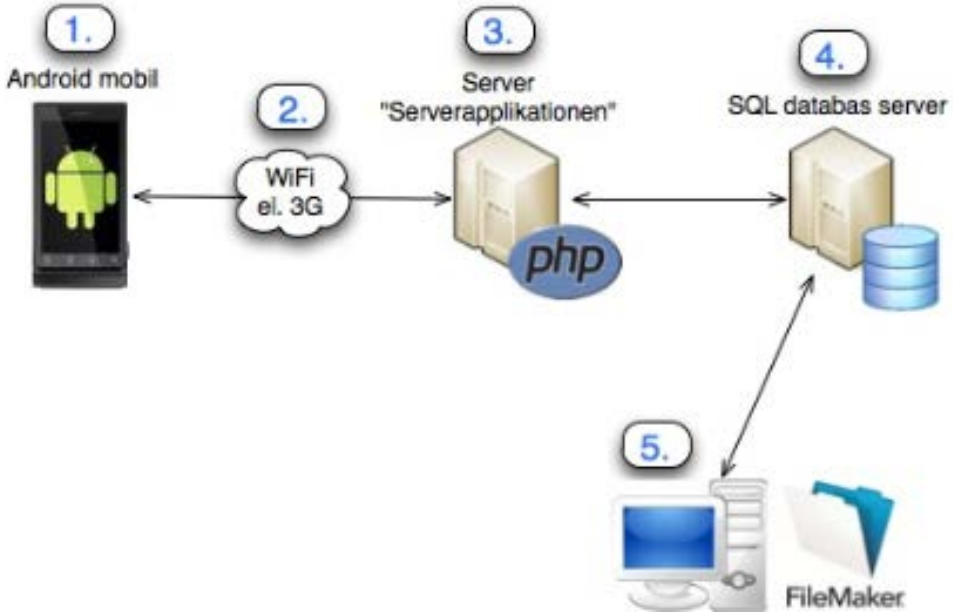
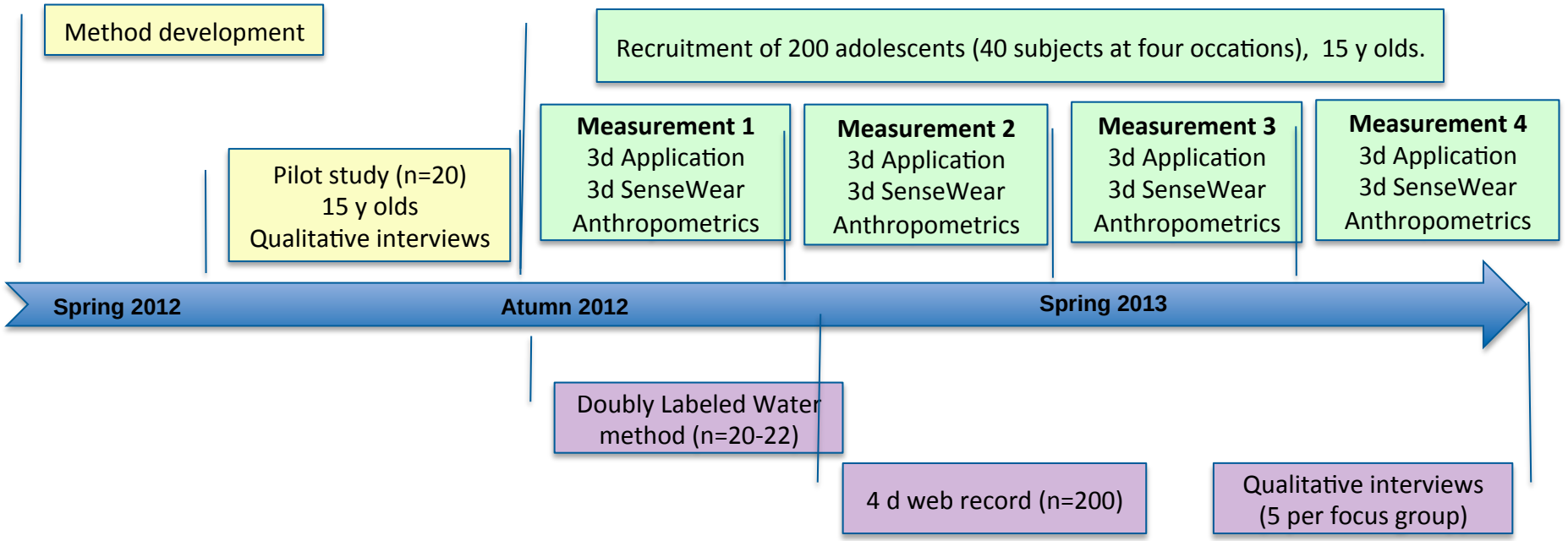
Transmission of information and feedback



