Feasibility study
FindMyApps

[The perspectives of informal caregivers on an intervention developed to guide persons with dementia to useful apps]

Master thesis Health Psychology & Technology

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Abstract

Background: A growing number of people are suffering from dementia, a progressive syndrome for which they need an increased level of care. The Dutch government wants them to stay at home as long as possible, with help of their informal caregivers. However, half of the informal caregivers feels burdened because of this care and this increases the possibility for them to get depressed by four times. To unburden informal caregivers, persons with dementia need self-management and have to engage in meaningful activities. Technology and especially tablet technology, has the potential to support persons with dementia in self-managing their disease and engages them in meaningful activities. Studies have shown that it is possible to teach persons with dementia to work with the tablet device with support from their informal caregivers. But applications (apps) must be carefully selected, because in the wide variety of apps, not all apps are dementia-friendly (useful for persons with dementia). Therefore, FindMyApps was developed, which consists of (1) the FindMyApps Training, a tablet training for informal caregivers, and (2) the FindMyApps Tool, a tool to select usable apps that match the individual needs, wishes, and functional abilities of persons with dementia. The aims of this study was getting insight into the opinions of informal caregivers about FindMyApps and in the changes in *feeling of competence, positive care experiences* and *quality of life* of informal caregivers.

Methods: A mixed methods design was used in this study and data collection consisted of semi-structured interviews and a pilot RCT (Randomized Controlled Trial). For this study an experimental group, who received the FindMyApps Training and Tool, and a control group, who received a simple tablet training and websites for suitable apps, where used. Subsequently 20 informal caregivers and persons with dementia (couples) were randomly divided in one of these groups. In the semi-structured interview, the informal caregivers were asked about: the training and the aspects (1) perceived usefulness, (2) perceived ease of use, (3) learnability, and (4) adoption and perceived effects of the FindMyApps Tool. Besides that, they participated in questionnaires about the outcome measures (feeling of competence, positive care experiences and quality of life) at baseline and after three months.

Results: Most informal caregivers were positive about the training they received. They were positive about the perceived usefulness and perceived ease of use of the FindMyApps Tool. They mentioned that the learnability was improved by using the tablet regularly and by using the errorless learning method. Most informal caregivers and persons with dementia (couples) downloaded at least one app in the FindMyApps Tool and used this app/these apps at least a couple of times a week. Besides that they mentioned that their relatives with dementia got more enthusiasm for the tablet device. Informal caregivers gave some suggestions to improve the FindMyApps Training and the FindMyApps Tool, such as improving the components ‘Mijn Apps’ and ‘categories’ by making the apps in ‘Mijn Apps’ clickable and by making a clear overview of the ‘categories’. Besides that, it was recommended to add more colors and add an option to follow the training an extra time. According to the informal caregivers, the learnability and adoption could be improved if the persons with dementia would be supported by someone else than the informal caregiver for teaching how to work with a tablet. Yet despite these positive evaluations, no significant differences were found on the outcome measures.

Conclusions: FindMyApps seems to be a valuable tool in the care for dementia. This study showed that it could be possible to teach persons with dementia to work with a tablet device with making use of the errorless learning method and help of informal caregivers. Improvements in FindMyApps need to be made and further research must demonstrate the real effects of FindMyApps. Currently, this will be evaluated in a RCT.

Samenvatting

Achtergrond: Steeds meer mensen krijgen dementie, een progressieve ziekte waarbij steeds intensievere zorg nodig is. De politiek wil dat zij zo lang mogelijk thuis blijven wonen met de hulp van hun mantelzorgers. Echter, de helft van de mantelzorgers voelt zich belast door de zorg die zij moeten geven waarbij de kans op een depressie stijgt met vier maal. Om mantelzorgers te ontlasten, is het belangrijk dat mensen met dementie gestimuleerd worden in zelfmanagement en bezig kunnen zijn met betekenisvolle activiteiten. Technologie waaronder touchscreen technologie zoals tablets, heeft de potentie om personen met dementie te stimuleren in de zelfmanagement van hun ziekte en bezig te kunnen zijn met zinvolle activiteiten. Onderzoeken hebben aangetoond dat het mogelijk is om personen met dementie te leren met een tablet te werken met de hulp van hun mantelzorgers. Maar, applicaties (apps) moeten zorgvuldig geselecteerd worden, want niet alle bestaande apps zijn bruikbaar voor mensen met dementie. Daarom is FindMyApps ontwikkeld, dat bestaat uit (1) een FindMyApps Training, een tablet training voor mantelzorgers, en uit (2) een FindMyApps Tool, een hulpmiddel dat bruikbare apps selecteert op basis van individuele behoeften, wensen en functionele mogelijkheden van mensen met dementie. De doelen van dit onderzoek waren inzicht krijgen in de meningen van mantelzorgers over FindMyApps en in de veranderingen in gevoel van competentie, positieve zorg ervaringen en kwaliteit van leven van mantelzorgers.

Methoden: In dit onderzoek zijn zowel kwalitatieve als kwantitatieve methoden gebruikt en de dataverzameling bestond uit semigestructureerde interviews en een pilot RCT (gerandomiseerde gecontroleerde studie). De studie bestond uit een experimentele groep, die de FindMyApps Training en Tool kregen, en een controle groep, die een simpele tablet training kregen en websites voor geschikte apps en 20 mantelzorgers en personen met dementia (koppels) zijn willekeurig ingedeeld in één van deze groepen. In het semigestructureerde interview werden mantelzorgers gevraagd naar de training en de aspecten (1) waargenomen bruikbaarheid, (2), waargenomen gebruiksvriendelijkheid, (3) leerbaarheid en (4) adoptie en waargenomen effecten van de FindMyApps Tool. Daarnaast kregen zij vragenlijsten over de uitkomstmaten (gevoel van competentie, positieve zorg ervaringen en kwaliteit van leven) die zijn afgenomen bij de start van de studie en na drie maanden.

Resultaten: De meeste mantelzorgers waren positief over de training die ze hebben ontvangen. Ze waren ook positief over de bruikbaarheid en gebruiksvriendelijk van de FindMyApps Tool. Ze noemden ook dat de leerbaarheid werd bevorderd door de tablet regelmatig te gebruiken en door de methode Foutloos Leren toe te passen. De meeste mantelzorgers en personen met dementie (koppels) hadden minimaal één app gedownload via de FindMyApps Tool en deze gebruikten ze minstens een paar keer per week of vaker. Daarnaast gaven ze aan dat hun partners met dementie meer enthousiasme voor de tablet hebben gekregen. Mantelzorgers noemden ook suggesties om de FindMyApps Training en Tool te verbeteren, zoals: de componenten ‘Mijn Apps’ en ‘categorieën’ verbeteren, door de apps in ‘Mijn Apps’ klikbaar te maken en door een duidelijker overzicht in ‘categorieën’ te geven. Daarnaast werd er aanbevolen meer kleuren toe te voegen en de mogelijkheid om te training twee keer te volgen toe te voegen. Mantelzorgers noemden ook dat de leerbaarheid en adoptie verbeterd kan worden door iemand anders dan de mantelzorgers de personen met dementie te laten helpen met het aanleren van de tablet. Ondanks de positieve ervaringen zijn er geen significante verschillen gevonden op de uitkomstmaten.

Conclusie: Het lijkt er op dat FindMyApps een waardevolle tool is in de zorg voor personen met dementie. Deze studie heeft laten zien dat het mogelijk lijkt dat personen met dementie kunnen leren werken met een tablet door middel van de Foutloos Leren methode en een beetje hulp van hun mantelzorgers. Verbeteringen moeten worden doorgevoerd in FindMyApps en verder onderzoek moet de daadwerkelijke effecten van FindMyApps gaan aantonen. Dit wordt momenteel onderzocht in een RCT.

Prologue

This thesis has been written with the purpose of graduating at the University of Twente in Health Psychology and Technology. This study is de result of my research regarding FindMyApps, an intervention for persons with dementia and their informal caregivers.

I am thankful for participating in the feasibility study of FindMyApps, because it gave me the possibility to do something with my interest for person with dementia and their informal caregivers. Besides that, it was great that I could experience how research is going in practice. So, I have learned a lot during this research. And therefore, I would thank Yvonne Kerkhof, employee of Saxion, School of Applied Sciences, and PhD of the University of Amsterdam, for giving me the opportunity and responsibility to do this and for supporting me during this period. I also thank my college Gianna Kohl for the co-operation during this research. Finally, I thank C.H.C Drossaert and G. Westerhof for the co-operation and the support and insights you gave me during my master thesis.

And last but not least, I would like to thank all informal caregivers and persons with dementia for their time, openness and opinions.

Melanie Veijer
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1. Introduction

In 2015, 46.8 million people were suffering from dementia worldwide. It is expected that this will increase till 50 million at the end of 2017 and that it will reach 75 million people in 2030 (Alzheimer's Disease International, 2015). Dementia is a syndrome in which cognitive function is deteriorated, which has mostly a chronic or progressive nature (WHO, 2017). This syndrome will affect memory, thinking, orientation, comprehension, calculation, learning capacity, language and judgment and has also an impact on emotion, social behavior and motivation (WHO, 2017). Despite of the syndrome, whereby dementia patients need an increased amount of care, the policy of Western countries will enable persons with dementia to live at home as long as possible with help of their informal caregivers (Spijker, Vernooij-Dassen, Vasse et al., 2008).

In the Netherlands, there are approximately 300.000 informal caregivers who care for 256.000 persons with dementia (Expertisecentrum Mantelzorg, 2018). According to Peeters, Werkman & Francke (2013) approximately 50% of the informal caregivers feel fairly or highly burdened. Caregiver burden is defined as: '*a multidimensional response to the negative appraisal and perceived stress resulting from taking care of an ill individual* (Kim, Chang, Rose & Kim, 2012, p.846)'. Informal caregivers have to deal with behavior changes of their relative with dementia and with their own concerns about the disease of their relative. Besides that, most informal caregivers also have to work and have to take care of their houses. Moreover, 50% of the informal caregivers have the feeling that they have to do it all alone and this all can increase caregiver burden (Peeters, Werkman & Francke, 2013). Therefore, caregiver burden needs attention, because caregiver burden can threat their physical, psychological, emotional and functional health (Carretero, Garces, Rodenas & Sanjose, 2009) and it can increase the possibility to get depressed by four times (Nivel, 2010).

To deal with caregiver burden and impairment in cognitive function of persons with dementia, opportunities must be created to stimulate self-management of persons with dementia and to engage them in meaningful activities. Self-management can be defined as: '*the individual's ability to manage the symptoms, treatment, physical and psychosocial consequences and lifestyle changes inherent in living with a chronic condition'* (Barlow, Wright, Sheasby, Turner & Hainsworth, 2002). For persons with dementia this refers to dealing with and adapting to the changes in their lives and maintaining a good quality of life (Dröes, Van Mierlo, Van der Roest & Meiland, 2011a;2010b). Barlow et al. (2002) found that self-management interventions can have a positive effect on the well-being of persons with chronic conditions in the short-term.

Besides self-management also engaging in meaningful activities is important for persons with dementia (Vernooij-Dassen, 2007), because with these activities they can express themselves and can get in contact with other people. This can decrease boredom and can increase positive emotions of persons with dementia (Leng, Yeo, George & Bar, 2014) and their informal caregivers and this can have a positive effect on caregiver burden. Meaningful activities can be defined as: '*the spectrum of occupations a person performs in his or her everyday life and that are perceived as significant to the person'* (Phinney, Chaudhurry & O'Connor, 2007). Phinney, Chaudhurry & O'Connor (2007) found that engaging in meaningful activities is important for persons with dementia, because they find meaning in the experienced pleasure and enjoyment, get a feeling of belonging to the world and they get a feeling of autonomy and having an identity. Meaningful activities are for example: leisure and recreation, household chores, social involvements and work-related activities. Stimulation of meaningful activities and making use of remaining capacities seems to be helpful for living as long as possible at home and for compensating deficits (Vernooij-Dassen, 2007).

Technology has the possibility to support persons with dementia in self-managing their disease and doing meaningful activities. It is expected that technology can stimulate self-management in people and can decrease healthcare costs (Krijgsman et al., 2013). eHealth can be explained as: '*the deployment of information and communication technologies (ICT) to support or improve health and healthcare'* (Krijgsman, Klein & Wolterink, 2012). Touch screen devices, such as tablets could be useful for eHealth interventions, because they are user-friendly and development of applications (apps) for tablets is simple (Kerkhof, Graff, Bergsma, de Vocht & Dröes, 2016). Wandke, Sengpiel and Sönksen (2012) found that a touchscreen device is effective for persons with dementia, because it makes less demand of hand-eye coordination in comparison to a desktop computer using a mouse and cursor. Stunnenberg and Andriaansen (2015) found first positive results of using tablets in elderly care and Joddrel, Astell & Psychol (2016) mentioned in their study that there are also opportunities for persons with dementia to use a tablet. Therefore, a tablet device with apps can be useful in supporting self-management and engaging in meaningful activities in persons with dementia (Upton, Upton, Jones, Jutlla & Brooker, 2011; Lim, Wallace, Luszcz & Reynolds, 2013).

Despite the potential of tablets for persons with dementia, not all persons with dementia can use a tablet device independently. Therefore, persons with dementia need support to learn how to use the tablet and its apps (Dröes, Bentvelzen, Meiland & Griag, 2010a; Lim et al., 2013, Kerkhof et al., 2016). Informal caregivers could be able to teach the person with dementia how to use it. Three case studies by Bello, Bouwmeester & Westerik (2013), Meussen, Wensink, Bannink, Nagtzaam & Steghuis (2014) and Vegterlo, Folkers, van der Zee & Grunder (2014) have shown that it is possible for persons with dementia to learn how to use a tablet and these results were positive. These case-studies included 9 participants with Mild Cognitive Impairment (MCI) or mild dementia living at home and found that people with MCI and mild dementia were able to learn how to use a tablet and apps. They also demonstrated that using a tablet device can have a positive impact on self-confidence and involvement in society. Some other qualitative studies demonstrated that persons with dementia who worked with a tablet and apps found it user-friendly and experienced the use as valuable (Lim et al, 2013; Groenewoud et al, 2017; Kerkhof, Rabiee & Willems, 2015; Astell et al, 2016). Furthermore, Lim et al. (2013) found in their study that half of their participants were able to use a tablet independently for leisure activities and that a quarter of the participants were able to store and charge the device without support. Kong (2017) also demonstrated in his study that a tablet is a user-friendly tool to use in interventions for persons with dementia. In addition, according to Tyack and Camic (2017), using a tablet can provide enjoyable shared activities for persons with dementia and their informal caregivers. Also Astell et al. (2010) found that interacting with a tablet is enjoyable for persons with dementia and their informal caregivers and this can have positive results on their relationship, because they found that informal caregivers are more relaxed. So, tablet technology for persons with dementia could also decrease the burden of informal caregivers and improve their *feeling of competence, positive care experiences* and *quality of life*.

