

Personalisation in POSEIDON

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www.poseidon-project.org

POSEiDON

POSEIDON project

EU FP7

PersOnalized Smart Environments to increase Inclusion of people with **DO**wn's sy**N**drome

*Objective 'ICT for smart and
personalised inclusion'*

- 2013 – 2016
- Budget 4 million €
- Contribution EU 3 million €
- Karde is project coordinator
- Participating countries:
Norway, Germany, UK, Sweden



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POSEIDON goals

Main goal of POSEIDON:

Increased quality of life, independence and inclusion of persons with Down syndrome

- Develop smart solutions to support daily living
- Available on different devices
- **Personalisation** for each person, based on simple and clean HCI
- Context awareness for situation and environments

Cognitive disabilities:

Number of people in Europe



People with intellectual disability
(e.g. Down syndrome)

Estimate:
0,1 %
≈ 0,5 mill



People with autism spectrum disorders
(e.g. Asperger syndrome)

Estimate:
1,1 %
≈ 5,5 mill



People with learning disability
(e.g. dyslexia, dyscalculia)

Estimate:
5 -12 %
≈ 25 - 60 mill



People with memory decline
(e.g. dementia)

Estimate:
1,29 – 1,55 %
≈ 6,5 – 7,6 mill

Typical learning characteristics of children with Down syndrome (a)

- Visual learning style – visual processing and visual memory skills are strengths.
- Reading is usually a relative strength, compared to oral language.
- Numbers can be an area of difficulty, focus should be on functional maths that is useful for everyday living.
- Social understanding and non-verbal communication are strengths.
- Reduced muscle tone causes difficulties in movement control (both fine and gross motor skills can be delayed).

Typical learning characteristics of children with Down syndrome (b)

- Around 50 % of children with Down's syndrome have some form of hearing impairment
- About 70 % of children with Down syndrome need to wear glasses by the time they start school. Even with corrective prescription individuals with Down's syndrome have difficulty focuses 'at near'.
- Specific speech and language profile – receptive language is usually superior to expressive language.
- Auditory short-term memory and auditory processing is an area of weakness.
- Auditory memory difficulties should be compensated for by the use of **visual supports and prompts wherever possible** (signs, pictures, words).

How do we
work?

Workshops and
technology
experiments
together with
people with
Down syndrome



Findings from requirements specification questionnaires (a)

- Persons with DS in our sample can do only a few things completely on their own, but they also show that many things can be done with differing degrees of help.
- A majority of people with DS in our sample uses modern ICT (laptop/PC [81,9 %], tablets [85 %], and smartphones [56,4 %]).
- About half of them need help when using these devices.
- Modern assistive technology (as e-learning) is regarded as helpful.

Findings from requirements specification questionnaires (b)

