

Specification requirements

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1.0.1 Requirement Prioritization

The requirements in this section is split into the different application they belong to. Each individual requirement has a number in end, which shows the priority of this specific requirement.

- (1) - Requirements that has the number (1) is a requirements that must be fulfilled.
- (2) - Requirements that has the number (2) is a requirements that must be fulfilled, but which are not essential.
- (3) - Requirements that has the number (3) is a requirements that must be fulfilled, but only if there is additional time available.

Profiles

- There is two types of profiles:
 - They are divided into organizations, this means that a profile from one organization does not have access to another organization's profiles. (1) See user story number 6.
 - Guardian profile:
 - * Has access to all functions in all applications. (1)
 - * Can give authorization to which functions in the applications, a citizen profile has access to. (1)
 - * Can add new guardian- and citizen profiles on both tablets and web. (1)
 - * Can edit existing profiles, both guardian- and citizen profiles. (1)
 - * Can remove existing profiles, both guardian- and citizen profiles. (1)
 - Citizen profile:
 - * Has access to functions and applications, which are authorized by a guardian profile. (1)
 - * As standard, citizen profiles does not have access to any functions. (1)
 - * Cannot add new profiles. (1)
 - * Citizen profiles can never use the three androids buttons (back, home and menu). (1)
- It must be possible to transfer a citizen profile to another organization, i.e. that a citizen profile's settings and private pictures transfers to another organization so that they can be used there. (3)
- Shifting between profiles requires approval, e.g. by the use of QR code. (3)

General

- No applications must close, stop or crash unexpectedly. (1)
- All applications must synchronize with the global database, once a day, if there is access to the Internet. (1)
 - It must be possible to synchronize manually with the global database. (2)
- All applications must be able to save settings for each individual profiles. (1)
 - It must be possible to copy settings from one profile to another. (2)
- All applications must run in landscape mode (horizontal). (1)
 - Sequences and Week Schedule must be able to use portrait mode. (1)
- All applications, except the Launcher, must have a 'close' button. (2)
 - When the button is pressed, it must close the application, if the user has permission to close applications. (1)
 - If the button is pressed and the user does not have access to close the application, the application must be able to close with the help of a guardian, e.g. by scanning QR code. (1)
- When and only when there is a permitted input, there must be some kind of response, which makes sense in context, but otherwise this is up to the individual developer. (2) see user story number 4.
 - Applications with functions targeted towards citizens must only use singleclick, drag and drop, and swipe input. (2)
 - If there is a function, which should only be usable by a guardian, then all Android gestures are permitted. (2)
 - All applications must be named with meaningful Danish names. (1)
- If a pictogram is not yet saved to the global database, then all applications must show a 'pending' icon, so the guardian can see that it is not yet saved to the database. (2) see user story number 8.
 - Pictograms must be able to be marked as private, so they are not uploaded to the global database. (2)
- All applications must be able to play a pictogram's associated sound. (2)

General GUI

- The general color scheme must be black and white (3)
 - It must be possible to choose a color theme for each application. (2) see user story number 3.
 - Each profiles must be able to have their own chosen color theme. (2) see user story number 3.
- All applications must use the same GUI components. (2)
- All applications must indicate if there is a sound attached to a pictogram. (2)

Database

- Pictograms, photos, sound clips, profiles and categories must be able to be saved in the database. (1)
 - Citizen profiles are split into groups. (1)
 - Profiles must be split into organizations. (1)
 - Pictograms and photos must be handled the same way in the database. (1)
 - Sound clips must be handled separately. (1)
 - Categories must be handled separately. (1)
- Global database:
 - It must be possible to synchronize the local database with the global database. (1)
 - Must contain all standard pictograms. (2)
 - Guardian profiles must be able to add new pictograms to the database. (1)
 - Guardian profiles must be able to remove and edit pictograms they have added to the database. (2)
 - Guardian profiles must be able to copy standard pictograms, edit them and then save the copy to the database. (2)
 - Guardian profiles must not be able to remove standard pictograms. (3)
- Local database:
 - All contents of the local database must be able to be saved in the global database, this includes settings. (1)
 - It must be possible to synchronize with the global database. (1)
 - * It must be possible to synchronize manually. (1)
 - There must be a synchronize button for the guardian in all applications. (2)
 - * It must be possible for the synchronization with the global database to happen automatically. (2)
 - As standard, automatic synchronization should happen once a day when there is wifi. (2)
 - All applications must use the same local database, e.g. different application does not have their own local database. (2)