So, a tablet device with apps could be a useful tool for persons with dementia, but apps for persons with dementia must be carefully selected, because not all apps in the wide variety of apps available are useful for persons with dementia (Astell et al, 2016; Groenewoud et al, 2017). Besides that, the needs, wishes and functional abilities of persons with dementia differ and therefore an individual based intervention with appropriate apps is needed. To give a solution, a person-centered tablet program is developed (FindMyApps) that will help persons with dementia and their informal caregivers to select and use apps for self-management and meaningful activities that match with their needs, wishes and functional abilities.

1.1 FindMyApps

The intervention FindMyApps consists of (1) the FindMyApps Training, a training for informal caregivers and (2) the FindMyApps Tool, that select usable apps matching with the individual needs, wishes, and functional abilities of persons with dementia. The overall goal of the intervention is improving self-management abilities of persons with dementia and promote engaging in meaningful activities and participation in daily and social life (Kerkhof et al., 2016).

The aim of the FindMyApps Training is to train informal caregivers in supporting their relatives with dementia in using a tablet device and the FindMyApps Tool. Therefore, in the FindMyApps Training, informal caregivers learn to use the tablet device and to use the FindMyApps Tool.

The aim of the FindMyApps Tool is making it easy for persons with dementia and their informal caregivers to select apps that fit their needs, wishes and functional abilities. Therefore, dementia-friendly apps, divided in (sub)categories in domains of self-management and meaningful activities were collected in the FindMyApps Tool. These apps are ranked from apps which fit most to the needs, wishes and functional abilities of persons with dementia till apps which fit less, based on saved personal preferences. This person-centered tool will be used by persons with mild dementia with support of their informal caregivers. But, for the further development of FindMyApps it is important that the intervention fit with the requirements of persons with dementia and their informal caregivers. Therefore, insight into the usability and user satisfaction of FindMyApps is needed.

1.2 Adoption of technology

To get insight into the usability of the FindMyApps Tool the Theory Acceptance Model (Davis, 1989) is used, see Figure 1. According to this model, the intention to use and adopt a technological system is determined by two determinants (1) perceived usefulness and (2) perceived ease of use. Perceived usefulness is defined as: '*the degree to which a person believes that using a particular system would enhance his or her job performance* (Davis, 1989, p.320).' The determinant perceived ease of use is defined as: '*the degree to which a person believes that using a particular system would be free of effort* (Davis, 1989, p.320).'

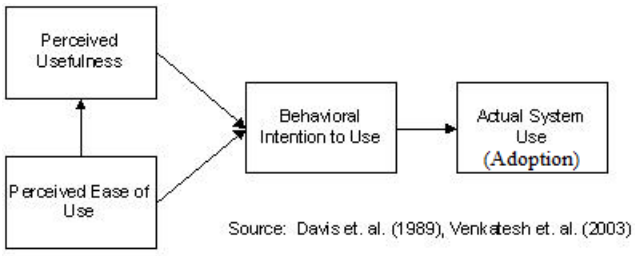

Figure 1. Theory Acceptance Model

Besides the usability of FindMyApps there is also a learning aspect in the intervention, which would be operationalized by the theme (3) learnability which is defined as '*How easy is it for the users to accomplish basic tasks the first time they encounter the design? (Nielsen, 2012).*

At last, the actual use of FindMyApps will be operationalized by the theme (4) adoption which is defined as '*The decision, by an organization or individual, to utilize and implement a technology, (IGI Global, 2018)'.* The impact of using FindMyApps will be operationalized by 'perceived effects' and will be added to the theme adoption.

1.3 This study

This feasibility study is conducted to improve FindMyApps for the start of a Randomized Controlled Trial (RCT). Therefore, questionnaires and a semi-structured interview will be conducted about the training, usability, learnability and adoption and perceived effects of FindMyApps.

The first aim of this study is getting insight into the opinion of informal caregivers about the training they

received. The second aim of this study is getting insight into the opinion of informal caregivers about the usability and learnability of the FindMyApps Tool and the user satisfaction with the FindMyApps Tool. The third aim of this study is getting insight into the adoption and perceived effects of FindMyApps. The last aim is getting insight into the improvements on the primary outcome measure (1) feeling of competence and secondary outcome measures (2) positive care experiences and (3) quality of life of informal caregivers. The results of persons with dementia who participated in this study are described in the study of Köhl (2018).

This leads to the following research questions:

1. What is the opinion of informal caregivers about the training they received?
2. What is the opinion of informal caregivers about (1) perceived usefulness, (2) perceived ease of use and (3) learnability of the FindMyApps Tool and how satisfied are they with the FindMyApps Tool?
3. What is the (4) adoption of the FindMyApps Tool and to what extend is FindMyApps perceived as effective?
4. To what extent are (1) feeling of competence, (2) positive experience of care and (3) quality of life of informal caregivers improved after using FindMyApps?

2.Method

2.1 Research Design

This feasibility study was conducted as pilot for a randomized controlled trial (RCT). A mixed methods design, including qualitative and quantitative research methods was used. Data collection consisted of semi-structured interviews and a pilot RCT. In total 20 informal caregivers and their relatives with dementia were included in this study. Participants in the experimental group received the FindMyApps Training and Tool and the participants in the control group received a training and tips for websites where they could find suitable apps for their relative with dementia, but without the FindMyApps Tool. All informal caregivers and persons with dementia were randomly assigned to the experimental or control group. With randomization the relationship between the informal caregivers and persons with dementia was taken into account and spouses and child's were equally divided in both groups.

Measurements took place at baseline and after three months. Informal caregivers got a questionnaire on each measurement moment and a semi-structured interview after three months.

2.2 Participants

Informal caregivers and their relatives with dementia for this study were recruited by institutions in the East part of the Netherlands. A convenience sampling method (Dooley, 2009) was used and informal caregivers and their relatives with dementia were recruited by daily activity institutions, by the Dutch Alzheimer association, by a case manager dementia and meetings centers and Alzheimer Cafes for persons with dementia and (informal) caregivers. All informal caregivers and relatives with dementia who were interested in this study received an information flyer to get more information about the study. The inclusion criteria of the person with dementia to participate in this study were:

- Early-stage dementia or a suspect of early-stage dementia defined by the Brief Cognitive Rating Scale (BCRS) of Reisberg & Ferris, (1988).
- Living in the community
- Availability of an informal caregiver to support
- Enthusiasm for using a tablet device
- Having a tablet device (iOS/Android)

Two exceptions were made in the inclusion criteria. First of all, if participants had real enthusiasm to participate in this study and did not have a tablet device, they had the possibility to borrow one of Saxion, School of Applied Sciences, for three months. In total ten tablet devices were borrowed. Second, if persons with dementia had real enthusiasm to participate, but the informal caregiver could not gave the support, volunteers were invited to support the person with dementia in this study. In total two volunteers were included (one in both groups) and they received the training to support the person with dementia, and they participated in the semi-structured interview. Persons with dementia and their informal caregivers were excluded from this study if they not met the inclusion criteria, when they were visually impaired or blind and if they had severe to moderate dementia.

When informal caregivers and their relatives with dementia were interested in this study, they were called for an introduction. In this phone call the content of the study was explained more profoundly and participants could ask questions. In addition, if they met the inclusion criteria, the stage of dementia was assessed with BCRS

questionnaire (Reisberg & Ferris, 1988) and the Guidelines Rating of Awareness in Dementia (GRAD) scale (Verhey, Rozendaal, Ponds & Jolles, 1993) was conducted. This phone call ended with the decision to participate or not. In total six out of twenty informal caregivers, three in both groups, dropped out after the start of the intervention and were excluded from pre- and posttests. Most mentioned reasons for drop-out, in both groups, were lack of motivation of person with dementia or informal caregiver to use the tablet and the training informal caregivers received was too little for some of them to work with the tablet.

2.3. The intervention

2.3.1. Intervention Experimental Group

The experimental group received FindMyApps, which consisted of (1) the FindMyApps Training and (2) the FindMyApps Tool. For differences with the control group see Table 1.

Table 1.
Differences Intervention Experimental and Control Group

	Experimental group	***Control group***
Training	Explanation errorless learning method Explanation control functions of tablet device Explanation FindMyApps Tool Tips and Questions	Explanation control functions of tablet device Explanation websites Tips and Questions
Tool	FindMyApps	X
Phone calls	Every two weeks	Every two weeks

The FindMyApps Training

The aim of the FindMyApps Training was to train the informal caregivers so that he/she could support their relative with dementia. The training took approximately two till three hours of each informal caregiver and consisted of the following aspects, (1) explanation errorless learning method, (2), explanation control functions of tablet device, (3), explanation of the FindMyApps Tool and (4) tips and questions. The training was given at the homes of the informal caregivers.

The errorless learning method of De Werd, Boelen & Kessels (2013) was used for learning their relatives with dementia how to use a tablet device and the FindMyApps Tool. This method focuses on the implicit memory, which is part of the long-term memory and relatively spared in the early and middle stages of dementia. This memory function helps people perform procedural tasks, such as dress up and washing hands, which are learnt through fixed routines and are conducted automatically (Kessels & Joosten-Weyn Banningh, 2008). To make a task automatic, a whole task must be divided in little steps and each step need to be repeated regularly without making mistakes. Making no mistakes is important, because also mistakes will be stored in the implicit memory. With this method, informal caregivers were taught the control functions of the tablet device and the FindMyApps Tool in the FindMyApps Training to gave them examples of how they could use this method.

The explanation about the control functions of the tablet consisted of the most important control options, such as: turning on the tablet, using the home-button, swiping up and down, downloading apps and creating a map of apps. These control options were divided in different steps.

After that, the FindMyApps Tool was explained to the informal caregivers. All different components of the FindMyApps Tool were explained in steps and tried out by the informal caregiver. Also, an app which fitted the interest of the person with dementia was downloaded and tried out by the informal caregiver.

Finally, informal caregivers got some tips and had the possibility to ask questions. Tips were given, such as: choose apps that fit within personal preferences; do not let the person with dementia carry out how a task works; do not make deviations in what was learned; use positive feedback for little things and use a stylus pen. After the training, informal caregivers received a hand-out of the training and two explanation cards with the steps of the errorless learning method and with the steps of the FindMyApps Tool.

The FindMyApps Tool

The main part of the intervention is the FindMyApps Tool, which consists a selection of potentially relevant apps for persons with dementia. The apps in the FindMyApps Tool were carefully selected by the two researchers and the following assessment criteria were used: interaction (type of gesture), interaction (control panel), feedback (auditory and/or visual), aesthetic design (size of text), aesthetic design (contrast and background), app design (intuitive use), app design (instructions/help tutorial), customization (language), obstacles (advertising and/or light version) and age appropriateness (not childish) (Kerkhof, Bergsma, Graff & Dröes, 2017; Joddrell, Hernandez & Astell, 2016). All apps were scored on a 3-point scale and the scores on the assessment criteria were summed up. Apps with a score of 20 points or higher were included in the library of the FindMyApps Tool.

In total, the FindMyApps Tool consists of approximately 180 apps for iOs and Android, which were divided in three main categories, (1) in and around the house, (2) contacts and (3) leisure, thirteen subcategories and forty sub-subcategories, which are categories related to domains of self-management and meaningful activities. For an overview of all categories and examples of apps see Appendix 1.

The FindMyApps Tool consists of six components (1) personal settings, (2) categories, (3) apps in each category, (4) description app (5) 'Mijn Apps' and (6) the explanation button.

A user-profile could be created in the *personal settings*, see Figure 2. Informal caregivers could set the personal preferences for their relatives with dementia in the personal settings. The six personal settings are if they want: apps with big letter size, apps with less text and many pictures, apps in Dutch language; apps with real photos; apps with easy type of gesture and apps that contain instructions how to use the app (Kerkhof et al., 2017).

The homepage in the FindMyApps Tool is the component *categories*, see Figure 3. In this component of the FindMyApps Tool it is possible to choose a category, a sub-category and a sub-subcategory to find apps that fit with their needs and interests. Next, an overview is given of apps in sub-subcategories in '*apps in each category'*, see figure 4. Every app is explained with a short sentence and with information about the costs of the app. Besides that, the best app was recommended with a higher score, which is based on the personal settings. The information button on this page links to the *description of an app*, see figure 5. In this component more and clear information about the app, screenshots and scores on the personal settings were provided. In this component it is possible to access the Appstore.

In the component '*Mijn Apps'* an overview of apps of interest, arranged by (sub-)subcategories, is provided, see Figure 6. Finally, in all components in the FindMyApps Tool is an *explanation button* with a help tutorial, see Figure 7.