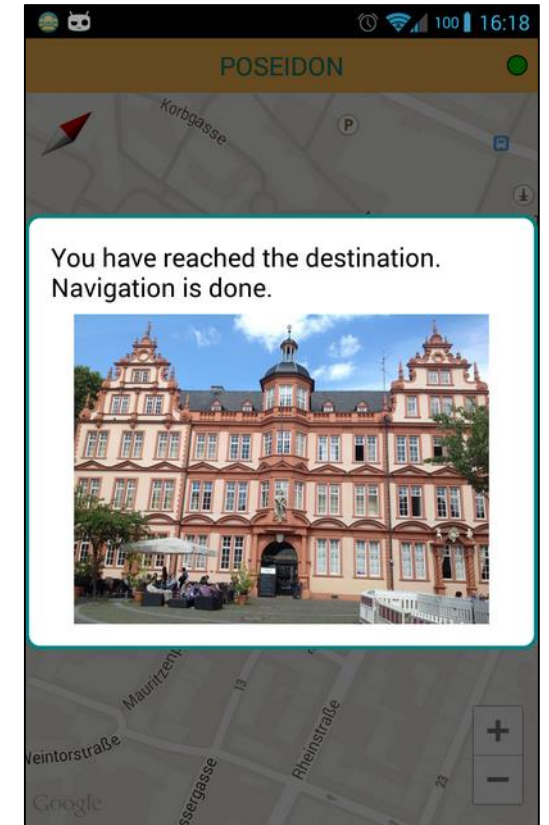
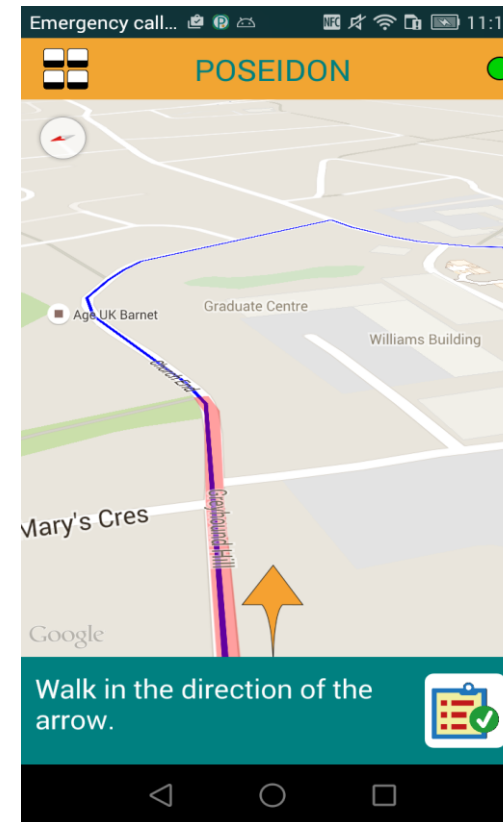
- Social integration varies highly between work/school and leisure time. Carers say that 38,4 % are well integrated at school or work but only 23,0 % in leisure time.
- For all daily activities, a support for independence and autonomy could be helpful. Most important seems to be supporting communicating and socialising.
- Carers see also chances to make their own work easier. They hope to get better informed about the whereabouts of their protégés (e.g., whether they have reached a destination safely), or setting alerts to remind them of doing certain things.

How do we work?

Pre pilot in Mainz:

Navigation to Gutenberg museum

- The prototype was meant as a starting point for discussions and idea generation.
- We were looking for inputs for the design of the POSEIDON navigation app.

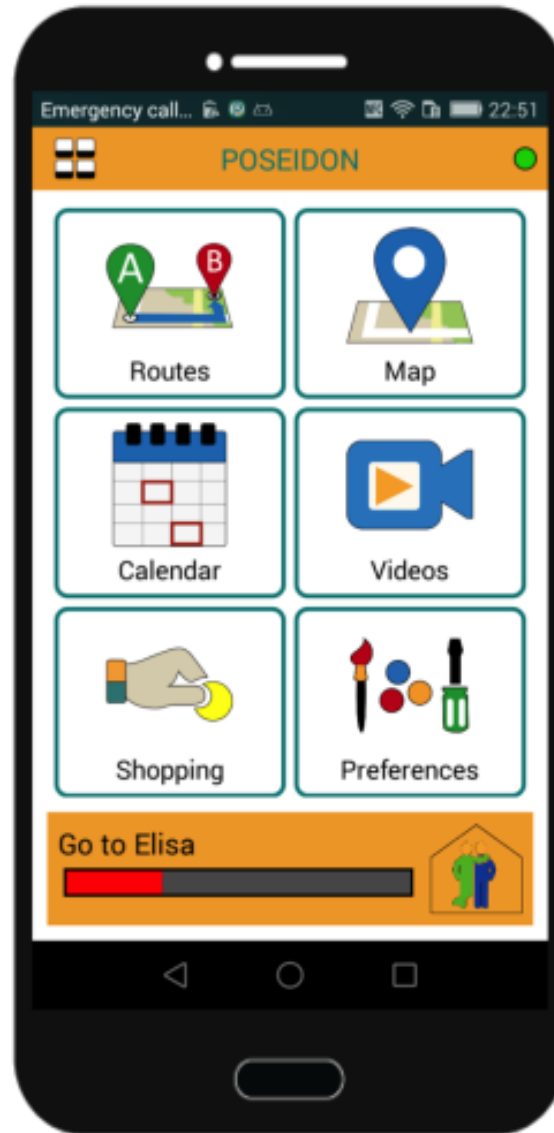


What did we
make?