Launcher

- The launcher must change the functionality of the three android buttons (back, home and menu), depending on the user's permissions. (1)
- The launcher must handle switch of color themes for each application. (3)
 - If you are logged in as a guardian, it must be possible to change launcher. (1)
 - If you are logged in as a citizen, it must not be possible to change the launcher. (1)
- The launcher must keep track of which applications should be visible. (2)

Pictocreator

- Must be able to use the camera to create a pictogram. (1) see user story 26.
- Must have a function to draw, save and edit pictograms. (2) see user story 8 and user story 6.
- Must have a function to record, save and edit sound clips for a pictogram. (3) see user story 8 and user story 6.
- It must be possible to mark a pictogram as private, so that it will not be saved to the global database. (2)
- It must be possible for a pictogram to have a title, which can be freely placed on the pictogram. (2)

Pictosearch

- Must be able to delete pictograms. (1)
- Must be able to show all pictograms, in their specific categories. (1)
- Must be able to search through pictograms. (1)

Categorizer

- Must be able to create new categories of pictograms. (1)
- Must be able to view, add and remove pictograms from existing categories. (1)
- Must be able to delete existing categories. (2)
 - When a category is deleted, a warning dialog box must be shown asking the guardian if they are sure they want the category to be deleted. (2)
- Guardian profiles must be able to connect a specific category to a specific citizen profile. (1)
 - It must be possible to copy a category from one profile to another. (2)

Communication Tool

- Must be able to view pictograms.
- Must be able to play the sound of a corresponding pictogram, when the pictogram is pressed. (1)

Sequences

- Citizen profiles must be able mark how far they are in a sequence. (1) see user story number 14
- The guardian can change whether sequences are shown horizontally or vertically for the citizens. (2)
- Guardian profiles must be able to view, create, edit and remove sequences. (1)
- There must be multiple ways to view sequences. (1)

- It must be able to show one pictogram, three pictograms or a complete sequence. (1)
- It must be possible for a guardian profile to authorize a citizen profile to be able to make sequences. (2)

Life Stories/Week Schedule

- Citizen profiles must be able to mark how far in a sequence they are. (1) see user story number 14.
- Colors for the week schedule must follow the international color standard for days. (1)
 - These colors must always be viewable, even if you have scrolled down in a sequence. (3)
- It must be possible to turn on a feature, such that days are switched upon swiping to either side, when you are in the day tasks. (1)
- This application must function as a tool to plan daily activities for citizens. (1)
- This application must be able to help citizens to formulate their day in pictograms. (2)
- This application must be able to allocate periods where citizens can choose between preselected activities. (1) see user story number 11.
- Guardian profiles must be able to define how many pictograms are shown at a time. (2) see user story number 18.
 - It must be able show one pictogram, three pictograms or a complete day. (2)
- Sequences of pictograms must have the same size and be locked in a grid. (1)
- When a citizen has a choice to make, other functions must be locked, until a choice has been made. (2)

Timer

- This application must be able to reset, edit, start and stop the timer. (1)
- This application must be able to make the timer visible in all other applications that the citizen profile has access to. (2)
- Citizen profiles can only see the time. (2)
- The timer must always count down. (1)
- When the time has run out, there must be a notification and a sound, that gives the user two options (1)
 - It must be able to move on to the next planned activity (this function must be able to be turned off). (2)
 - A button that stops the timer, but which requires a guardian to continue. (1)

- A notification must have a short iconic/recognizable sound, which indicates that the time has passed. (1)
 - * There must be a possibilities for a guardian profile to choose which sound that is used as the notification. (1)
 - * One of the possibilities for the sound must be the sound of a kitchen timer. (1)
- A notification must contain a pictogram, that explains to the citizen that the time has passed. (1)
- The list of buttons must be able to be listed horizontally or vertically. (1)
- There must be a representation of the Product Owners' timers. (1)
 - The clock face must always represent 1 hour. (1)
 - The time indicator (that which shows how much time there is left) is pulled from 0 and is pulled clockwise. (1)
 - When the timer is counting down, it will go counterclockwise. (1)
- There must be three alternatives for their timers. (3)
 - Hourglass. (3)
 - Progress bar. (3)
 - Digital watch. (3)

Train

See user story number 30 og 32.

- A train leaves the main station after it have been loaded with pictograms and drives to one or more stations where some of the pictograms will need to be unloaded before it reaches the train depot at the end. (2)
 - A pictogram must be unloaded on a station with a category the pictogram belongs to. (2)
 - The train cannot leave a station before all the right pictograms are unloaded from the train. (2)
- It must vary how long a train takes to reach a station. (2)
- The picture of the driver must be the picture associated with the citizen profile. (2)
- There must be instructions for the game. (2)
 - In the beginning of the game, there must be instructions with arrows that indicate that a pictogram should be dragged down into a cart. (2)
- Carts must be named. (2)
- The train must be able to change colors. (2)

Cars

See user story number 31.