Figure 2. Personal Settings

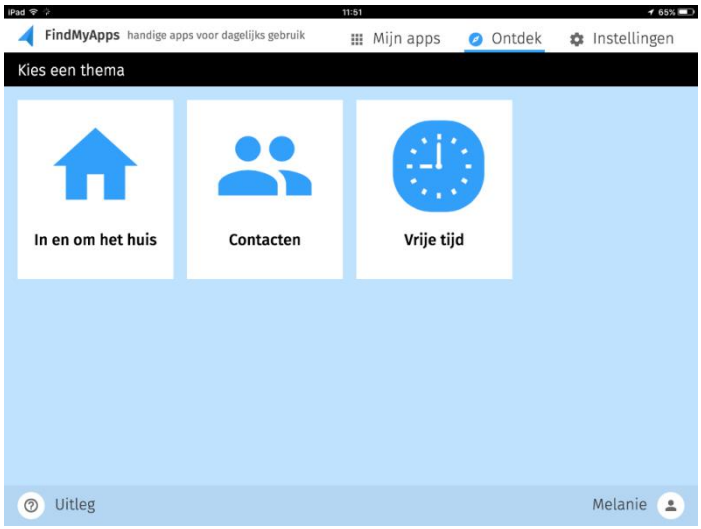

Figure 3. Categories

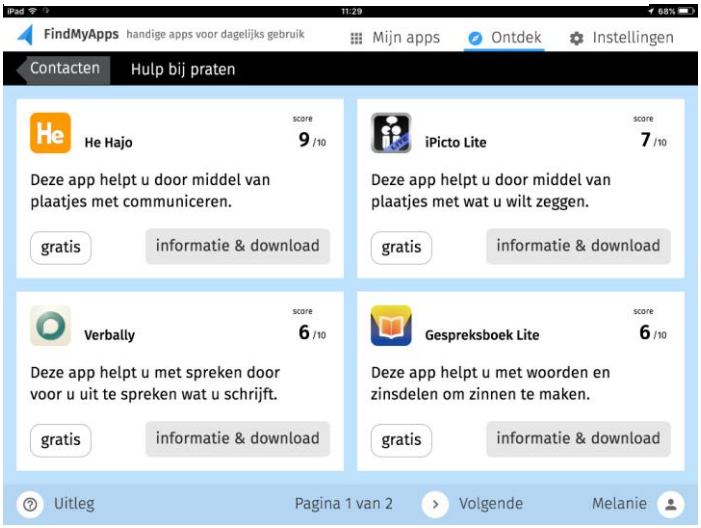

Figure 4. Apps in each category

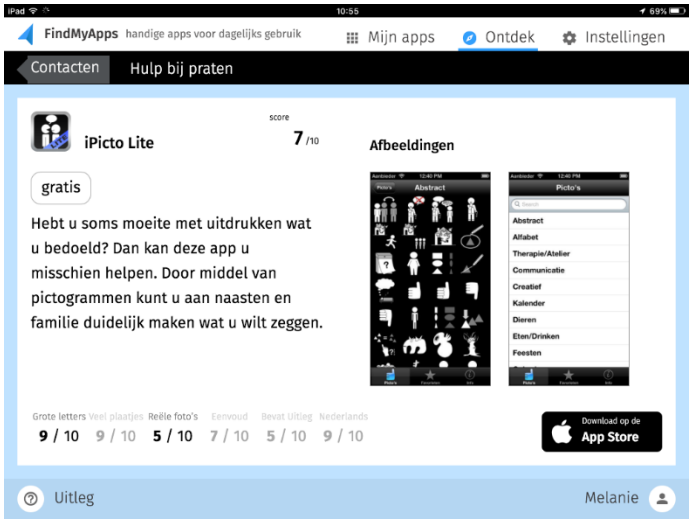

Figure 5. Description App

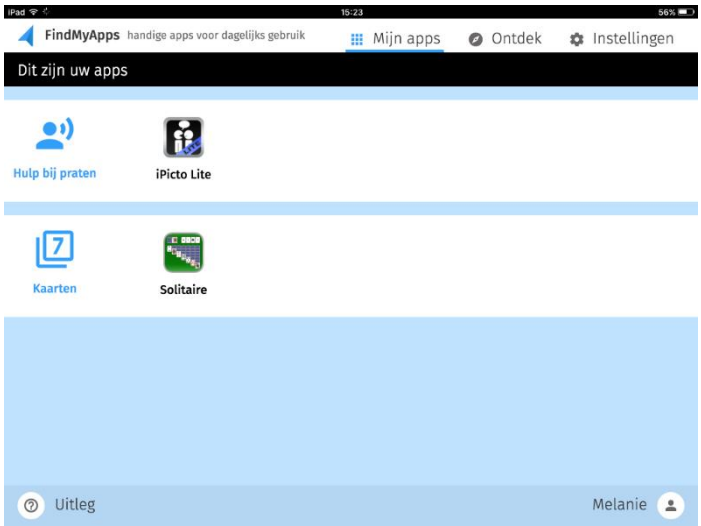

Figure 6. 'Mijn Apps'

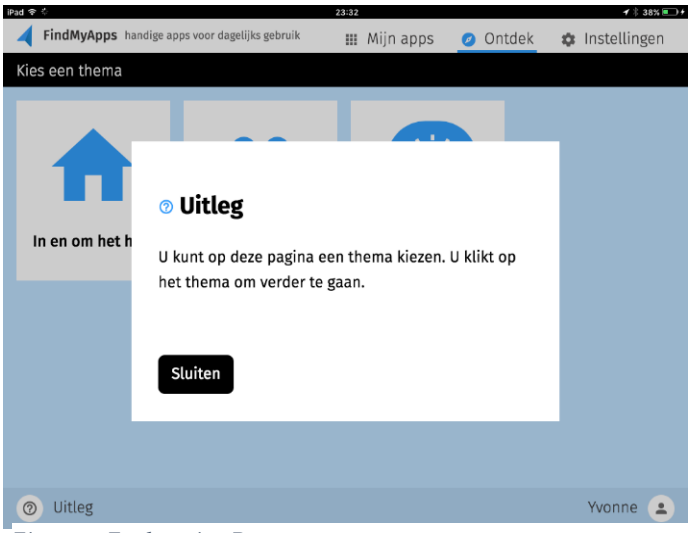

Figure 7. Explanation Button

2.3.2. Intervention Control Group

Informal caregivers of control group received an introductory training for most important control functions of the tablet and tips for websites where they can find suitable apps for persons with dementia. The training for control group is not based on the errorless learning method. The training duration was approximately one till two hours and consisted of (1) explanation control functions of tablet device, (2) explanation websites and (3) tips and questions. The training was given at the homes of the informal caregivers.

The training started with an explanation of the same most important control functions of the tablet device as in the experimental group. Informal caregivers received also twelve websites for appropriate apps and one website was showed to the informal caregiver with a short explanation. Given websites were for example 'Expertise Centrum Mantelzorg' and 'Alzheimer-Nederland'. Finally, informal caregivers got some tips and had the possibility to ask questions. Tips were given, such as: choose apps that fit within personal preferences; use positive feedback for little things and use a stylus pen. After the training informal caregivers received a hand-out of the training and an explanation card with the websites.

2.3.3. Phone calls

After the training persons with dementia and their informal caregivers were asked to use the interventions for three months. During these three months informal caregivers in both groups were called every two weeks for information about how things were going. For these calls a question protocol was used. This protocol contains questions, such as: how the person with dementia experiences the support, how the method errorless learning helps by supporting and which support of the informal caregiver is needed. There also was some space for informal caregivers to ask questions.

2.4 Measurement Instruments

Informal caregivers were asked about their ***characteristics***, such as: age, relation with person with dementia, gender, SES and how often they have used a smartphone or tablet.

2.4.1 Measurement Instruments to assess opinions, adoption and perceived effectiveness and user satisfaction

To get insight in the usability of FindMyApps a semi-structured interview was conducted with four themes (1) perceived usefulness, (2) perceived ease of use, (3) learnability and (4) adoption and perceived effects (see Appendix 2 for interview scheme). Besides that, user satisfaction was measured.

Perceived usefulness was operationalized in general questions and in questions about the six different components (personal settings, categories, apps in each category, description app, 'Mijn Apps' and explanation button) of the FindMyApps Tool. General questions about the perceived usefulness of the FindMyApps Tool were asked, such as: 'can you tell me something about your experiences with FindMyApps' and 'Where does FindMyApps helps your relative with?'. Questions about the perceived usefulness of the six components were divided in open-ended questions, such as: 'Did you miss personal settings and which?' and structured questions, such as: 'How useful where the personal settings in the FindMyApps Tool in your opinion?' Answer categories for the structured questions were: not useful, useful or very useful.

Perceived ease of use was also operationalized in general questions and in questions about the six different components of the FindMyApps Tool. General questions about the perceived ease of use were asked, such as: 'How do you experience the user-friendliness of FindMyApps for your relative?' and 'Which suggestions do you have to improve FindMyApps?'. Their opinions about the perceived ease of use of the six components

were asked with structured questions, such as: 'How difficult was it for your relative to navigate through the categories of the FindMyApps Tool?'Answer categories for the structured questions were: difficult, a bit difficult or easy.

Learnability was operationalized with open-ended questions about their experiences with giving support to their relative with dementia. Questions were asked, such as: 'how did you experienced the support you gave to your relative?' and 'Where exactly did your relative needed support for?'

Adoption and *perceived effectiveness* was also operationalized with open-ended questions and multiple choice questions about using the FindMyApps Tool, the tablet device and the FindMyApps Training in everyday life. Open-ended questions were asked, such as: 'to what extend is FindMyApps part of the daily activities of your relative?' and 'to what extend is the errorless learning method part of the support you give to your relative?'. Multiple choice questions were asked, such as: 'how many usable apps were found in the FindMyApps Tool?' (*0, 1-2, 3-4 or 5+)* and 'how often did your relative used the found apps?' (*several times a day, once a day, several times a week or several times a month*).

Finally, ***user satisfaction*** of the FindMyApps Tool was measured with the Use questionnaire of Lund (2001). The Use questionnaire consists of 30 statements in four subscales: usefulness, ease of use, ease of learning and satisfaction. Informal caregivers answered these statements on a 7-point-likkert scale which ranges from 1 (*strongly disagree*) to 7 (*strongly agree*), whereby a higher score indicated better usability of a system. Scores were presented at item level and the means of the subscales were also presented.

2.4.2. Outcome Measures

In this study the following outcome measures of informal caregivers were assessed at baseline (*T0*) and after 3 months (*T1*): (1) feeling of competence, (2) positive care experience, (3) quality of life, see Table 2.

Table 2

Overview Outcome Measures Informal Caregivers

Quantitative measurements	**Outcome measures**	**Questionnaires**	**Baseline (T0)**	**Post-tets (T1)**
Primary outcome	Feeling of Competence	Short Sense of Competence Scale(SSCQ)	x	x
Secondary outcome	Positive Care Experience	Positieve Ervaringen Schaal (PES)	x	x
Secondary outcome	Quality of Life	EQ-5D-5L, EQ VAS, Questions quality of life TOPICS MDS	x	x

The primary outcome measure ***feeling of competence*** was measured with the Short Sense of Competence Scale (SSCQ) of Vernooij-Dassen et al. (1999). The SSCQ contains of seven statements in three categories, namely: consequences of involvement in care for the personal life of the caregiver ('*I feel that my present situation with my … doesn't allow me as much privacy as I'd like')*; satisfaction with one's own performance as caregiver *('I wish that my … and I had a better relationship')* and satisfaction with the person with dementia as a recipient of care *('I feel that my … behaves the way s/he does to annoy me')*. Informal caregivers had answered these questions on a 5-point-likert scale which ranges from '*agree very strongly'* to *'disagree very strongly'.* For feeling

of competence, the scores on all items were summed to get a sum-score. The sum-score ranges between 7 and 35 and a higher score indicates a greater feeling of competence.
Informal caregivers were also asked about their ***positive care experiences*** which was measured by the Positieve Ervaringen Schaal (PES, Positive Experience Scale) of Boer, Oudijk, Broese van Groenou & Timmermans (2012), based on the stress-coping model of Lazarus & Folkman (1984). The PES is an 8-item unidimensional hierarchical Mokkenscale which included intrinsic satisfaction, relation enhancement, improvement of competence and social enhancement. Informal caregivers had to answer on statements, such as: '*looking after my care receiver gave me a good feeling'* and '*giving care meant I also learned new things myself*'. The answer categories were: (1) *agree , not agree/not disagree and disagree*, whereby not agree/not disagree are took together as (0) disagree. The scores on all items were summed to get a sum-score. The sum-score ranges between 0 and 8, whereby a higher score indicates more positive care experiences.

Informal caregivers were also asked about their ***quality of life*** which was measured with the EQ-5D-5L (The EuroQol Group, 1990) and the quality of life topic in the TOPICS-MDS (Lutomski et al., 2013). The EQ-5D-5L consists of five dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Informal caregivers had the following answer options on these dimensions: (1) *no problems*, (2) *slight problems*, (3) *moderate problems*, (4) *severe problems* or (5) *extreme problems*. A mean sum-score was calculated on these dimensions which ranges from 1 till 5, whereby a higher score indicates more problems. Besides that, the EQ-5D-5L consists of the EQ VAS, which contains of a 20 centimeter vertical scale ranging from 0 till 100. Informal caregivers rated their health on this scale, whereby a higher score indicates a better health.

In the quality of life topic of TOPICS-MDS informal caregivers were asked to rate their current quality of life on a five-level response scale which ranges from 1 (*excellent*) till 5 (*poor*). Besides that, they rated their quality of life in comparison with the previous year on a five-level response scale which ranges from to 1 (*much better*) till 5 (*much worse*), whereby a lower score indicates a better quality of life. These questions were based on the RAND-36, which is a health-related quality of life survey validated to use in the Netherlands (Hays & Morales, 2001). The last question which informal caregivers answered was about their perceived quality of life. They answered this question by rating their present life on a scale of 0 till 10, whereby a higher score indicates a better life. This question was based on the Chantril's Self Anchoring Ladder of Cantril (1965).

2.5 Procedure

First of all, all questionnaires of pre- and posttests were filled in with the help of nurse students of Saxion School of Applied Sciences. These students were trained how to fill in all questionnaires and how to deal persons with dementia and their informal caregivers. The pre- and posttests were conducted by two different groups of students.

The trainings for informal caregivers were conducted by the researchers (MV and GK) and scheduled at the homes of the informal caregivers. Researcher MV provided the FindMyApps Training and researcher GK provided the training for control group. The same researcher who gave the training conducted the semi-structured interviews with the informal caregivers, this choice is made, because both the interviewee and the couple knew each other already, and it was assumed that there existed some trust between them. The possibility that informal caregivers were not honest about their opinion of the training was taken into account by assuring that all information they gave was treated respectfully, and that the informal caregivers were free to say everything they wanted. In addition, it was emphasized that it has no negative consequences and that it is valuable for the development of the intervention. All interviews were recorded by a voice recorder. Each interview took approximately one hour.

2.6 Data analysis

The semi-structured interviews were analyzed with deductive coding using the framework analysis of Ritchie & Spencer (1994). According to Ritchie & Spencer (1994) framework analysis could be defined as: '*an analytical process which involves a number of distinct though highly interconnected stages'.* Framework analysis consists of 5 stages: (1) familiarization, (2) identifying a thematic framework, (3) indexing, (4) charting and (5) mapping and interpretation.