POSEIDON
applications for
end users

- Calendar app with multimedia instructions
- Personalisable navigation app
- Money handling game on the interactive table
- Money handling app
- Healthy food app (under construction)
- Home navigation system
- Context awareness module
- POSEIDON web for carers
- Social platform

Main view of the primary end user's app



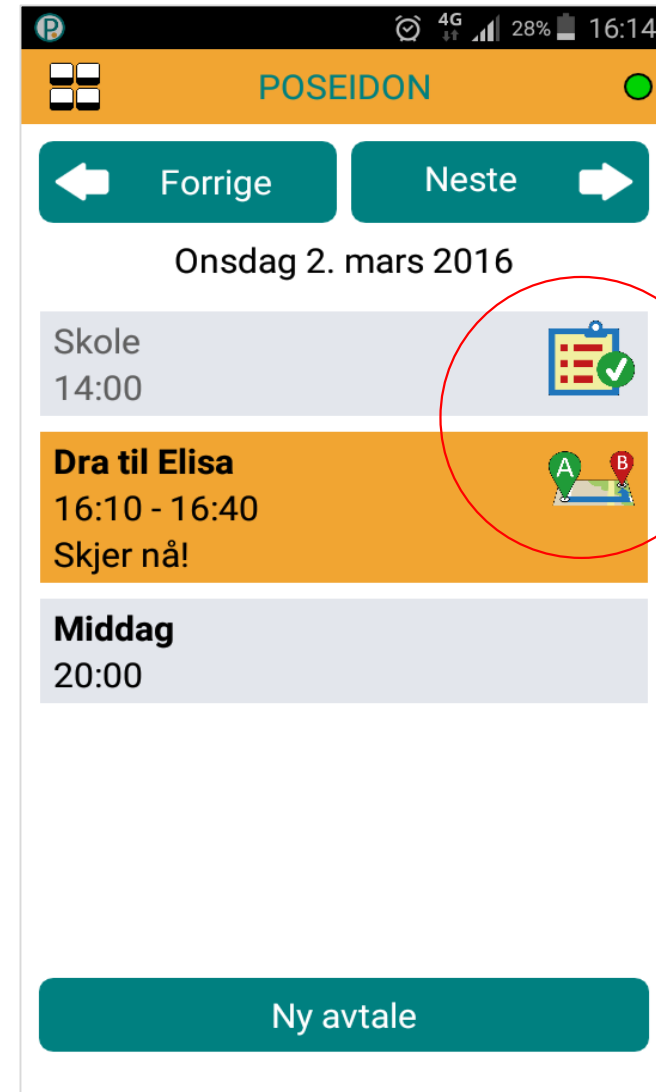
This app supports daily planning, traveling, shopping and personal video clips:

- **Routes** – Start navigation by using planned routes or a new route.
- **Map** – View current position on Google Maps.
- **Calendar** – View planned events and add new events.
- **Videos** – View YouTube videos that are uploaded by the carer.
- **Shopping** – Access the Money Handling Assistance app
- **Preferences** – Turn on/off position tracking and choose colour themes.

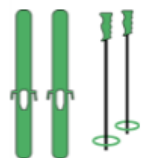
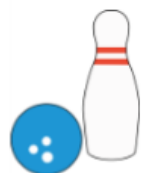
1. Supportive content in calendar events

Carers can make personal calendar events with instructions by adding text, images, sound recordings and videos.

They can also add pre-defined routes (made in the Home Navigation app).



Symbols can be selected either from the POSEIDON's own symbol repository, or other symbol sets