- You must be able to steer the car by the use of your voice volume. (1)
- While driving there must be obstacles that is avoided by changing the volume of your voice. (1)

New Entertaining Learning Tools (Not requirements)

- Barrels, a game where a barrel is shown, where possibly a sound comes from it, and the child will have to guess what is in the barrel. (3)
- PuzzleStory, a game where a collection of specific pictograms are shown, where the child then has to organize these into a coherent story. (3)
- RepeatStory, a story where repetition is important. A good example of this is the song "12 Days of Christmas", where each new day repeats the previous days. (3)

The Product Owner suggests that we can be creative and mix these ideas together with existing games. Such as when you have completed a game of Train, a barrel will appear as a fun surprise for the child.

User Stories 2

We have used the user stories from the earlier years as a foundation to create user stories for this semester. The user stories will be used to describe the application of the system in a common language which the stakeholders can understand and relate to. The stories can then be used as guidelines when developing the specification requirements, which is a more formal way the developers can base their design on. The user stories will also be used to check that all the necessary specification requirements are described to develop the solution the stakeholder seeks.

1. Adding profiles

- A new citizen has started at the institute so as a guardian I want to be able to create a new autistic profile for that citizen.

2. Deleting profiles

- A citizen is no longer part of the institute so I as a guardian want to be able to remove his profile from the system. I want to be able to remove his personal pictograms from the system, but be able to save them to a local storage device if needed before they are deleted.

3. Changing color scheme

- A new profile for citizen does not have the appropriate color scheme. As a guardian I want to change the color scheme to a color that suits the specific citizen. I select the citizens profile, selects the desired color for scheme of an application and drags it over the application. I expect that the new color scheme for the given application is store for the given citizen profile.

4. Application responding to the user

- A citizen is playing one of the learning games in the system. As the citizen I expect the application to respond to the input I give the system so I see that something is happening. This should be general for the whole system.

5. Opening an application through the launcher

- As a guardian or citizen I want to work with many of the applications from the system. I open the launcher and select the application I want to work with. When I am done, I go back to launcher and simply select the next application I want to work with.

6. Creating a pictogram

- As a guardian I want to create a pictogram to describe an action. I open the pictogram creator, where I draw the pictogram as want it. I add a caption and record myself pronouncing the action. I then assign it into a suited category and saves the pictogram. I expect that the pictogram will be accessible for other guardians from the institute I work as well as myself.

7. Deleting a pictogram

- A citizen has a personal pictogram that is no longer needed, so I as a guardian want to remove it from the system.

8. Editing an existing pictogram

- A pictograms caption does not fit and it needs to be changed. The pictogram also have sound attached. As a guardian I select the specific pictrogram and open it in pictogram creator. I now replaces the caption with a new, record a suitable sound and stores the edited pictogram. I expect that the changes to the pictogram now are store and is changed for all application using this specific pictogram. I also expects an indication of whether a pictograms changes have been uploaded to the database or if it still to be done.

9. Adding a new pictogram to a specific category

- As a guardian I am in the categorizer application and I notice that there is not a pictogram for the activity I need. So I press the button for adding a new pictogram to category and I am sent to the pictocreater so I can either take a photo or draw my own pictogram. When I am done I save it and I am returned to the categorizer application where I can choose the new pictogram. I expect that the newly created pictogram is not accessible to any other institutions except my own.

10. Removing a pictogram for a specific category

- As a guardian I have accidentally added a pictogram to a category it did not belong to, so I want to be able to remove it from that category.

11. Planning activities

- A citizen needs a schedule to tell him what he is doing a specific day. I as a guardian want an application that lets me put together a schedule that I can attach to the autistic profile. When making the schedule I make a sequence of pictograms one for each activity, though I can also make an activity free. A free activity is an activity where the citizen has a choice between multiple activities. Each activity can lead to a stored sequence describing how to complete that activity.

12. Keeping track of the schedule

- As a citizen I look at the schedule to see the activities planned for the day. I check the color of each day to find which day I have to look at in the schedule. I then mark the activity that have been done and move on to the next activity.

13. Creating a new sequence

- A new citizen is starting at the institute. As a guardian I want to create a new sequence for this citizen because the stored sequences does not fit this specific citizen. I can then use this new sequence to explain activities for the citizen. I expect that the newly created sequence is stored and accessible only to my institute.

14. Mark actions as complete

- As a child I want to be able to mark actions as completed so I can keep track of my current progress in a sequence. There should be multiple options for how to mark actions as complete so I can choose one I find appropriate.