The aim of the first stage was to get familiar with de content of the semi-structured interviews as a whole before breaking it into parts. This was done by listen to the voice records of the interviews and transcribe the interviews. After that, the transcribed interviews were read repeatedly till the researcher was familiar with the data. In the second stage, identifying a thematic framework, categories and sub-categories were made for coding the data. The four themes perceived usefulness, perceived ease of use, learnability and adoption were used as categories. All quotes matched with these themes were given a separate color. The first sub-categories that were used, were positive and negative and for every quote it was marked with green for positive or red for negative. The first ideas for coding the data further were made and noted in the margin of the text. The first two interviews were identified by three researchers (YK, GK & MV) till consensus about the first coding scheme was reached. The last six where identified by researchers GK & MV. The final code scheme was discussed with researcher YK till consensus was reached. Researchers GK & MV worked also together in the last three stages of the framework analysis. In the third stage, indexing, the positive and negative quotes for each theme were sifted and related to the categories and sub-categories used in the code scheme. In the stage of charting, all the quotes were taken of the real interview and were placed in the coding scheme with categories and sub-categories.
Finally, in the stage of mapping and interpretation, the data was managed. The (sub)categories and belonging quotes were put into tables and quotes of informal caregivers who said the same about a code were counted. Subsequently, an overall interpretation of the codes and quotes of each theme was written.

All questionnaires were analyzed with the statistical software program, SPSS. First of all, Descriptive statistics were used to give insight in ***characteristics*** of both groups. To test if there were no significant differences between experimental and control group, Nonparametric Tests were used for analyzing, because the sample was to small and not normally divided (Gibbons, 1993). A Chi-Square test was used to assess the differences between both groups for categorial variables and a Mann-Withney U test was used to assess the differences on ordinal and continuous variables. If the assumptions for Chi-Square test were not met, Fisher's Exact Test or Likelihood Ratio Test were used.

Descriptive statistics were used to analyze ***user satisfaction***, the outcomes of the quantitative questions of the semi-structured and the primary and secondary outcome measures ***feeling of competence, positive care experience*** and ***quality of life.*** The aim was to analyse the outcome measures with ANCOVA, but the study group was too small to conduct statistical analysis.

2.7 Ethical considerations

The Medical Ethics Committee of the VU University Medical Center in Amsterdam approved the study protocol and it was also approved by the CE of faculty Behavioral Sciences of the University Twente (17784). Strategies for meaningful inclusion of persons with dementia in qualitative research were taken into account in this research (Murphy, Jordan, Hunter, Cooney & Casey, 2015). First of all, all participants signed an informed consent at the start of research and during this research, an on-going consent is performed by asking them if they still were comfortable with the procedure (Murphy et al., 2015).

There was also made use of strategies to maximize the response of persons with dementia and their

informal caregivers by creating a safe environment, building a relationship, being flexible, recognizing signs of discomfort, help with telling their story, and emphasizing the importance of their participation (Murphy et al, 2015). A safe environment was created by coming to their home address and we built on the relationship by conducting the trainings, calls and semi-structured interviews by the same researcher. Being flexible and recognizing signs of discomfort were taken into account by taking a pause when necessary. Researchers helped telling their story by using the tablet and diary during the semi-structured interview, so they could recognize things. Last, the importance of their participation was taken into account by thanking them for participating and asking them how they had experienced this research.

3. Results

3.1 Description of informal caregivers in this study

Table 3 presented the characteristics of the informal caregivers (n=14) and their relatives with dementia in this study. There were no significant differences found between the experimental and control group.

Table 3

Characteristics of Informal Caregivers in the Experimental and Control group (n=14)

	Experimental group (n=7)		*Control group (n=7)*		
	n (%)	Mean (SD) Min-Max	n (%)	Mean (SD) Min-Max	p*
Gender					1.00
Female	7 (100)		6 (86)		
Male	-		1 (14)		
Age		63 (11.8) 47 – 79		61 (11.7) 40 – 71	0.81
Relationship with person with dementia					0.56
Spouse					
Child	6 (86)		4 (57)		
	1 (14)		3 (43)		
Gender relative with dementia					0.56
Female	1 (14)		3 (43)		
Male	6 (86)		4 (57)		
Age relative with dementia		69 (14.0) 50 – 87		77 (6.8) 71 – 90	0.32
Type of dementia relative					0.35
Alzheimer's disease	3 (43)		1 (14)		
Vascular dementia	2 (29)		1 (14)		
Not diagnosed	1 (14)		4 (57)		
Other	1 (14)		1 (14)		
Education level					0.53
Lower education	1 (14)		1 (14)		
Secondary education	1 (14)		1 (14)		
Higher education	4 (57)		3 (43)		
University	1 (14)		-		
Using smartphone					0.73
Every day	6 (86)		6 (86)		
No Experience	1 (14)		-		
Using tablet device					0.62
Every day	5 (71)		4 (57)		
Once a week	1 (14)		-		
Once or twice a month	-		1 (14)		
Only once	-		1 (14)		
No experience	1 (14)		1 (14)		

* Differences between experimental and control group were tested with Chi-Square tests for categorical variables and differences on ordinal or continuous variables were tested with a Mann-Withney U tests.

3.2 Evaluation Training

Participants in both groups were asked about their opinion of the training they received and they were in particular positive about the training (See Table 4). The most positive evaluated aspects of the FindMyApps training were 'clear explanation', 'explanation all aspects in the FindMyApps Training were useful' and 'errorless learning was useful'. Participants made also some critical remarks, such as: 'also explanation to person with dementia' and 'explanation is too little for someone with no experience'. A remark must be made by 'also explanation to person with dementia', because one person with dementia received the training together with the informal caregiver and the informal caregiver was positive about it: *'Ik vond het ook fijn dat we dat met zijn*

drieën direct deden (met persoon met dementie erbij), want dat was gewoon heel prettig, want anders krijg je een heel onnatuurlijke situatie, maar dat is natuurlijk afhankelijk van hoe het op dit moment bij ons is, MZ19'. Two other participants mentioned that they would prefer that: '*Ik dacht wel, dat het misschien zou helpen als het aan mijn moeder was uitgelegd, want door de moeder-kindrelatie moet ze er wel open voor staan dat ik haar dat leer … En ik denk als dan een vreemde het doet, vreemde ogen dwingen zeggen ze altijd, MZ14.'*

The participants who received the training for control group were in particular positive about the 'clear explanation'. Which aspects of the training they evaluated as useful is a bit divided, most of the participants were positive about 'the hand-out of training' and about 'the explanation functions of the tablet'. Two participants made a critical remark about the training, namely 'the person with dementia forgot what they have learned' and 'it consisted of too much paperwork'.

Table 4.

Evaluation Training FindMyApps (n=7) and Training Control Group (n=7)

		Experimental group			*Control group*
	n*	Quotes		n	Quotes
Positive remarks					
Clear explanation	7	MZ14: '*Ik vond dat je het me goed hebt uitgelegd. Ja, ik vond het prima. Fijne, goede, duidelijke uitleg.'*	Clear explanation	6	MZ11: 'Nou, het was duidelijk en te snappen, dus goed.
Explanation all aspects in the FindMyApps Training were useful	5	MZ19: '*Ik denk dat het allemaal nuttig was om in ieder geval alle stappen even door te lopen. Doe je dat niet, dan weet je ook niet waar je tegenaan zou kunnen lopen. Doe je het wel, dan kun je zeggen van dat gaat allemaal al goed of dat snap ik al, dat is heel fijn, maar het is denk ik wel fijn om even alle stappen door te lopen.'*	Hand-out of training was useful	3	MZ16: '*Nou ja, omdat ik natuurlijk, het is je nog niet helemaal eigen na één instructie, dus dan kon je dat weer nalezen. Dat vond ik wel makkelijk, ja.'*
Errorless Learning was useful	2	MZ14: *'Ik vond het een openbaring om te leren dat mensen die beginnende dementie hebben toch nog dingen kunnen leren. En ik dacht echt dat mensen met dementie niets meer konden leren, ik dacht echt dat is idioot … Vooral die methode dat heb ik echt wel op die manier gedaan en ik hoop dat dit ook werkt voor de lange duur.'*	Explanation functions of tablet was useful	2	MZ16: '*Ook om het apparaat, de iPad, natuurlijk te leren kennen.'*
Explanation cards useful for learning person with dementia	2	MZ19: '*En ik denk dat zo'n instructiekaart dat dat ook heel fijn is, want dan kun je snel even kijken van oke, hoe zit dat ook alweer.'*	Websites were useful	1	MZ01: '*Nou, ik vond het nuttig dat die apps eraan kwamen, die erop moeten komen (websites).'*
Phone contact every two weeks was useful for support	1	MZ07: '*Doordat jij ook aan de telefoon tips gaf van doe is zus, doe is zo, probeer dat. Daar was ik zelf nooit op gekomen om via een omweggetje toch dingen voor elkaar te krijgen. En om het dan ook weer op een manier die hij fijn vindt weer uit te leggen.'*	Explanation cards were useful	1	MZ11: '*En ook dat formulier dat we daarna kregen, zeg maar dat gesealde, dat is ook handig.'*
Critical remarks					
Also explanation to person with Dementia	3	MZ14: '*Ik dacht wel, dat het misschien zou helpen als het aan mijn moeder was uitgelegd, want door de moeder-kindrelatie moet ze er wel open voor staan dat ik haar dat leer … En ik denk als dan een vreemde het doet, vreemde ogen dwingen zeggen ze altijd.'*	It consisted of too much paperwork	1	MZ20: '*En de hoeveelheid papier vond ik wel erg veel. Over dat en dat papier. Gewoon simpele instructies: 'dat, dat, dat, klaar.'*
Explanation too little for someone with no experience	1	MZ02: '*Maar ja, voor iemand die daar dus niet mee werkt, is het gewoon te weinig vind ik. Dus inderdaad, dat je het dan nog even vanaf het begin af aan nog even helemaal zelf kunt doen. Dus uitzetten en alles opnieuw … vond ik ook zo ongemakkelijk en dan zat ik en dan had ik die papieren erbij en dan dacht ik ja op die papieren daar staat het zo (tablet anders) en dat zijn allemaal van die dingetjes waar ik in het begin heel erg mee heb zitten worstelen.'*	Persons with dementia forgot what they have learned	1	MZ08: '*Nou, dus als je iemand iets leert, dan is iemand met dementie het al weer vergeten. Dus dat is dan ook nog een handicap. En van het aanzetten met die knop, ja dat vergat ze gewoon.'*
Explanation took too long	1	VR17: '*Goede uitleg, duidelijk, wel een beetje aan de lange kant vind ik.'*			

* Number of participants

3.3 Evaluation FindMyApps Tool

In general, the informal caregivers were positive about the FindMyApps Tool and judged it on average with an 8 (7 – 9). Besides that, informal caregivers (n=7) judged on average the satisfaction with the FindMyApps Tool with an 4.9 on a scale from 1 till 7 in the use questionnaire, see Appendix 3. To substantiate this, they gave their opinion about the perceived usefulness and perceived ease of use of the FindMyApps Tool and judged the different components of the FindMyApps Tool. Besides that, they gave their opinion about learnability and adoption and the perceived effects of the FindMyApps Tool. At last, some suggestions for improvement of FindMyApps were given. These results are shown in the next paragraphs.

3.3.1. Perceived Usefulness

In total seven informal caregivers (n=8) judged the perceived usefulness of the FMA Tool. Seven of them had the opinion that FindMyApps is useful and one participant found FindMyApps not useful. Reasons for its usefulness are summarized in Table 5 and included 'fits with personal needs and interest', 'provides meaningful activities', 'selects appropriate apps and gives direction', 'it brings new ideas', 'stimulates to use tablet device and new apps', 'provides memory training' and 'supports self-management'. The single participant who found the app not useful stated that this was because 'it fits older people more than younger people with dementia.'

Table 5.
Perceived Usefulness of the FindMyApps Tool (n=8)

	n*	Quotes
Positive remarks		
Fits with personal needs and interests	7	MZ14: '*Ze houd bijvoorbeeld erg van spelletjes en ja dat zit er in. En ze houd van nieuws en dat zit er in. Er zitten genoeg verschillende dingen in die tegemoet komen aan haar persoonlijke behoeftes, want ze kan kiezen'*
Provides meaningful activities	4	MZ05: *'Ik vind het een leuke ervaring als ik zie hoe mijn man zich hiermee kan vermaken, dus dat vind ik wel heel prettig dat hij wat te doen heeft zeg maar. Ik merk toch dat mijn man passief wordt, dus dan is dit toch wel een leuke invulling zeg maar van zijn dag.'*
Selects appropriate apps and gives direction	4	MZ14: *'Omdat het een fijne app is die veel selecteert, waardoor je als mantelzorger durft te vertrouwen dat wat je er op zet dat het ook goede dingen zijn en dat je alvast een selectie maakt in wat bij de persoon past vind ik echt heel fijn.'*
It brings new ideas	3	MZ13: '*Wat ik zelf heel nuttig vind of heel mooi vind, je merkt dat het initiatief minder wordt he en het is natuurlijk prachtig als je door die apps op ideeën komt, dat je denkt van ooh ja, dat is ook nog wel eens leuk om eens wat mee te doen. '*
Stimulates to use tablet device and new apps	2	MZ14: *'Ik denk dat het haar geholpen heeft om wat meer dingen uit te proberen. Ik denk dat ze dat anders niet zo had gewild … en daardoor hebben we dus nu een stuk of 3 of 4 extra dingetjes op de tablet gezet.'*
Provides memory training	2	MZ17: *'Wat ik zo heel graag wil is dat hij niet zo heel veel voor de televisie zit, maar dat hij ook andere dingen gaat doen. De eerste aanzet tot dit was we moeten hem iets geven waardoor zijn hersenen beter getraind worden, dat willen we graag, … , maar daarna heeft hij weinig initiatief om nog dingen te doen, dan zit hij eigenlijk het liefst de hele dag alleen maar voor de televisie, wat ik echt afstompend vind. En ik wil zo graag dat hij zelf zijn hoofd weer een beetje gaat gebruiken om te proberen om de snelheid waarmee de dementie toeslaat om die te verminderen. En dat is gelukt…'*
Supports self-management	1	MZ14: *'Dus de ondersteuning moet groter worden, … En dat is ook waarom we dit doen, omdat we hopen dat ze daarmee langer zelfstandig kan blijven wonen … Ik denk dat het haar wel ondersteund, althans ik hoop het.'*
Critical remarks		
It fits older people more than younger people with dementia	1	MZ19: *'Qua inhoud vind ik het wat meer op oudere mensen gericht dan op jongere mensen … Omdat veel sportdingen qua filmpjes en zo gaat over oudere mensen, dat spreekt niet zo aan voor jongere mensen. En als ik bijvoorbeeld denk aan vrije tijd had ik wel vaak het idee dat men er vanuit gaat dat dit twee mensen zijn die alle twee thuis zijn, die hebben alle tijd om leuke dingen te doen, maar zo is het niet.'*

* Number of participants

Informal caregivers (n=7) gave also their opinion about the usefulness of the FindMyApps Tool on eight statements in the use questionnaire, see Appendix 3. On average they judged the usefulness of the FindMyApps Tool with 4.6 on a scale from 1 till 7, indicating that informal caregivers were in general positive about the usefulness of the FindMyApps Tool. For example, all informal caregivers agreed with the statement 'FindMyApps is useful'. Informal caregivers were less positive about the statement 'it saves my relative time when he/she uses it', because only one informal caregiver agreed a little bit with it, four were neutral and two disagreed.

