**Title:** Exploring the feasibility of an individual Cognitive Stimulation Therapy (iCST) application and related technology for use by people with dementia and carers in Indonesia: A mixed method study.
Abstract

Background: Cognitive Stimulation Therapy (CST) is a psychosocial intervention for people with dementia, and can benefit cognition and quality of life. A touch-screen individualised CST (iCST) application has been developed to improve on accessibility and provide increased interactivity. This study aimed to explore the attitudes of people with dementia, carers and healthcare professionals in Indonesia towards the iCST application and related technology.

Methods: Four focus groups were organised: one comprising family carers (n = 3), two comprising people with dementia and family carers (n = 12), and one made up of family carers and home care workers (n = 3). Participants discussed the uses of technology, tried out the iCST application and completed a usability and acceptability questionnaire. Furthermore, 21 healthcare professionals attended an expert meeting to discuss the potential of implementing the iCST application in the community.

Results: Attitudes towards technology were positive but lack of experience, difficulties with operating devices, and a limited infrastructure to support technology were described as barriers. The iCST application was seen as an interesting tool to support mental stimulation. Compared with people with dementia, carers were more willing to use the application and rated its usability higher. Healthcare professionals were positive about the interactive features of the application and judged that it could be useful within the family context.

Discussion: Low-cost and low-infrastructure technology like iCST can meet needs for stimulation of people with dementia in Indonesia and other countries. By understanding the attitudes of people with dementia and carers towards IT and their willingness to adopt technology like the iCST application, we are better placed to overcome potential obstacles to its implementation. It appears that systemic changes are needed to facilitate wider use of IT particularly in dementia care. These include needs to empower end users; strengthen access and connectivity to technology; and improve diagnostic support.

Keywords: Dementia, technology, application, Cognitive Stimulation Therapy, Indonesia.
Introduction

The prevalence of dementia is increasing with the ageing global population and more than two-thirds of people with dementia live in low-and-middle income countries (LMIC). One of the largest increases in the number of people with dementia is expected to take place in the Asia Pacific region with Indonesia ranking fourth after China, India, and Japan (Alzheimer’s Disease International, 2014). For Indonesia, the number of people with dementia is expected to increase fourfold from 1.2 million in 2015 to almost 4 million in 2050 (Hogervorst et al., 2011; Prince et al., 2015). Moreover, there is little information on the current health and social care services provision for people with dementia. Psychosocial interventions may be particularly useful because the costs of anti-dementia drugs are relatively high making them hard to access for many people, added to which they are unsuitable for some people with dementia due to side effects (Prince, Comas-Herrera, Knapp, Guerchet, & Karagiannidou, 2016).

Cognitive Stimulation Therapy (CST) is a psychosocial, group intervention that is effective in improving cognition and quality of life (QoL) in people with mild to moderate dementia by providing mentally stimulating and engaging activities (Spector et al., 2003). More recently, CST has been translated to Bahasa, Indonesia and is offered at several day centres in Jakarta, but it has yet to be a routinely, accessible programme. A pilot study among people with dementia in Indonesian nursing homes suggested possible cognitive improvements after attending CST groups. However, the numbers were small (N = 5) and more research is warranted (Komalasari, 2014).

An individual version of CST (iCST) is also available and is usually delivered by a carer at home. It can be effective in improving the QoL of the carer, and the quality of the relationship between the person with dementia and carer (Orrell et al., 2017). Researchers in the UK have now developed a touch-screen version of iCST, which aims to combine the benefits of CST with the potential benefits of engaging with technology (Spector et al., 2003; Xavier et al., 2014). The iCST application seems to be a promising approach for people with dementia.
dementia in Indonesia as it aims to improve accessibility to the intervention for people unable to access CST groups. In addition, as most people with dementia in Indonesia live among their family, the involvement of a carer in the iCST application may encourage intergenerational activities. The population of internet users in Indonesia is expected to boom in the next five years, reaching a penetration rate of 53%, meaning that technology will play an increasingly important part in the daily lives of the residents (Das, Gryseels, Sudhir, & Tan, 2016). However, not much is known about the application of technology in the health industry, compared to more developed countries - particularly in the care of people with dementia.