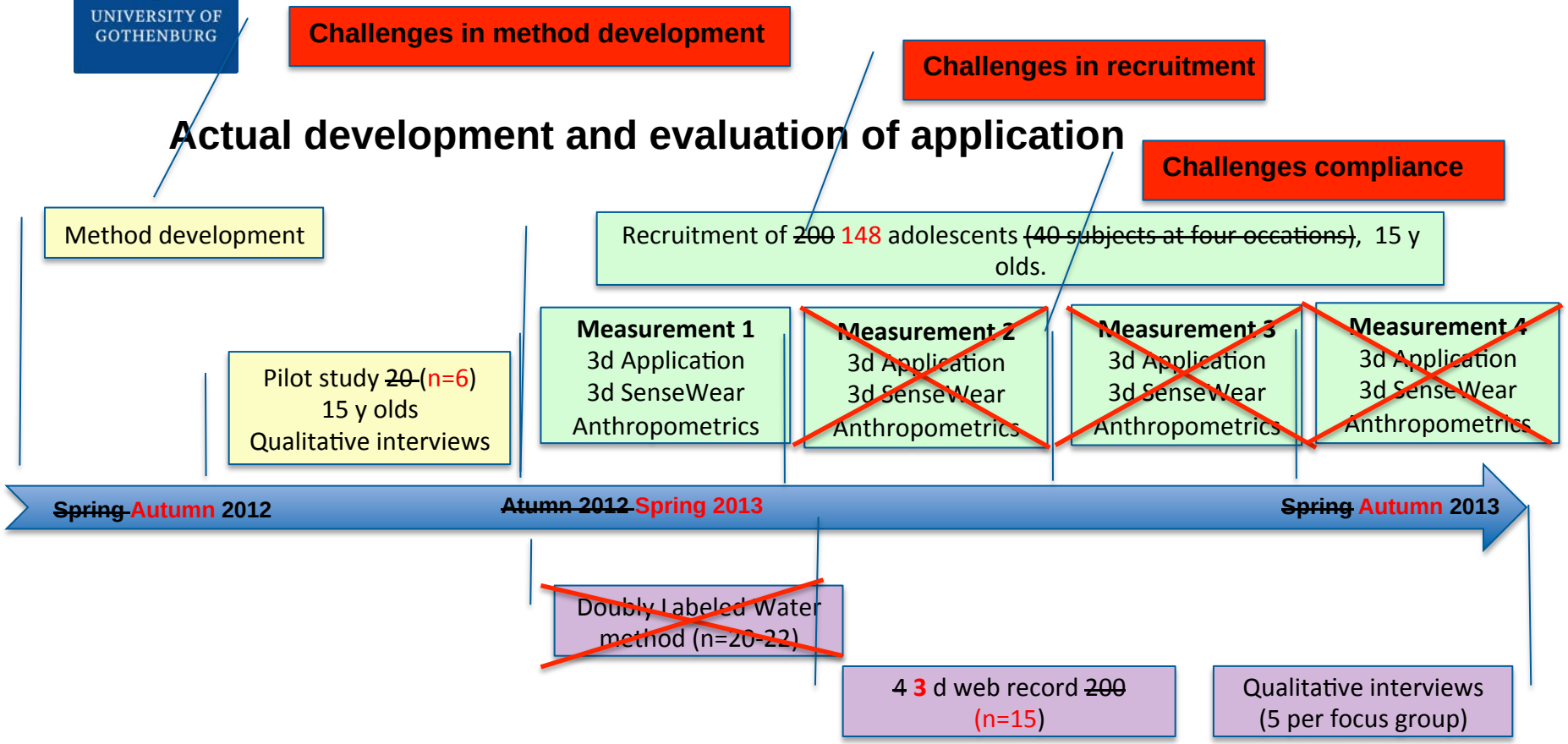
Studyplan for development and evaluation of application



To obtain knowledge regarding:

- User-friendliness of application.
- Validity and reproducibility of reported energy intake.
- Relative validity of reported nutrient and food intake.

Actual development and evaluation of application



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Doctoral thesis of Åsa Svensson dissertation 23rd of January 2015

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Thank you!