The informal caregivers (n=8) were also asked how useful they found the different components of the FMA Tool. It can be read from Table 6 that they found the personal settings, the categories, the apps in each category and the description of apps in particular useful. The informal caregivers were less positive about the usefulness of the page 'Mijn Apps', because you can not do anything with it: '*Weinig gebruikt, dus eigenlijk niet nuttig, je kunt er niets mee. En volgens mij was het ook zo, als je apps had verwijderd, dan bleven ze er wel in staan, VR17.'* The opinions about the explanation button were divided, because some found it unnecessary and some found it useful.. For example, a participant who found the explanation button not useful in the component 'categories': *'Ik vind het eerlijk gezegd een beetje overbodig, want je gaat automatisch al één van deze drie thema's aanklikken, MZ13'.*

Table 6.
Perceived Usefulness of the Different Components of the FindMyApps Tool (n=8)

	Not useful	Useful	Very useful
1. Personal settings	1 (13%)	7 (86%)	0 (0%)
2. Categories	0 (0%)	6 (75%)	2 (25%)
3. Apps in each category	1 (13%)	5 (63%)	1 (13%)
4. Description app	0 (0%)	7 (88%)	0 (0%)
5. 'Mijn Apps'	4 (50%)	3 (38%)	0 (0%)
6. Explanation button	2 (25%)	3 (38%)	1 (13%)

3.3.2. Perceived ease of use

Informal caregivers (n=8) were mixed about the ease of use of the FindMyApps Tool. Two considered it as easy, but four found it a bit difficult. None of the participants found it very difficult. The mentioned reasons for finding the FindMyApps Tool a bit difficult or easy are summarized in Table 7. Most frequent mentioned positive remarks about perceived ease of use were: 'easy to use', 'icons and text are recognizable' and 'it is clear'. Most mentioned critical remarks were: 'touchscreen did not always react on finger touch', 'download in Appstore is difficult' and 'apps on page 'Mijn Apps' are not touchable'.

Table 7.
Perceived Ease of Use of the FindMyApps Tool (n=8)

	n*	Quotes
Positive remarks		
It is easy to use	4	MZ05: *'Ja, dat denk ik wel, want het is gewoon heel gebruiksvriendelijk gewoon. Het is niet moeilijk. Zo technisch ben ik ook niet met computers en Ipads en ik zeg wel eens, zelfs ik snap dit.'*
Icons and text are recognizable	4	VR17: *'Ja, ik denk over het algemeen wel ja, duidelijke iconen. Maar ik denk over het algemeen met de tekst maakt het een goed geheel.'*
It is clear	3	MZ19: *'FMA vind ik zelf ook heel overzichtelijk qua lay-out … omdat ik vind dat het duidelijk en overzichtelijk is.'*
Touchscreen is working well	2	MZ07: *'Ik vind hem eigenlijk wel prima. Geen problemen mee gehad, niets aan opgevallen.'*
Explanation button on every page is easy	2	MZ19: '*Ik denk dat het wel handig is dat het er is, omdat dan makkelijk even gekeken kan worden van wat was dit ook alweer. Ik denk dat dat wel fijn is. Want anders moet je constant gaan switchen als je op een ander blad moet kijken wat was dat ook alweer … Ja, dat is wel handig ik bedoel ik denk dat het niet storend is dat het daar zit.'*
Categories made it easier to search for an app	1	MZ19: *'Ik denk dat het wel fijn is dat er categorieën zijn gemaakt, want anders is het helemaal een oerwoud.'*
Screenshots are easy, because you get what you search for	1	MZ02: *'En dat vind ik van FMA wel dat je daar plaatjes bij hebt en dat het daar dan ook op slaat en op Google zie je alleen maar tekst. Dus die plaatjes zijn wel heel belangrijk vind ik, … Dat je dus echt duidelijker ziet waar je naar aan het zoeken bent. En als je ze dan hebt, dan is dat ook wat je zoekt.'*
Critical remarks		
Touchscreen did not always react on finger touch	4	VR17: '*Maar wat ik wel ervaarde in het begin is dat we soms wat moeite hadden met aanraken met de vinger en die styluspen die hielp daarbij, want het was merkbaar dat dat verbetering bracht.'*
Download in Appstore is difficult	3	MZ13: *'Waar het dan inderdaad nog wel eens, zeg maar met het doorklikken met de knop van die Appstore, dat gaf dan nog wel eens problemen … Ja, want dan krijg je natuurlijk die algemene pagina en dan moet je ook wat intikken en dat was dan wel wat lastig.'*
Apps on page 'Mijn Apps' are not touchable	2	MZ13: *'In die app wordt dus op gegeven moment een lijstje aangelegd van apps die opgezocht zijn en ik heb een paar keer gemerkt dat mijn man daar bij die lijst een app aan wilde klikken om dus die apps weer te zoeken en dat zou ook heel logisch zijn … dat hij dat probeert komt juist doordat hij al gewend is aan andere apps waarbij je gewoon door kunt klikken.'*
Too many categories and apps made it unclear	2	VR17: *'Maar wat ik dan wel moet zeggen is dat het best wel uitgebreid aan thema's is, dus dat maakt dat je jezelf wel kunt verliezen in FMA laat maar zeggen, of verliezen, dat het een beetje onoverzichtelijk zou kunnen worden zeg maar … Maar omdat het zoveel vertakkingen zijn naar verschillende apps wordt het wat onoverzichtelijker.'*
Buttons 'informatie&download' and 'Download Appstore' are unclear through color	2	VR17: *'Alleen wat me wel opviel was de 'informatie&download' knop die zou wel iets in een andere kleur mogen, want je ziet nu niet zo heel snel van hier moet ik op drukken … want om 'gratis' zit ook een lijntje, maar dat is geen knop, terwijl je wel zou denken dat je daar op kunt drukken.'*
Categories are not equally divided	1	MZ13: *'Ja, hier zitten heel veel dingen in, maar goed of dit nu altijd onder 'vrije tijd' valt. Hier zit dus heel veel in en in anderen zit relatief weinig in, … Maar op zich zou je verwachten dat het een beetje gelijk verdeeld zou zijn.'*
Icon of category 'leisure' is not recognizable	1	MZ19: *'Ik zou zelf vrije tijd met zo'n klok niet zo'n goede combinatie vinden.'*
Category 'In and around the house' did not represent what is behind it.	1	MZ13: *'Dat wil niet zeggen dat je onder de rubrieken vind wat je daar altijd zou verwachten … Ja, 'in en om het huis' was wat vaag denk ik, want als je dat aanklikt krijg je alleen agenda, dagindeling en medicijn herinneringen en dat is het enige wat je bij in en om het huis krijgt … maar 'in en om het huis' is voor mij meer dan agenda alleen of je medicijn herinneringen.'*

* Number of participants

Informal caregivers mentioned also reasons why a tablet device or app was easy or difficult to use, see Table 8. The most frequent remarks that made it easy to use a tablet device or app were: 'using a styluspen' and 'making a map for most used apps'. The most mentioned critical remarks that made using the tablet device and apps a bit difficult were: 'dealing with adverts' and 'making a password'.

Table 8.
Perceived Ease of Use of the Tablet Device (n=8)

	n*	Quotes
Positive remarks		
Using a styluspen	2	VR17: *'Maar wat ik wel ervaarde in het begin is dat we soms wat moeite hadden met aanraken met de vinger en die styluspen die hielp daarbij, want het was merkbaar dat dat verbetering bracht.'*
Making a map for most used apps	2	MZ13: *'Ik heb ze dus allemaal hier op gezet en in één icoontje staan, kijk dan staan ze allemaal bij elkaar, ik heb een aparte map voor hem gemaakt dus daar kan hij ze zo opzoeken.'*
Tablet device is easy to use when you getting used to it.	1	MZ02: *'Je moet in het begin wel even door hebben, omdat ik natuurlijk niet zo'n apparaat gewend ben, was het voor mij eerst even uitproberen hoe of wat. Maar als je daarmee gewend bent, dan is het gewoon heel gemakkelijk te gebruiken.'*
Critical remarks		
Dealing with adverts	3	MZ14: *'Het eerste waar ik tegenaan liep is bij de eerste app die wij wilden openen, kreeg mijn moeder een melding dat we moesten betalen, terwijl we naar gratis apps hadden gezocht. Dus dat was even een barrière, want mijn moeder zei meteen 'Dit ga ik niet doen.''*
Making a password	2	MZ14: '*We hebben wel zo min mogelijk met wachtwoorden gedaan, omdat je anders eens in de zoveel tijd een wachtwoord moet wijzigen, maar dan weet ik me god niet meer wat het wachtwoord nou was, dus dat hebben we maar niet gedaan. Het moet wel gebruiksvriendelijk blijven.'*
Creating an account	1	MZ13: *'Als je een account moet aanmaken met wachtwoord, dat is niet gebruisvriendelijk voor deze doelgroep.'*
Apps where you have to upload data beforehand	1	MZ13: 'Dat was dus een app voor tuinieren, dat bleek dus een lege app te zijn die je dus helemaal zelf moet invullen en dat moet je aan iemand met Alzheimer niet gaan vragen, dat zijn geen handige dingen denk ik.'
Cover tablet device is uncomfortable	1	MZ02: *'Ik zou er dan gelijk een standaard bij kopen, want dit vond ik ook heel ongemakkelijk (hoesje om tablet).'*
Placing apps through all screens of the tablet device	1	MZ14: '*Überhaupt, er was een keer dat ze ineens iets kwijt was, dat ze me in paniek opbelde en zei dat er iets van de tablet was afgehaald, maar dat stond gewoon op een andere plek, dus het is heel belangrijk dat altijd alles op dezelfde manier in beeld staat, want anders kijkt ze er overheen ofzo.'*

* Number of participants

Informal caregivers (n=7) gave also their opinion about the ease of use of the FindMyApps Tool on eleven statements in the use questionnaire, see Appendix 3. On average they judged ease of use of the FindMyApps Tool with a 4.9 on a scale which ranges from 1 till 7, which meant that informal caregivers were in general positive about the ease of use of the FindMyApps Tool. All informal caregivers agreed with the statements 'FindMyApps is easy to use' and 'FindMyApps is user friendly'. Informal caregivers were less positive about the statement 'my relative can use FindMyApps without written instructions', because only two informal caregivers agreed with it, two disagreed and three were neutral or had no opinion.

Finally, informal caregivers (n=8) were also asked to indicate the perceived ease of use of the different components of the FindMyApps Tool for their relative with dementia (Table 9). According to the informal caregivers, most persons with dementia found it a bit difficult to work with the components: 'categories', 'apps in each category' and 'description app' and two persons with dementia found it easy to work with these components. For one person with dementia it was difficult to work with these components of the FindMyApps Tool, because

that persons with dementia had difficulties with making choices because of his disease: '*Het lukt hem niet alleen om daar keuzes in te maken, keuzes maken is sowieso op alle gebieden heel moeilijk. Zelfs op straat, ga ik linksaf of rechtsaf. Of ga ik vandaag dit doen of ga ik vandaag dat doen. Dat bezorgt hem allemaal heel veel hoofdbrekens. Dus ook keuzes op de tablet vindt hij moeilijk, MZ07'.* Persons with dementia had, according to their informal caregivers, less difficulties with 'personal settings', 'Mijn Apps' and the 'explanation button.' A remark must be made, because these pages were only judged by two informal caregivers, because these pages were used less by remaining persons with dementia.

Table 9.
Perceived Ease of Use of the Different Components of the FindMyApps Tool (n=8)

	Difficult	A bit difficult	Easy
1. Personal settings	0 (0%)	1 (13%)	1 (13%)
2. Categories	1 (13%)	3 (38%)	2 (25%)
3. Apps in each category	1 (13%)	3 (38%)	2 (25%)
4. Description app	1 (13%)	3 (38%)	2 (25%)
5. 'Mijn Apps'	0 (0%)	2 (25%)	0 (0%)
6. Explanation button	0 (0%)	0 (0%)	2 (25%)

3.3.3. Learnability

In total seven informal caregivers and one volunteer gave their opinion about the learnability of persons with dementia to get used to the FindMyApps Tool and the tablet device (see Table 10). The most frequent mentioned promotors of learnability were 'do it regularly' and 'use errorless learning method'. According to informal caregivers, most persons with dementia needed support for 'downloading', 'working with component apps in each category' and 'navigating through categories'.