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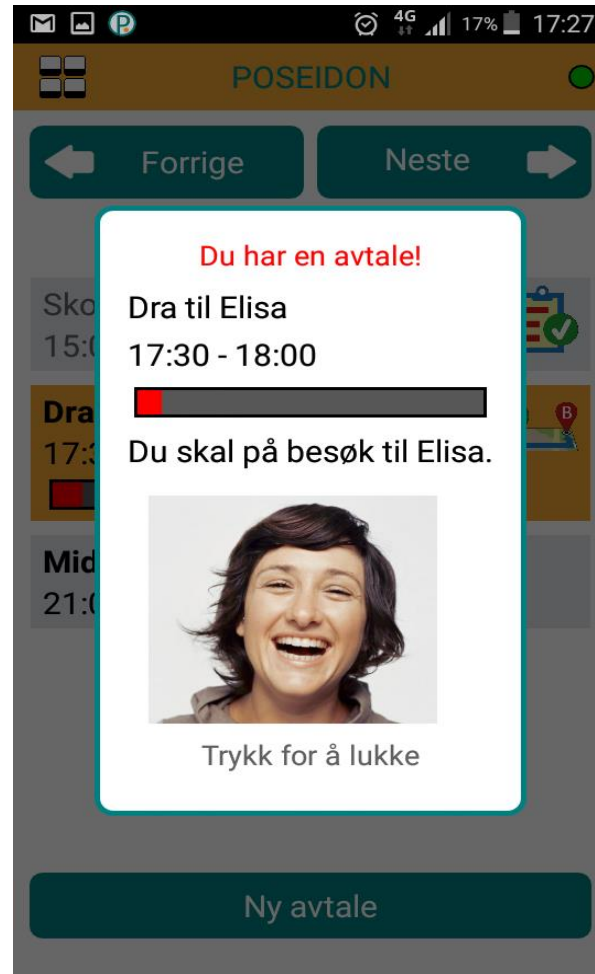
POSEIDON's symbol repository

Symbol categories

- 0. Main choices and generic icons
- 1. Calendar
- 2. Preferences and personalisation
- 3. Status and commands
- 4. Tasks and activities
- 5. Items
- 6. Map and navigation
- 7. Money handling and gaming

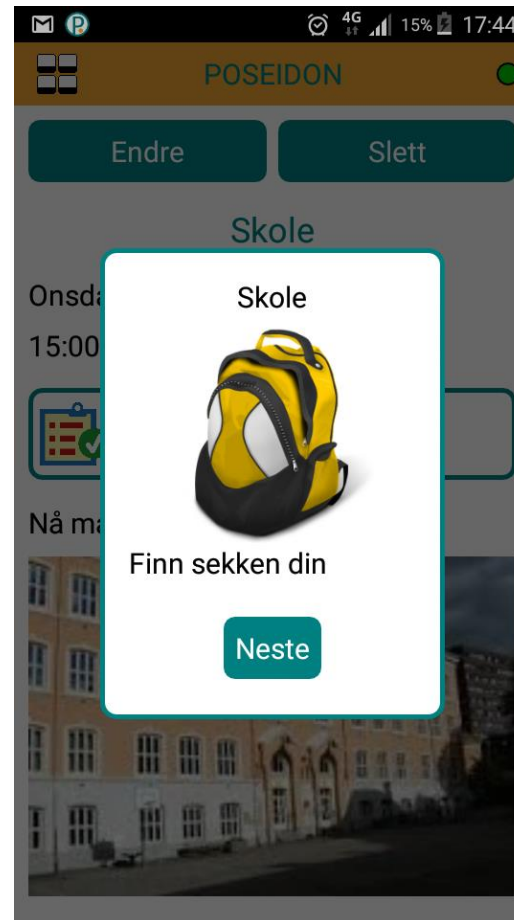
Carers may
upload any
helpful picture
material

This is useful for example when a calendar event is about visiting a familiar person, or going to a place where visual recognition is helpful:



Lists with
images for
each list item

... or adding instruction list items to the event so that the end user recognises as her/his personal things to be taken along (e.g. when symbols are sufficient for recognition):



The list functionality

Lists can compensate for working memory difficulty and be used in a number of different situations, to include any items that support a particular end user, for example:

- things to put in the school-bag
- steps to take during the morning
- shopping list



Voice recordings

For end users who need an additional modality in the calendar or navigation app, carers can record spoken messages or instructions.