Considering the existing use of CST in Indonesia and the expected technology boom, there is a need to investigate the potential for adapting and implementing the iCST application and related technology in Indonesia. By exploring the willingness of people with dementia and carers to adopt technology, steps towards offering technology-based interventions such as the iCST application can be made in order to combat the lack of resources for the care of people with dementia in Indonesia and perhaps other LMIC.

**Aims**

This aims of this study were to explore the attitudes of people with dementia, carers, and healthcare professionals towards the iCST application, and the use and implementation of related technology in their daily lives.

**Methods**

**Sample**

People with dementia, family- and paid carers, and healthcare professionals were recruited for different parts of this study. The inclusion criteria were adapted from previous CST and iCST research (Orrell et al., 2017; Spector et al., 2003). People with dementia needed to (1) have a formal diagnosis of dementia, (2) have some ability to communicate and understand the research (e.g. ability to give informed consent), (3) see/hear well enough to participate,
(4) have a minimum age of 50 years with no maximum age limit, (5) and have a carer (or friend/befriender) available to participate in the research activities. For family- and paid carers, and healthcare professionals the criteria included (1) a minimum age of 21 years, (2) see/hear well enough to participate, and (3) sufficient experience of working in the field of dementia for healthcare professionals only. Family carers were related to the person with dementia such as a spouse or child. Paid carers consisted of care workers who provided professional, in-home care to people with dementia living in the community. We aimed to recruit healthcare professionals from a diverse range of backgrounds who could help us to better understand the feasibility of implementing the iCST application in Indonesia, and how this could fit in the current dementia care system. We therefore recruited professionals working in clinical care such as medical doctors and nurses, social care such as care home- or social workers, and academia.

People with dementia and carers were recruited as familial dyads through the Indonesian Alzheimer’s associations in Jakarta and Depok (Alzheimer Indonesia). The research team advertised the study through leaflets and promoted it during Alzheimer Indonesia events for people with dementia and carers. People expressed their interest in the study through approaching and/or contacting the research team directly. They were then provided with separate information sheets for the person with dementia and the carer. Alzheimer Indonesia also supported the recruitment of healthcare professionals through distributing leaflets to their list of contacts.

**Study design**

This was an exploratory, mixed method study, which took place in Jakarta and Depok, Indonesia. Methods consisted of focus group discussions with people with dementia and carers followed by a short testing session of the iCST application and an expert meeting with healthcare professionals. These methods were used to gather diverse and in-depth data regarding the attitudes of people with dementia and carers towards the use of technology in daily life with the iCST application serving as an example of such technology. A discussion
guide was developed by the researcher (HR) which included semi-structured questions to explore key areas related to the different uses for technology and its usefulness for people with dementia.

The expert meeting was organised with professionals working in the field of dementia to gather their views on how technology can be used in dementia care, and on the feasibility of adapting and implementing the iCST application in Indonesia. Aguirre, Spector, and Orrell (2014) recommend the early inclusion of health care workers such as psychologists, social workers, and local health workers in the adaptation process of CST. Their knowledge and experience of working with people with dementia in their cultural context helps to uncover potential cultural barriers for adaptation and their feedback can be useful in making the necessary changes to the intervention (Aguirre et al., 2014).

**Intervention – iCST application**

The intervention was a third version of the iCST application prototype, developed at the University of Nottingham in the United Kingdom and in collaboration with Eumedianet in the Netherlands. The application follows the content and principles of paper-based iCST and is intended to be used by the person with dementia and carer together (Orrell et al., 2017). The (third prototype) version used included a welcome section and the full range of 21 activities in English including interactive word-, picture, and number games as well as discussion activities (Table 1). Each activity comes with a choice between two levels with more challenging and in-depth content provided in level two. Considering the differences in cultural contexts, a sub-set of activities with a focus on interactivity and culturally relevant content was presented to the participants. These activities included Food and Sounds (Figure 1).