Table 10.
Learnability of the FindMyApps Tool & Tablet Device (n=8)

	n*	Quotes
Promotors of learnability		
Do it regularly	4	MZ13: '*Ja, het heeft alles met discipline te maken he, ik zit me even af te vragen hoe je dat er in kunt krijgen he, dat het gewoon een regelmatiger terugkomend iets is. Je dagindeling, je weekindeling, … , maar om dat op de één of andere manier te stimuleren dat het een wat vaster item wordt … dat het dus niet wegzakt, want je gaat natuurlijk straks het voorjaar in en dan ga je ook weer vaker weg en zo en dan kan ik me voorstellen dat je dan op gegeven moment heel veel weer kwijt raakt.'*
Use Errorless Learning method	4	MZ14: *'Ik probeer heel bewust die methode toe te passen en dat doe ik met meer dingen en niet alleen met het gebruik van de tablet. Dus dat herhalen en zeggen wat je doet, dus zeg maar die stapjes probeer ik gewoon met meer dingen te gebruiken, omdat ik hoop dat het dan toch blijft hangen.'*
Patience of informal caregiver	3	MZ13: *'Ja, ik ben vrij ongeduldig, dus daar moest ik wel even goed bewust van zijn, dat je de stappen dus wel goed doornam.'*
Experience with computer/tablet	3	MZ05: *'Ja, want tot nu toe vind ik dat hij zich er best wel heel goed zelf mee heeft kunnen redden. We hebben wel regelmatig samen natuurlijk gezeten, maar hij kan het ook nog wel vrij goed zelf. Dat komt misschien ook omdat hij altijd al wel goed met de computer overweg heeft kunnen gaan, met de Ipad, weet niet of dat ook een dingetje is natuurlijk.'*
Stimulation to learn something new	3	MZ17: '*En dat is wel moeilijk bij mensen met beginnende dementie van hoe is hun eigen idee nog van om dingen te gaan leren en om dingen erbij te willen leren, dus dan denk ik wel van je moet ze eigenlijk een beetje stimuleren om dat te doen, want dat doen ze niet zo 1, 2, 3 uit zichzelf.'*
Listen to personal needs person with dementia	2	MZ14: '*Het lastige is soms dat het soms teveel kan zijn voor iemand, dan wil ik graag, ben ik enthousiast en dan moet ik echt denken van 'hoooo, niet te hard van stapel lopen', want dan wil het gewoon echt niet, het is nu te veel en die balans moet ik in de gaten houden voor haar, want anders gaat het niet werken, dus dat is wel een belangrijk ding wat je je moet realiseren als je hiermee begint.'*
Start at early age with learning how to use a tablet device	2	MZ14: '*Eigenlijk is het jong mee beginnen. Dat zegt mijn moeder zelf ook he, over 10 jaar is dit probleem voorbij he. Dan kan iedereen wel met een tablet overweg. Het is echt zo'n generatiedingetje … Je moet wel mee in die wereld en jong geleerd is oud gedaan en dat geld voor de tablet ook.'*
Have some knowledge about an app before you explain it to person with dementia	1	MZ14: '*Ik heb ook bedacht van soms wil ik hem zelf even voor beoordelen, zeg maar dat ik hem op mijn eigen tablet zet, dat ik hem even bekijk van wat is het nou eigenlijk, dat is wel een dingetje, want ik moet hem eigenlijk zelf ook kennen, voordat ik hem aan mijn moeder kan uitleggen.'*
Need support for		
Downloading	2	MZ05: '*Ja, downloaden dat gaat niet altijd, dat deden we meestal dan samen, dus dat deed hij niet echt alleen zeg maar.'*
Work with component apps in each category	2	MZ13: '*Daar heeft hij nog wel eens wat hulp bij nodig. Eigenlijk als je het maar blijft proberen, dan lukt het altijd wel een keer en dat loopt bij hem nog wel eens vast dat ik hem daarbij moet helpen … ik kom er niet uit zegt hij dan en dan zeg ik als je daar nou op drukt, dan lukt het wel.'*
Navigate through categories	2	MZ13: *'Daar heb ik hem wel bij geholpen, zeker de eerste keren.'*
Switch over to another app	1	MZ07: '*Nog steeds bij dat switchen. Niet het aandoen, of een spel vinden, dat allemaal niet, maar wel het schakelen.'*
Searching for a new app	1	VR17: '*Maar als je een nieuwe app zocht, dan had hij daar wel wat begeleiding bij nodig.'*

* Number of participants

Informal caregivers (n=7) gave also their opinion about ease of learning of FindMyApps and tablet device on four statements in the use questionnaire, see Appendix 3. The category ease of learning was on average judged with 4.4 on a scale of 1 till 7 by informal caregivers, which meant that informal caregivers were in general positive about ease of learning. Informal caregivers were positive about the statements 'my relative learned to use it quickly' and 'it is easy for my relative to learn to use it', five of them agreed with these statements and two disagreed or had no opinion. Informal caregivers were less positive about the statement 'my relative easily

remembers how to use it', because only one informal caregivers agreed with it, the others disagreed or were neutral.

3.3.4. Adoption & Perceived Effects

Informal caregivers in experimental and control group were asked how many apps they found, how often their relative with dementia used that apps and which type of support the apps provided to their relatives with dementia (see Table 11). In the experimental group most apps were found in the FindMyApps Tool, four participants found 1-2 apps elsewhere (in the Appstore) and two participants found more than five apps in the Appstore. In the control group, three participants found apps on the websites, but most apps were found in the Appstore.

In the experimental group five persons with dementia had used the apps several times a week or several times a day, both for apps found in the FindMyApps Tool as for apps found in the Appstore. In the control group the apps found in the Appstore were more often used as the apps found on the websites. Most persons with dementia used the apps several times a day and a few used it several times a week or less.

In the experimental group apps found in the FindMyApps Tool supported most frequent meaningful activities according to the informal caregivers. Apps for coping with disease and for self-management were also found in the FindMyApps Tool according two informal caregivers. The support provided by the apps found in the Appstore was equally divided between coping with disease, self-management and meaningful activities. In the control group the apps found on the websites were in particular supporting self-management and the apps found in the Appstore supported mostly meaningful activities.

Table 11.

Overview Apps, Usage and Type of Support Experimental and Control Group (n=14)

	Experimental group (n=7)		*Control group (n=7)*	
	Found in FMA tool	Found elsewhere	Found on websites	Found elsewhere
Number of apps	n (%)	n (%)	n (%)	n (%)
0	1 (14)	1 (14)	4 (57)	1 (14)
1-2	1 (14)	4 (57)	-	2 (29)
3-4	2 (29)	-	2 (29)	3 (43)
>5	3 (43)	2 (29)	1 (14)	1 (14)
Usage				
Several times a day	2 (29)	2 (29)	-	3 (43)
Once a day	-	-	-	-
Several times a week	3 (43)	3 (43)	2 (29)	2 (29)
Several times a month	-	-	1 (14)	1 (14)
Type of support				
Coping with disease	2	2	0	1
Self-management	2	2	2	1
Meaningful activities	4	2	1	6
Other	0	0	1	1

In total seven informal caregivers and one volunteer also told about the impact of FindMyApps in daily life (see Table 12). The main impacts, according to the informal caregivers, were 'more interest and enthusiasm for tablet device', 'daily or weekly use of tablet device' and 'interest in technology increased'. Informal caregivers and mentioned also some reasons that impede the impacts, and the most mentioned reason is 'lack of time and distance of informal caregivers who were not inhabiting'.

Table 12.
Perceived Effects of FindMyApps and Tablet Device (n=8)

	n*	Quotes
Impacts		
More interest and enthusiasm for tablet device	4	MZ07*: 'Jawel, zijn interesse als die is gewekt, maar het heeft wel zijn interesse gewekt, want hij zei ik wil er zelf één, want als ik dan straks buiten zit, dan heb ik lekker wat te doen. Hij leest geen boeken, dat is te ingewikkeld, dus hij heeft dan lekker wat te doen. Dus we hebben zelf een tablet gekocht. Dus dat heeft het wel gemaakt dat de interesse in de tablet sowieso gewekt is.'*
Daily or weekly use of tablet device	3	MZ14: '*Dagelijks. Ze gebruikt het elke dag. Ze kan hem niet missen. Als hij kapot is, moet er echt een nieuwe komen, dat weet ik nu al.'*
Interest in technology increased	2	MZ07: '*Nee, hij kende zelfs het woord 'apps' niet. Wat is dat dan? Want je stuurt een app en je hebt een app, nou dat weet hij dus nou wel hoe dat zit. Dus er zijn wel hele kleine dingen, die hij, dat inzicht heeft hij wel geleerd, dat daar ook verschil in zit. En bijvoorbeeld mensen die op de fiets op de telefoon kijken, dan vraagt hij wat is die daar nou aan het doen? Dan zeg ik die is vast aan het bellen, en dan zegt hij geen spelletjes aan het spelen? En dan zeg ik dat mag ik hopen van niet. Maar daardoor is ook wel zijn blik op de wereld iets ruimer geworden denk ik.'*
More self-confidence	1	MZ13: '*Maar ik denk wel dat het hem wat meer zelfvertrouwen geeft.'*
Errorless learning method used in daily life	1	MZ14: *'Ik probeer heel bewust die methode toe te passen en dat doe ik met meer dingen en niet alleen met het gebruik van de tablet. Dus dat herhalen en zeggen wat je doet, dus zeg maar die stapjes probeer ik gewoon met meer dingen te gebruiken, omdat ik hoop dat het dan toch blijft hangen.'*
Reasons that impede impacts		
Lack of time & Distance of informal caregiver who were not inhabiting	3	MZ02: '*Het komt er gewoon niet van, mijn man is ook altijd al anti laptop en computers geweest en doordat je dan zelf allemaal andere dingen hebt, komt het er gewoon niet van. Het is echt tijdgebrek onder andere … dat heeft ook iets te maken met mijn energie, want die heb ik nodig voor mijn man en dan komen er allerlei andere familiekwesties bij die het dus gewoon onmogelijk maken. Dus doordat je al je energie nodig hebt voor je eigen strubbels, kun je er geen andere dingen bij gebruiken.'*
Using FindMyApps too little	1	*MZ14: '… maar dan zegt ze dus wat is die app ook alweer, dan weet ze eigenlijk gewoon niet meer dat dat FMA is. Dus dat komt omdat ze hem te weinig gebruikt.'*
Using a tablet is not adopted in daily life	1	MZ19: '*Nee, want PwD doet wel graag Sudoku, maar die doet hij graag uit de krant of uit een tijdschrift. Want dat merk ik zelf, want we hebben ook wel van die boekjes waar ze in staan, zelfs dat pakt hij niet zo gauw. Dan is toch van oh, dat hoort op die plek en daar blijft het dan ook. En ik merkte dat ook, onze televisie die haperde op gegeven moment, dat ik toen zei van je kunt dat ook wel op de tablet terugkijken, maar dat zit er niet in … het zit niet in zijn systeem.'*

* Number of participants

3.4 Suggestions for improvement FindMyApps

The informal caregivers gave various suggestions for improvement of the FindMyApps Training, the usability of the FindMyApps Tool and learnability & adoption and perceived effects. First of all, an informal caregiver suggested to improve the FindMyApps Training for persons with no experience with a tablet device by coming to their home a second time and explain it again *'Weet je, ik had het misschien wel prettig gevonden als je nog eens een keer weer geweest was om alles uit te leggen, dat misschien wel. Misschien zou dat beter zijn, dat de eerste keer dat je belde, dat je dan toch weer gekomen was in plaats van gebeld had. Misschien voor iedereen wel hoor,*

dat bedoel ik, niet alleen voor mij, maar dat was voor mij inderdaad wel fijn geweest … Ja, voor mensen waar het nieuw is, dat is misschien wel handig om in plaats van te bellen toch nog eens een keer te komen, MZ02.'

Suggestions for improving the perceived usefulness of the FindMyApps Tool were given for the components 'categories' and 'Mijn Apps' in the FindMyApps Tool. According to the informal caregivers, the component 'categories' in the FindMyApps Tool could be improved by enlarge the categories 'contacts' and 'in and around the house' with more categories, such as 'genealogy' and 'music': '*Ik zit te denken aan een link naar muziek en dat heeft er mee te maken dat hij heel erg van muziek houd, maar ook als andere functies wegvallen, dan blijft muziek heel lang, dus ik zou me kunnen voorstellen dat dat daar een goede aanvulling op zou kunnen zijn, MZ13.'* The component 'Mijn Apps' could be improved by an updated and operational page with most used apps and with a link to these apps *'(Mijn Apps) Ja, en dat is dus niet handig eigenlijk. Ik zou zeggen alleen de apps die je gedownload hebt, want dan wordt het een mooi overzicht waar je de volgende keer uit kunt werken dan. Dit zou dan wel een mooi begin overzicht kunnen zijn. Want nu, als je bijvoorbeeld tennis hebt gedownload en je wilt even geen apps zoeken, dan druk je op het tennis icoontje op de tablet en dan ga je niet eerst naar FMA en als je dit werkbaar zou maken (het klikken op de apps), dan is FMA ook een app waaruit gewerkt kan worden, VR17.'*

Suggestions for improvement that were mentioned about the perceived ease of use of the FindMyApps Tool were about colors, about the component 'Mijn Apps' and about the portrait presentation of the FindMyApps Tool. The colors in the FindMyApps Tool could be improved by adding colors to the component 'categories': *'de app is rustig en overzichtelijk en dat moet je ook zeker zo houden, maar iets meer met kleurtjes werken in de categorieën, zodat het misschien nog iets meer zou aanspreken. Het is nu heel rustig, maar eigenlijk ook een beetje saai. Het hoeft niet uitgesproken te zijn, maar met een beetje meer kleur kun je misschien net iets meer bereiken, MZ14.'* Informal caregivers also suggested to change the color of the 'informatie&download' button and 'Download Appstore' button, because these buttons did not stand out right now '*Ja, nou ja en ik kan me voorstellen dat als je dit in een andere kleur doet (downloadknop) dat het eerder uitnodigt om daar naar toe te gaan, MZ19.'* The component 'Mijn Apps' could be improved by making the apps in this component touchable and by changing the swipe-option from left to right into up and down, because it was not clear that it was possible to swipe from left to right when there were more apps in one category *'Maar ik vraag me wel af, stel dat je bijvoorbeeld meerdere dingen hebt, hoe gaat het er dan uit zien? Want als ik nu kijk dan passen er iets van 5 op, stel dat je er 10 hebt, moet je dan door? … Want dat is dan weer niet handig, want dan is het niet direct zichtbaar. Dan kan ik me voorstellen dat als hij naar beneden gaat, dat dat handiger is, MZ19.'* At last the perceived ease of use could be improved by making the FindMyApps Tool also fit for a portrait presentation, in addition to the current landscape presentation.