Video recordings

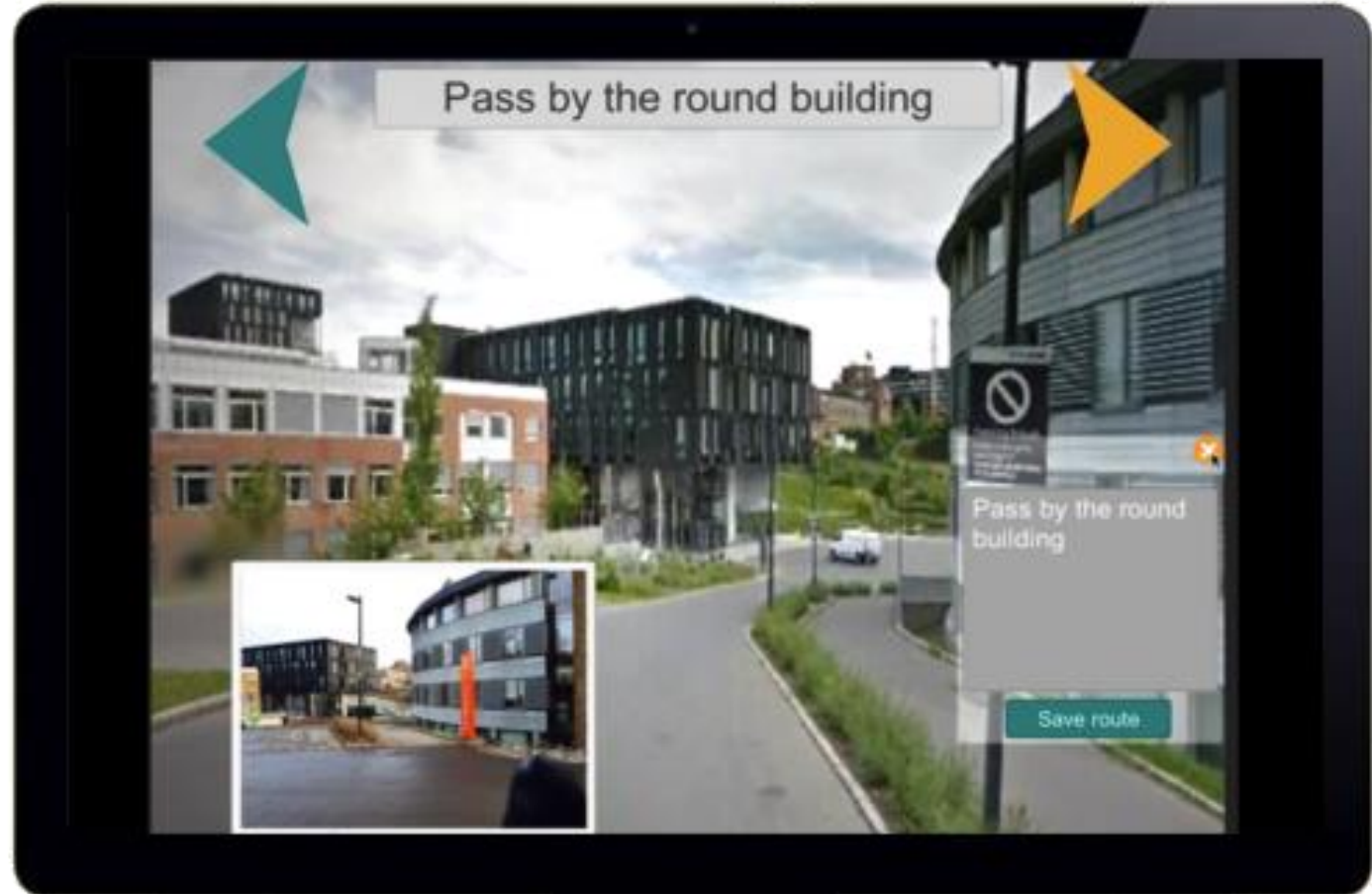
Personal video clips can be added to the calendar and also accessed through the list of videos on the home page of the POSEIDON mobile app.



Carer-made video clips of procedural everyday activities may be to great support, especially according to possible *working memory difficulties and abstract information*.