15. Different views of sequences

- A child cannot always understand if there are too many sequences in a week schedule, and a child sometimes pick another sequences instead of the one that was meant to be. Therefore the child want to have as few as possible sequences, and it is possible as a citizen to create sequences for month, week, day or simply a half day schedule.

16. Edit a sequences title and images

- A citizen would like a new brand of cereal instead of the old brand for breakfast. As a guardian I want to open the old breakfast sequence and replace a specific pictogram with the new pictogram. Then I want to save the sequence with a new title so I still have access to both. I can then help the new citizen with breakfast by using the new sequence while my colleagues can still access the old sequence.

17. Deleting a sequence

- A specific sequence is no longer necessary in the system. As a guardian I select a sequence and delete it. I expect that the deleted sequence is removed from the system.

18. Opening a sequence

- The entire institute is going for a walk. As a guardian I want to show a sequence for a citizen so I can help them with the correct order of actions for putting on outdoor clothes. I expect the application to provide the possibility to view the sequences displaying all, 3 or 1 pictogram in sequence, so I can help the citizen.

19. Helping a citizen communicate

- As a citizen I can have a difficult time speaking, so I want an application that can play the sound of a pictogram when I press it.

20. Using the timer application

- A citizen needs to do an activity for a set amount of time. As a guardian I open the timer application and allocate the appropriate time. I select a suited visual representation of the timer and start it. I expect the timer application to show the representation for the allocated time without the screen turning off. When the time runs out I expect the timer application to notify with a sound that the time has passed and the citizen shall move on to the next activity.

21. One application available in another

- A citizen has a free time slot and wish to play the Train application. As a guardian I want to be able to set a timer so the citizen knows how long he can play. I want the timer to be visible in the Train application, so he always know exactly how long he can play. This should be general for the entertainment and learning applications.

22. Creating a category

- A large collection of pictograms have been added to the system. As a guardian I want to create suitable categories so I can add these pictograms to the category I deem they belong to. I expect that the created categories persist until they are deleted. I also want to be able to link the created category to specific profiles.

23. Deleting a category

- As a guardian I have accidentally made a category that will not be used, so I want to be able to delete it.

24. Viewing the collection of categories

- When I as a guardian enter the categorizer application I expect to only see the categories associated with my profile or the autistic profile I am currently helping. I also expect to be able to press a button to see all the categories and pictograms that are available to me. When looking at all the categories I expect I am able to see what each category contains.

25. At the end of the day

- When a citizen gets home they want to tell their parents about their day. As a guardian I want to be able to help them make a life story of their day. I make a template for them where I access the categorizer and choose a set of pictograms for each activity they have done this day. When the citizen then use this template to create their life story they can choose between the pictograms and place them as they like. When they get home they can show off their life story on a tablet.

26. Take a photograph and use it as a pictogram

- Some citizens need a real photo before they can understand the meaning of a pictogram and link it to the real world. As a guardian I want to be able to open the application for creating pictograms, take a photo and use it to create a new pictogram. I go to the sequence application and use the newly created pictogram in a sequence.

27. Changing to another citizens profile in a given application

- As a guardian I want to change the settings of some citizen profiles in a given application. I open the list of profiles and select the profile which settings I want to change. I expect that all the settings appears as they are for a given profile and changes to these settings will be stored in place of the old settings. I adjust the settings for all the profiles that I wanted to change and then return to the given application.

28. Remember what I do

- As a guardian I expect that anything I do or change will be stored so I can use it on any tablet I choose when I am logged in on my profile.

29. Safe navigation

- As a citizen I want to be in an application mode where I cannot accidentally navigate to parts of the system I am not supposed to use, so I do not get lost or loose focus on the task I should do.

30. Training citizens sequences view

- For helping citizens in a fun way they use the train application to understand how they can place something in a sequences. They are using the train and have to drop the things at the right place.

31. Training a citizens voice

- Some citizens cannot control the level of their voice. As a guardian I open the training game to help the citizen control their voice and give them an understanding of how to use it. I expect the game to use the citizens voice to achieve some kind of goal so they find it entertaining while using it and thereby help motivate them to complete the training.

32. Training a citizens understanding of pictograms

- As a guardian I want to train a citizens understanding of pictograms and their relation to each other. I open the learning game application for understanding pictograms, if this is not the first time then I expect that the selection of categories is the same as from last session. I can edit the list of categories that should be present in the game and start the game. I expect the game to arrange a selection of pictograms from each selected category and choose one category which some of the pictograms are associated with. The citizen then tries to find the pictogram associate with the chosen category.