According to five informal caregivers, the learnability and adoption and perceived effects could be improved by supporting persons with dementia by someone else than the informal caregiver. Four informal caregivers mentioned that it could have bigger impacts when the person with dementia was supported by some else '*…dat het dan goed zou zijn als iemand van buiten ons tweeën dat doet, maar meer omdat het dan qua tijd beter zou kunnen passen, want nu is het heel vaak dan heb ik er tijd voor en heeft PwD er net geen zin in, die is met wat anders bezig, maar ook wel eens dat ik denk PwD kan nu mooi met de tablet bezig, maar ik moet nu koken of ik moet nu dit doen of ik moet nu dat doen, MZ19.'* One informal caregiver mentioned that her experiences with support of a volunteer were positive '*Ja, en dat kwam toch wel duidelijk naar voren, want hij begint nogal gauw als hij ergens mee bezig is, dan gaat hij er weer een ander verhaal bij halen en dan dacht ik van VR kap het af, maar dat deed hij juist niet en dat was misschien wel erg goed, want ik kap het dan wel meteen af en daarom is het voor mij denk ik ook niet zo goed geweest om met hem bezig te gaan, want ik zit hem veel te*

dicht op de huid, MZ17.' Another possibility that was mentioned is supporting persons with dementia by someone else in a small group '*Weetje, hij zou dat misschien nog veel beter kunnen leren als hij dat misschien in een heel klein groepje begeleid zou kunnen doen. En ik moet eerlijk zeggen, dat dat bij ons niet altijd lukt, want dat kost mij namelijk veel te veel tijd, MZ07.'*

3.5 Results of the outcome measures

Table 13 showed the results of informal caregivers on the primary outcome measure ***feeling of competence*** and on secondary outcome measures ***positive care experiences*** and ***quality of life***. As shown in Table 13, no big differences were found on the outcome measures between pre- and posttest and between experimental and control group.

Table 13.
Results of Informal Caregivers in Both Groups on all Outcome Measures (n=14)

		Median (min-max)	
Outcome measure	**Group**	**Pretest**	**Posttest**
Feeling of competence (SSCQ)	EXP	27.0 (16.0 - 34.0)	27.0 (10.0 - 33.0)
	CON	21.0 (18.0 - 29.0)	24.0 (13.0 - 32.0)
Positive Care Experiences (PES)	EXP	5.0 (3.0 - 7.0)	4.0 (2.0 - 7.0)
	CON	4.0 (1.0 - 7.0)	4.0 (1.0 - 8.0)
Quality of life (EQ-5D-5L)[a]	EXP	1.6 (1.0 - 1.8)	1.4 (1.0 - 1.8)
	CON	1.2 (1.0 - 3.0)	1.4 (1.0 - 3.0)
Quality of life (EQ VAS)	EXP	80.0 (60.0 - 90.0)	80.0 (60.0 - 100.0)
	CON	80.0 (50.0 - 100.0)	80.0 (50.0 - 90.0)
Quality of life (TOPICS-MDS)			
1) General	EXP	3.0 (2.0 - 4.0)	3.0 (1.0 - 4.0)
	CON	3.0 (2.0 - 4.0)	3.0 (2.0 - 4.0)
2) General – In comparison with year ago	EXP	3.0 (2.0 - 4.0)	3.0 (2.0 - 4.0)
	CON	3.0 (1.0 - 4.0)	3.0 (2.0 - 4.0)
3) Rate	EXP	7.0 (6.0 - 8.0)	7.0 (6.0 - 8.0)
	CON	7.0 (4.5 - 8.0)	7.0 (6.0 - 8.0)

Note. EXP = experimental group; CON = control group

4. Discussion

This study aimed to get insight into the opinions of informal caregivers about the FindMyApps (1) Training and the (2) usability, (3) learnability, (4) adoption and perceived effects of the FindMyApps Tool and improvements in (5) the outcome measures ***feeling of competence, positive care experiences*** and ***quality of life*** of informal caregivers. A web-based and personalized toolbox with mobile health apps for youngsters between 16 and 25 years old to prevent them from developing mental disorders is existing (Bidargaddi et al., 2017), however, to our knowledge, a person-centered application that selects appropriate apps for persons with dementia did not exist. This is the first study that has developed and examined such a tool for persons with dementia.

4.1 Overall results

The *training* is evaluated positively in both groups of informal caregivers. Especially the clear explanation was evaluated as positive in both groups and the experimental group pointed out the importance of the errorless learning method. Most critical remark about the training was that the training offered too little support for informal caregivers with no experience with tablet devices.

The *usability* of the FindMyApps Tool was evaluated positively, because it navigates in a simple way to apps, for self-management and meaningful activities, which fit with their needs, wishes and functional abilities. This is important, according to Astell et al. (2016) and Groenewoud et al. (2017), who pointed out in their studies that it is important that apps fit with the needs, wishes and functional abilities of persons with dementia. Despite the positive evaluation, the component 'Mijn Apps' in the FindMyApps Tool was evaluated as not useful by some informal caregivers, because it is not possible to click on the apps that were shown.

With regard to the *learnability* informal caregivers mentioned that it is important for persons with dementia to use the tablet with its apps regularly, which is part of the errorless learning method of De Werd, Boelen, Olde Rikkert & Kessels (2013), because this makes it possible for persons with dementia to recall how the tablet works for a longer period of time. Besides that, they suggested that it would be better when persons with dementia were supported by someone else than the informal caregiver.

This study showed that the errorless learning method supported informal caregivers to learn their relatives with dementia new tasks, such as working with the tablet device, its apps and the FindMyApps Tool. This is in line with the findings of De Werd, Boelen, Olde Rikkert & Kessels (2013) who also found in their study that it is possible for persons with dementia to learn new tasks with this method. In addition, Bier, Paquette & Macoir (2015) found also that it is possible to learn persons with dementia work with technology, a smartphone in this case, with making use of the errorless learning method. Moreover, it seems that the FindMyApps Training provided informal caregivers with enough skills, because they also used this method for relearning their relatives with dementia everyday activities, such as: cooking and working in the garden. These findings could be of great importance for clinical practice, because with this method it could be possible for persons with dementia to relearn everyday activities and learn new tasks in daily life, which can potentially reduce caregiver burden.

Regarding the *adoption and perceived effects*, most apps were found in the FindMyApps Tool and this stimulated self-management and meaningful activities and helped them to cope with the disease. In the control group most persons with dementia found at least one app in the App-store and mostly these apps stimulated meaningful activities. Most persons with dementia in both used the apps several times a day or several times a week. Informal caregivers pointed out that the persons with dementia got more interest and enthusiasm for the tablet device after using FindMyApps.

At last, no differences were found on the *outcome measures*.

4.2 Results for future RCT

In this feasibility study was also found that the FindMyApps (1) Training and (2) Tool, (3) the outcome measures, (4) the recruitment of participants and (5) the control group need improvement for future RCT.

This study showed that the FindMyApps *Training* offered to little support for informal caregivers with no experience with tablet devices. This is in contrast with our expectations that the FindMyApps Training in combination with the hand-out was extensive enough to support their relatives with dementia. An explanation could be that the FindMyApps Training has too much information to recall all important details. Therefore, the FindMyApps Training could be improved by realizing a possibility for informal caregivers to follow the training a second time if they need it.

The component 'Mijn Apps' in the FindMyApps *Tool* was evaluated as not useful by half of the informal caregivers, because it is not possible to click on the apps that were shown. It would be more useful when the apps that are shown link to the app itself or to the App-store and to improve this before the start of the RCT. Besides that, in this study it is found that there were too much categories in the FindMyApps Tool, which made the design of (sub)categories unclear. Therefore, it is recommended to provide an overview of (sub)categories so that people with dementia found easier the app of their interest. At last, this study found that the 'informatie&download' and 'Download Appstore' buttons were not recognizable through their colors. Therefore, it would be important for the RCT to change the colors of these buttons.

On the outcome measures ***feeling of competence, positive care experiences*** and ***quality of life*** no differences were found in this study. It was also not the expectation of this study to find significant differences on the outcome measures, but it was expected to see some improvements on the outcome measures at posttest. However, an explanation could be that the outcome measures not fit this intervention and therefore it is recommended for future RCT to use outcome measures that better fit with the scope of the intervention such as instruments that evaluates the effectiveness of eHealth interventions.

In this feasibility study, the *recruitment of participants* took a lot of time, approximately 3 months to recruit 20 participants. We started with sending e-mails to case-managers dementia and the Dutch Alzheimer association. This resulted only in five participants for our study. Most participants were recruited by contacting acquaintances of daily activities and meeting centers (were contacted four months before the start of the study, n=7) and 3 Alzheimer Cafes for persons with dementia and their (informal) caregivers (n=8). We waiting till the last month with visiting Alzheimer Cafes, however there we recruited most participants. An explanation of this more fruitful recruitment strategy could be that participants have real contact with the researcher(s) and this can increase the motivation of participants to participate in the study. Therefore, it is recommended for the recruitment of participants for the RCT to start with visiting Alzheimer Cafes.

At last, persons with dementia in both groups found approximately the same amount of apps and used that apps approximately just as often and that was contrary to our expectation. This could be explained by the active *control group* that is used in this study, who also received a tablet training and websites for finding suitable apps. It is possible that this 'intervention' has also improved the tablet use of persons with dementia, whereby the impacts of FindMyApps are not clear enough. Therefore it is recommended to use a passive control group in the RCT who for example only receive an instruction to use the tablet device.

4.3 Strengths and limitations

The main strength of this research is that a mixed methods design was used with both qualitative as quantitative methods (Robinson et al., 2011). Semi-structured interviews and questionnaires were used in this feasibility study. Despite the data-collection was time-consuming, it was successful to use a mixed-method design, because rich data was collected in this feasibility study to improve the intervention and study design for the RCT. Besides that, a strength of this research is that the end-users were involved in the development process of FindMyApps, because it improves the usefulness and acceptability of technology according to Span, Hettinga, Vernooij-Dassen, Eefstings & Smits (2013) and Meiland et al. (2014). This increases the dementia-friendliness of FindMyApps and this will increase the possibility that it will be used in future.

On the other hand, there were also limitations in this study that need to be mentioned. First of all, in this feasibility study a low number of informal caregivers were included and with taken into account the drop-outs, the study group was too small to do statistical analysis. Besides that, in this research the training and the semi-structured interviews were conducted by the same researcher. The informal caregiver and researcher knew each other, which could have resulted in social desirable answers given by informal caregivers. In this research we chose for building on a good relationship because this was seen as manner for collecting rich data. Building a relationship was simultaneously a strength of this research, because according to Murphy et al. (2015) it is important to create a safe environment and building a relationship to maximize the response of persons with dementia and their informal caregivers. But it must be taken into account that social desirable answers could have influenced the reliability of this research.

4.4 Practical implications

This feasibility study has acquired a lot of information to improve FindMyApps and to take into account for further research. First of all, the results could be integrated in FindMyApps and the study procedure for future RCT, which will be done to evaluated the effectiveness before implementation of FindMyApps.

For future research and after improvements in the FindMyApps Training it would be interesting to see if it is possible to make persons with dementia, with less enthusiasm or experience with a tablet device, enthusiast for the tablet device and to learn them to work with it, because than FindMyApps can have a bigger impact in dementia care. It is interesting how it is possible to motivate them to work with the tablet.

Finally, as seen in studies of Bidargaddi et al., 2017 and Kerkhof, den Ouden et al, 2017, other target groups could also benefit from a concept like FindMyApps, for example people with intellectual disabilities, autism, psychiatric disorders or brain injuries. Further research needs to be done to fit FindMyApps also to their specific needs, wishes and functional abilities.

4.5 Conclusion

This study showed that it could be possible to learn persons with dementia to work with a tablet device and the FindMyApps Tool with support of informal caregivers making use of the errorless learning method. Generally, FindMyApps seems to be a valuable tool in the care for persons with dementia, because it makes it easy to select suitable apps for self-management and meaningful activities, which may stimulate their involvement in these activities. This hopefully will result in experiencing pleasure and enjoyment, feelings of connection and belonging and retaining a sense of autonomy and personal identity (Phinney, Chaudhurry & O'Connor, 2007) However, improvements in FindMyApps need to be made and further research must demonstrate the real effects of FindMyApps and this will be done in future RCT.

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Appendix 1

Table 14
Categories and Apps in FindMyApps

Main category	Subcategory	Sub-subcategory	Examples apps
Vrije tijd	Bewegen	Wandelen & Fietsen	Blokje om Route.nl Klompenpaden
	Spellen	Fitness & Gym	Zin van Bewegen GoliveHealth FysiOtherappy
		Bordspellen	Dammen Backgammon Free Schaken – Speel & Leer
		Sportspellen	Flick Kick Football Kickoff Hit Tennis 3
		Kaarten	Patience Solitaire
		Puzzelen	Jigzo HD Sudoku 4 plaatjes 1 woord
		Woordspellen	Woordzoeker Ultieme Galgje Spreekwoorden NL
		Overige spellen	Bubble Explode Let's Create! Pottery HD Goed Fout - Algemene Kennis
	Er op uit	Cultuur	MuseumTV OverUIT Rijksmuseum
		Uit eten	Yelp IENS de online restaurantgids Tellmewhere
		Reizen	Google Maps: Navigatie en OV Ongehinderd 9292
	Natuur	Dieren	Dierengeluiden Tuinvogels Dierenzoeker
		Planten & Bomen	Flower Garden Plantengids
		Het weer	Buienrader – weer Weeronline: weer en regenradar Buienalarm
	Media	Radio & TV	Nederland.FM NPO TVgids.nl

		Films	Willem
		Nieuws	De Telegraaf Tubantia Nieuws Blauw Bloed
		Sociale Media	Facebook Instagram
	Herinneringen ophalen	Foto's & Filmpjes	My House of Memories Dementie en Herinneringen Fotoscanner van Photomyne
		Muziek Luisteren	Dementie en Herinneringen
		Notities & Dagboek	Moment Diary ColorNote notities notitieblok
	Hobbies	Muziek maken	Perfect Piano Bloom HD
		Kunst	Kunst van de dag Google Arts & Culture MuseumTV
		Geschiedenis	Historiek – Geschiedenis Beroemde mensen – de quiz Wikipedia
		Handwerken	Glotty Breien rij Teller Cross Stitch
		Lezen & Schrijven	iBooks LuisterBieb Onze Taal
		Fotografie	Cloudina Camera Foto Bewerker door Aviary Fotoscanner van Photomyne
	Diversen	Politiek	Debat Direct Informatie Rijksoverheid Politiek Portaal Publieksapplicatie
		Religie	Kerkdienst gemist Bijbel Bidden Onderweg
In en om het huis	Agenda	Dagindeling	Clockaid Pictoplanner Dementia-App
		Medicijn herinneringen	MedAlert Clockaid Pictoplanner
	Veiligheid & Gezondheid	Ontspannen	VGZ Mindfulness Coach Natuurgeluiden
		Hulpmiddelen	GreyMatters Medipoint Zorgpro Beter Zien
		Gezondheid	Einstein Brain Trainer HD Alzheimer Assistent Thuisarts

	Huishouden	Schoonmaken	Slim Huishouden Hoe houd ik mijn kamer schoon?
		Klussen	Klussen voor beginners PRAXIS bouwmarkt
		Tuinieren	Gardroid MijnTuin.org
		Eten & Drinken	MyTaste Recepten Groente- en Fruitkalender Allerhande Koken (van AH)
		Boodschappen	MyShopi Reclamefolder ALDI Nederland
		Wonen	Wonen.nl Stek Woon & Lifestyle Magazine
Contacten	Contact op afstand		MiessAgenda Dementia-App Skype
	Hulp bij praten		iPicto DigiTaal He Hajo

Appendix 2

Interview scheme

Semi-structured interview with informal caregiver - feasibility study (experimentele groep)

(Kerkhof, Y., Veijer, M. & Kohl, G.)