Navigation app: picture material and advice in the route

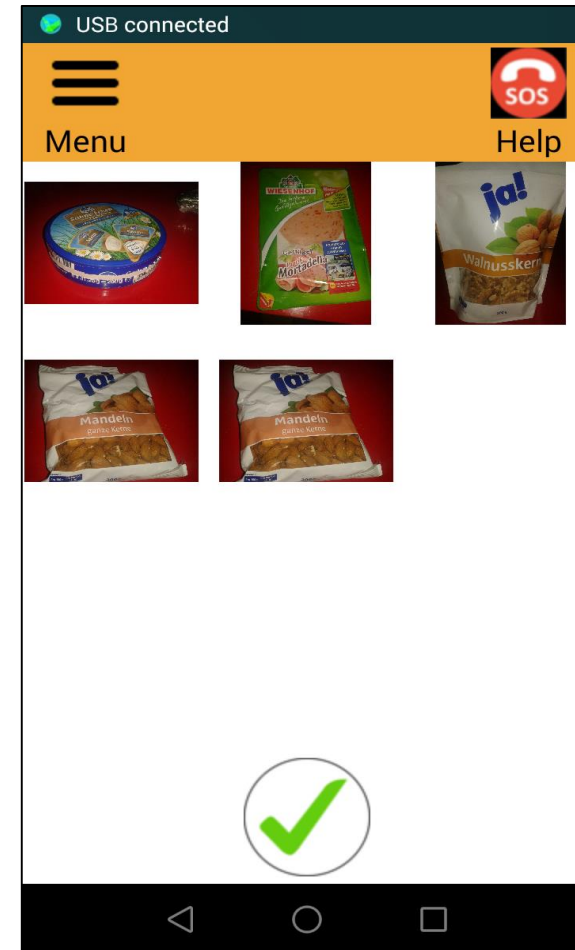
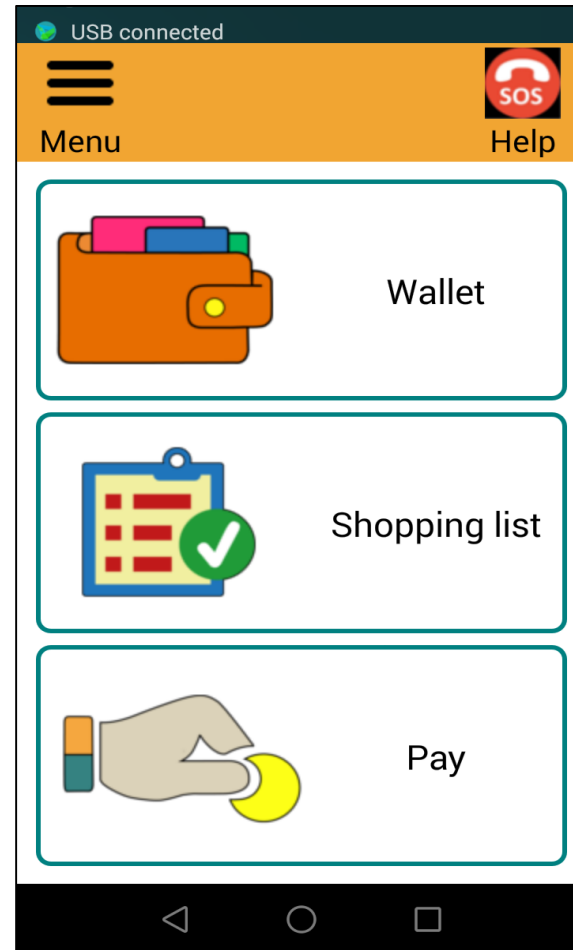
For many persons with Down syndrome, conceptual or abstract information, such as maps and routes on maps, can be concretised and made highly personal according to their particular knowledge of the environment:



The shopping list for daily coping and independence

Main personalisation aspects :

- Input into the virtual wallet exactly the coins and bills used for shopping.
- Input own images and specific prices of the product.



Timing of calendar prompts

It is possible to define the timing of the reminding prompt in the calendar.

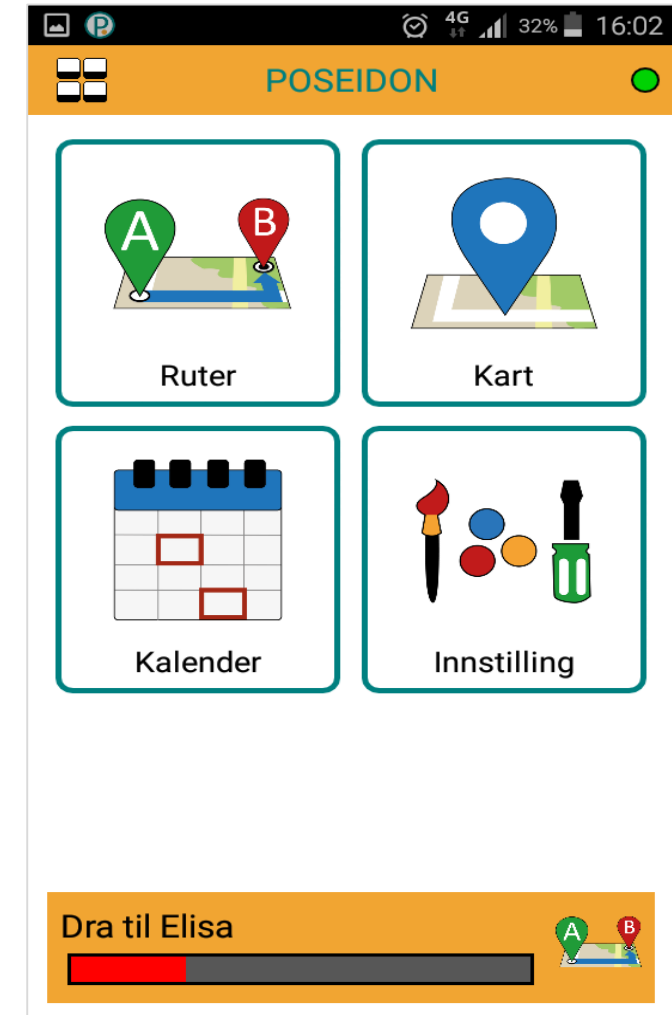
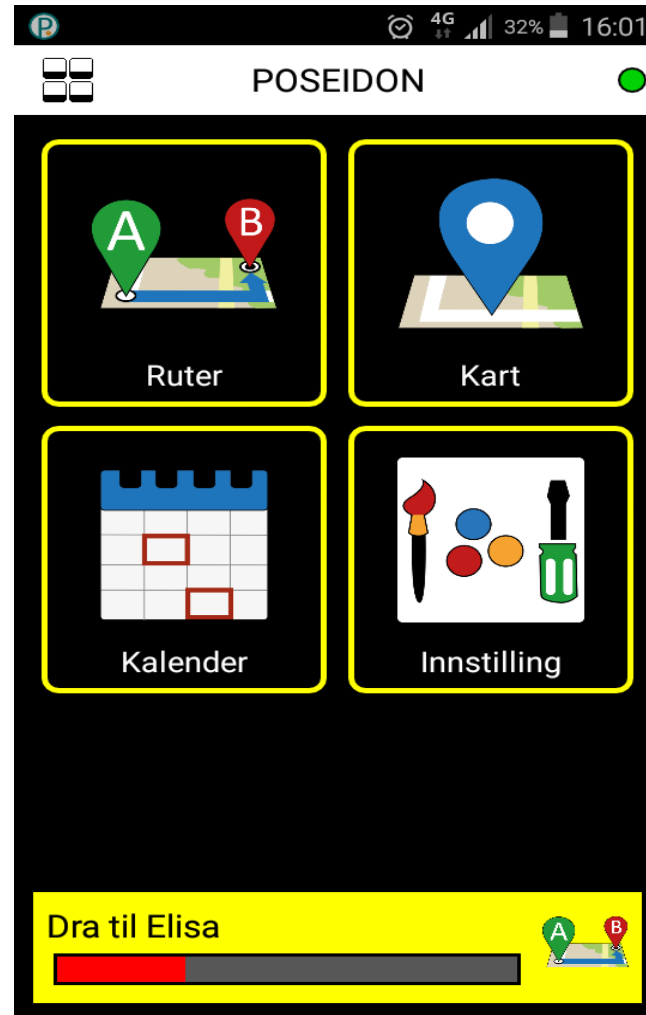


Some cannot be reminded too long before an event/appointment, as they are fixed on the current task and are not able to do other things up to the event.

Others need a reminder long time before, because it is necessary for them to know the exact plan, what is coming and when.

These are opposite types of cognitive styles, but both exist.