Instructies: In de opmerkingen kolom kan aangegeven worden dat de mantelzorger in het geheel geen mening heeft over een bepaald item in de vragenlijst (code 9 voor onbekend of geen mening) of dat de vraag niet van toepassing is (code 8). Daarnaast dient, in het geval van een negatief antwoord, de reden voor dit negatieve antwoord uitgevraagd te worden. Dit kan eveneens in de opmerkingen kolom worden genoteerd.

(Suggestie: Voor de experimentele groep geldt dat de FindMyApps tool aanwezig is tijdens het interview. FindMyApps moet geraadpleegd kunnen worden wanneer naar zijn ontwerp en functies wordt gevraagd)

Interviewer: *In dit interview wordt uw mening gevraagd over de bruikbaarheid, de gebruiksvriendelijkheid, de leerbaarheid en het effect op het dagelijks leven van het gebruik van de tablet met de FindMyApps selectie tool. Ook willen we graag met u in gesprek over uw ervaringen met deelname aan dit onderzoek. We willen benadrukken dat we geïnteresseerd zijn in uw mening en ervaringen.*

Naam interviewer Code PwD en mantelzorger: Datum:		…… …… ……../……../……			
Algemene observaties Duur van het interview? Andere context informatie die belangrijk is?					
(B) Bruikbaarheid & (G) Gebruiksvriendelijkheid FMA		**Opmerkingen en observaties** **(8 = niet van toepassing; 9 = onbekend/geen mening; bij negatief antwoord: waarom?)**			
B1	Kunt u mij wat vertellen over uw ervaringen met FMA?				
B2	Is FindMyApps nuttig voor uw naaste?	Niet nuttig	Nuttig	Heel nuttig	
	- Zo ja, waarom wel?				
	- Zo niet, waarom niet?				
G1a	Vindt u FindMyApps gebruiksvriendelijk voor uw naaste?				
	- Zo ja, waarom wel? Welke onderdelen?				

	- Zo niet, waarom niet?					
G1b	Hoe gaat het om FindMyApps te gebruiken voor uw naaste?	Moeilijk	Een beetje moeilijk	Makkelijk		
B3	Waar helpt FindMyApps uw naaste bij?					
B4	Komt FMA tegemoet aan de persoonlijke behoeftes van uw naaste? - zo ja, waarom wel? Welke behoefte/op welk terrein? - zo niet, waarom niet?					
	- Zo ja, waarom wel? Welke behoefte/op welk terrein?					
	- Zo niet, waarom niet?					
B5	a) Hoeveel bruikbare apps heeft uw naaste gevonden in FMA?	0	1-2	3-4	5 of meer	
	b) Welke apps waren dat?					
	c) Hoe vaak heeft uw naaste deze apps gebruikt?	Meerdere keren per dag	1x per dag	Enkele keren per week	Enkele keren per maand	
	d) Waar hebben deze apps uw naaste bij ondersteund?	Omgaan met ziekte	Dagbestedin g	zelfredzaamh id	Anders	Namelijk, …..
B6	a) Hoeveel bruikbare apps heeft uw naaste elders gevonden?	0	1-2	3-4	5 of meer	

	b) Waar gevonden?					
	c) Welke apps waren dat?					
	d) Hoe vaak hebt uw naaste deze apps gebruikt?	Meerdere keren per dag	1x per dag	Enkele keren per week	Enkele keren per maand	
	e) Waar hebben deze apps uw naaste bij ondersteund?	Omgaan met ziekte	Dagbesteding	Zelfredzaamheid	Anders	Namelijk, …..
G2	a) Waren de apps gevonden in FMA gebruiksvriendelijk?					
	b) Welke wel/niet?					
	c) Waren de apps elders gevonden gebruiksvriendelijk?					
	d) Welke wel/niet?					
G3	Wat vindt u van de iconen op FMA? (PwD vindt ze (niet) leuk, PwD herkent ze. Maak opmerkingen van de meest onduidelijke/ onherkenbaare iconen[1]).					
G4	Wat vindt u van de gevoeligheid van het touchscreen op FMA?					
B7a	Hoe nuttig vindt u de persoonlijke instellingen die u (voor uw naaste) kunt doen in FMA?	Niet nuttig	Nuttig	Heel nuttig		

[1] Het is ivm tijd niet de bedoeling om alle iconen langs te lopen.

B7b	Heeft u instellingen gemist? Zo ja, welke?				
G5	Hoe ging het aanpassen van de persoonlijke instellingen voor uw naaste?	Moeilijk	Een beetje moeilijk	Makkelijk	
B8a	Hoe nuttig is de indeling in categorieën in FMA voor uw naaste?	Niet nuttig	Nuttig	Heel nuttig	
B8b	Heeft u categorieën gemist? Zo ja, welke?				
G6	Hoe ging het om te navigeren van de ene naar de andere categorie voor uw naaste?	Moeilijk	Een beetje moeilijk	Makkelijk	
B9a	Hoe nuttig is het overzicht met apps per categorie in FMA voor uw naaste?	Niet nuttig	Nuttig	Heel nuttig	
B9b	Heeft u iets gemist in het overzicht met apps per categorie? Zo ja, wat?				
G7	Hoe ging het om het overzicht met apps per categorie te bedienen voor uw naaste?	Moeilijk	Een beetje moeilijk	Makkelijk	
B10a	Hoe nuttig is de beschrijving van een app in FMA voor uw naaste?	Niet nuttig	Nuttig	Heel nuttig	
B10b	Heeft u iets gemist in de beschrijving van de app? Zo ja, wat?				
G8	Hoe ging het om de pagina met beschrijving van een app te bedienen voor uw naaste?	Moeilijk	Een beetje moeilijk	Makkelijk	
B11a	Hoe nuttig is de pagina ‘Mijn Apps’ in FMA voor uw naaste?	Niet nuttig	Nuttig	Heel nuttig	

B11b	Heeft u iets gemist op de pagina ‘Mijn Apps’? Zo ja, wat?				
G9	Hoe ging het om de pagina ‘Mijn Apps’ te bedienen voor uw naaste?	Moeilijk	Een beetje moeilijk	Makkelijk	
B12a	Hoe nuttig is de uitlegknop voor uw naaste?	Niet nuttig	Nuttig	Heel nuttig	
B12b	Heeft u informatie gemist op de uitlegknop? Zo ja, wat?				
G10	Hoe ging het om de uitlegknop te bedienen voor uw naaste?	Moeilijk	Een beetje moeilijk	Makkelijk	
G11	Waar liep u tegenaan bij het gebruiken van FMA of wat heeft het gebruik van FMA belemmerd?				
G12	Welk rapportcijfer zou u FMA geven?				
G13	Heeft u suggesties hoe FMA te verbeteren?				
G14/ F1	Wat vond u van de training die u heeft gevolgd?				
	a) Wat vond u goed?				
	b) Wat vond u minder goed?				
B13	Welke onderdelen in de training waren nuttig voor u?				
	- Waarom waren deze onderdelen nuttig?				

G15/ F2	Heeft de training u geholpen om uw naaste in het gebruik van FindMyApps en de tablet te ondersteunen?	
	- Zo ja, wat heeft u (vooral) geholpen?	
	- Zo niet, waarom heeft de training u niet geholpen?	
B14	Heeft u suggesties hoe de training verbeterd kan worden?	
B15	Wat heeft u aan dit onderzoek gehad?	
(L)	**Leerbaarheid FMA**	**Opmerkingen en observaties** **(8 = niet van toepassing; 9 = onbekend/geen mening; bij negatief antwoord: waarom?)**
L1	Hoe heeft u het begeleiden van uw naaste ervaren?	
	a) Wat vond u makkelijk?	
	b) Wat vond u moeilijk?	
	c) Wat vond u leuk?	
L2	Hoe heeft u het ervaren om de functies van FMA aan te leren aan uw naaste?	

L3	Hoe goed lukt het uw naaste om FindMyApps zelfstandig te gebruiken?	
L4	Hoe heeft u het ervaren om de functies van de tablet aan te leren aan uw naaste?	
L5	Hoe goed lukt het uw naaste om de tablet zelfstandig te gebruiken?	
L6	Waar had uw naaste precies ondersteuning bij nodig?	
L7	Heeft u suggesties om het gebruiken van en leren omgaan met FMA te vergemakkelijken?	
L8	Heeft u suggesties om het gebruiken van en leren omgaan met de tablet te vergemakkelijken?	
L9	Heeft u suggesties hoe de begeleiding vergemakkelijkt kan worden?	
(A)	**Adoptie FMA**	**Opmerkingen en observaties** **(8 = niet van toepassing; 9 = onbekend/geen mening; bij negatief antwoord: waarom?)**
A1	In hoeverre maakt FMA onderdeel uit van de dagelijkse activiteiten van uw naaste?	

A2	Denkt u dat het leven van uw naaste veranderd is, sinds hij/zij FMA gebruikt? Zo ja, kunt u enige voorbeelden geven? (omgaan met dementie, gelukkig zijn, meer/andere dagbesteding, zelfstandigheid)	
A3	In hoeverre maakt hetgeen geleerd in de training onderdeel uit van de begeleiding die u geeft aan uw naaste?	
A4	In hoeverre maakt de methode ‘foutloos leren’ onderdeel uit van de begeleiding die u geeft aan uw naaste?	

Appendix 3; Results use questionnaire

Table 15. *Mean Results Use Questionnaire per Subscale*

Subscale	Mean
Usefulness	4.6
Ease of Use	4.9
Ease of Learning	4.4
Satisfaction	4.9

Table 16. *Results Use Questionnaire (n=7)*

	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
Statements Usefulness	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
FindMyApps helps my relative be more effective.	1 (14)	1 (14)	-	-	1 (14)	4 (57)	-
FindMyApps helps my relative be more productive.	1 (14)	1 (14)	-	1 (14)	2 (29)	2 (29)	-
FindMyApps is useful.	-	-	-	-	1 (14)	5 (71)	1 (14)
FindMyApps gives my relative more control over the activities in his/her life.	1 (14)	-	-	1 (14)	2 (29)	-	3 (43)
FindMyApps makes the things my relative wants to accomplish easier to get done.	1 (14)	-	-	-	3 (43)	3 (43)	-
It saves my relative times when he/she uses FindMyApps.	1 (14)	1 (14)	-	4 (57)	1 (14)	-	-
FindMyApps meets the needs of my relative.	1 (14)	1 (14)	-	-	1 (14)	4 (57)	-
FindMyApps does everything my relative would expect it to do.	1 (14)	1 (14)	-	-	2 (29)	2 (29)	1 (14)
Statements Ease of Use							
FindMyApps is easy to use.	-	-	-	-	1 (14)	5 (71)	1 (14)
FindMyApps is simple to use.	-	-	-	1 (14)	-	5 (71)	1 (14)
FindMyApps is user friendly.	-	-	-	-	1 (14)	5 (71)	1 (14)
FindMyApps requires the fewest steps possible to accomplish what my relative wants to do with it.	-	-	-	3 (43)	1 (14)	3 (43)	-
FindMyApps is flexible.	-	1 (14)	-	1 (14)	2 (29)	3 (43)	-
Using FindMyApps is effortless.	-	-	2 (29)	1 (14)	2 (29)	2 (29)	-
My relative can use FindMyApps without written instructions.	-	-	2 (29)	3 (43)	1 (14)	1 (14)	-
My relative doesn't notice any inconsistencies as he/she uses FindMyApps.	-	1 (14)	-	3 (43)	-	2 (29)	1 (14)
Both occasional and regular users would like FindMyApps.	-	1 (14)	-	1 (14)	1 (14)	3 (43)	1 (14)
My relative can recover quickly and easily from mistakes he/she made in FindMyApps.	1 (14)	1 (14)	-	3 (43)	1 (14)	1 (14)	-
My relative can use FindMyApps successfully every time.	-	2 (29)	1 (14)	1 (14)	1 (14)	2 (29)	-
Statements Ease of Learning							
My relative learned to use FindMyApps quickly.	1 (14)	-	-	1 (14)	2 (29)	3 (43)	-
My relative easily remembers how to use FindMyApps.	1 (14)	1 (14)	2 (29)	1 (14)	1 (14)	-	-
It is easy to learn to use FindMyApps.	-	1 (14)	-	1 (14)	1 (14)	3 (43)	1 (14)
My relative quickly became skillful with FindMyApps.	-	1 (14)	-	3 (43)	2 (29)	1 (14)	-
Statements Satisfaction							
My relative is satisfied with FindMyApps.	1 (14)	1 (14)	-	-	2 (29)	2 (29)	1 (14)
My relative would recommend FindMyApps to a friend.	-	2 (29)	-	1 (14)	-	2 (29)	1 (14)
FindMyApps is fun to use.	-	-	-	-	-	6 (86)	-
FindMyApps works the way my relative wants it to work.	-	-	-	2 (29)	-	3 (43)	1 (14)
FindMyApps is wonderful.	-	-	-	-	4 (57)	2 (29)	-
My relative feels he/she needs to have FindMyApps.	-	1 (14)	-	-	3 (43)	2 (29)	-
FindMyApps is pleasant to use.	-	-	-	-	1 (14)	4 (57)	1 (14)