Colour schema

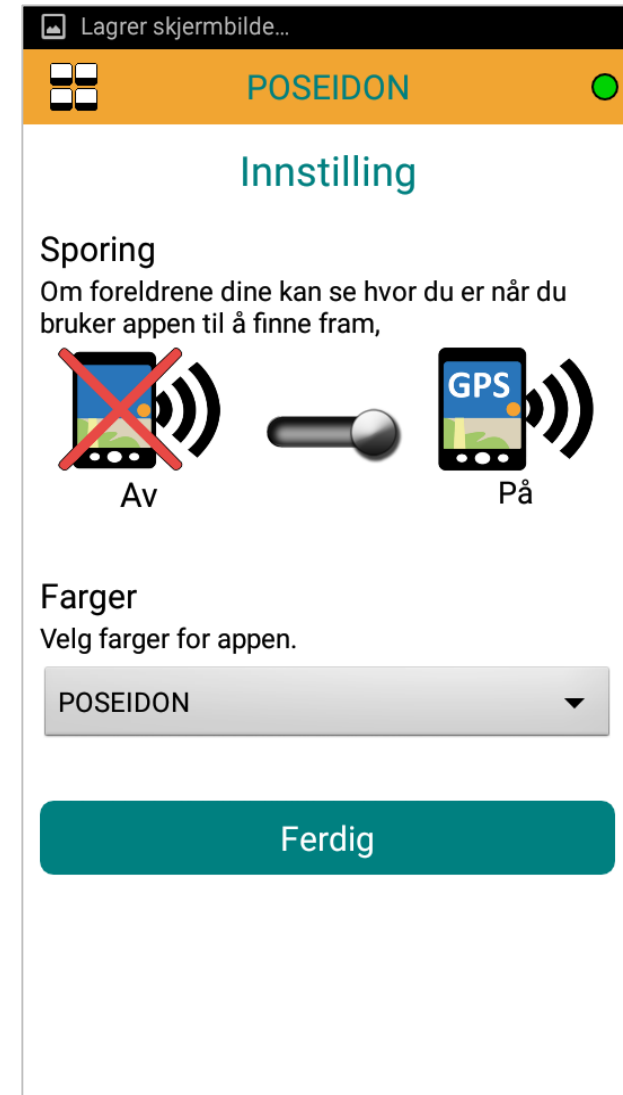


GPS tracking on/off

For some end users this may be a feature too demanding to comprehend or use, whilst others may well be able to utilise this option.

Example:

adult end users who do not want to be tracked by carers or helpers, and when they have the authorisation/competency to make this decision.



Carer's web (a)

The POSEIDON web has been designed to accommodate the personalisation of primary end user's applications.

On this website, the carer may adjust a number of features to fit the end user's individual requirements (vis-à-vis abilities) and preferences (even "likes or dislikes").

It provides customised calendar events, a shopping list, monitoring of the primary end user, video management, and a set-up functionality for the POSEIDON app and the context awareness.

Carer's web (b)

Edit event

Details

Instructions

Start

29.06.2016

14

:

00

End

29.06.2016

17

:

00

Alarm

☒

10

minutes

before

+

Summary

Travel to Peter

Routes

Peter

Describe

You are going to Peter for the weekend.

Image/
Video

Drag and drop here or click to
upload event image/video

YouTube

Paste YouTube link here.

Add YouTube link

Repeated

☐

Cancel

Save

Personalisation
in POSEIDON is
about taking
into account
following
knowledge
about people
with Down
syndrome (a)

Challenges

- They are often visually oriented end users.
- They may have visual and hearing impairment.
- They may have difficulty with fine motor skills.
- They may have difficulty with the short-term working memory.
- They may have difficulty with learning, conceptualisation, abstract thinking and problem solving.
- They may have a reading difficulty, and some do not read at all.
- They may have difficulty in the application of existing knowledge in new situations/contexts.

Personalisation
in POSEIDON is
about taking
into account
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with Down
syndrome (b)

Strengths

- They can master many activities of daily life with appropriate support or through repeating training over an extended period.
- They are often clever users of information technology such smart phones and tablet PCs.

Personalisation needs can change

Personalisation must always be possible to change; it can “suddenly” be less, because the end user trained a certain skill with the system and does not need all personalisation any more.

Observing the development is an important task of the secondary user in order to adapt the personalisation to the right level. This can change during the usage of POSEIDON.