**Table 1.** List of iCST application activities.

<table>
<thead>
<tr>
<th>Activity name</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sounds</td>
<td>Past Events</td>
<td>Being Creative</td>
</tr>
<tr>
<td>Spaceman</td>
<td>Odd One Out</td>
<td>The Price is Right</td>
</tr>
</tbody>
</table>
Procedure

All study related documents were translated from English to Bahasa Indonesia by the research team before any research activities took place.

Focus groups
Four focus groups were organised: two mixed groups with people with dementia and family carers (n = 12), one with family carers only (n = 3), and one other with both family carers and home care workers (n = 3). Different types of focus groups were organised in order to gain more diverse perspectives and therefore increase the richness of the data (Morgan, 1996). Participants completed a short demographics form prior to the focus group discussion. Three researchers (HR, PT, IT) and one student were present at each group. Two researchers (HR, PT) facilitated the discussion while a student made notes, written observations, and provided translations where necessary. One researcher (IT) provided assistance with any practical needs of the participants. Each focus group lasted approximately 30-45 minutes followed by a 20-minute try-out with the iCST application in pairs. During the introduction, a brief explanation was given about the application. Hereafter, one touch-screen tablet was given to each pair with the application already open and presented on the screen. Given that the activities were in English, activities were trialled at level one and there were a minimum of three facilitators present who spoke both Bahasa Indonesia and English in order to provide translations to the participants. Support and guidance from the researchers was given as participants made their way through each activity. Detailed notes and written observations were made during the session.

The focus group discussions were audio recorded, transcribed, and translated from Bahasa Indonesia to English. The transcripts were anonymized and stored on a password protected computer at Atma Jaya Catholic University.

Usability and Acceptability Questionnaire

Participants of the focus groups were invited to complete the Usability and Acceptability Questionnaire for older people (translated from Spanish) in order to gain more standardised feedback regarding the iCST application in particular (Castilla et al., 2018). This questionnaire is a ten-item measure used to identify user opinions on perceived ease-of-use, confidence and control whilst using an application. Responses range from strongly disagree (0) to strongly agree (4) on all items.
Expert meeting

The expert meeting was organised with professionals working in the field of dementia (n = 21). One researcher (HR) gave a brief introductory presentation covering the purpose of the day, technology for people with dementia, and the iCST application, and led the subsequent discussion. Another researcher (TS) provided support for simultaneous translation from English to Bahasa Indonesia. Findings from the focus group discussions with people with dementia and carers were also shared. This was followed by a structured group discussion on key topics set in advance by the research team. Topics included current experience with technology in dementia care, potential uses for technology, any limitations, and the feasibility of the iCST application. Data was not audio-recorded but detailed notes of the emerging thoughts and ideas were taken throughout the group discussion by two undergraduate medical students from Atma Jaya Catholic University.

Ethical approval

Ethical approval was obtained through the Division of Psychiatry and Applied Psychology Ethics Committee at the University of Nottingham in March 2019 (reference number 0280). For the focus groups, a researcher explained the purpose of the research on the day of the event and written informed consent was obtained from each participant hereafter. Wherever necessary, the carer sat with the person with dementia during the consenting process. Each consent form was checked by a researcher to ensure it was completed in full. Verbal informed consent was given at the expert meeting. Those involved were stakeholders and not research participants and no personal data was collected. The purpose of the meeting was to gain insights in the group’s views rather than the view of an individual.

Analysis

The data from the focus groups was coded and analysed thematically using NVivo software by two researchers (HR, VP). The data was analysed independently to ensure reliability of the analysis. An inductive approach was chosen as it allows for the analysis to be driven by
the data leading to the generation of new ideas and themes rather than testing a preconceived theory (Thomas, 2006). This approach was best suited for the current study as the aim was to gather exploratory data on the views and opinions of participants on using the iCST application and related technology in daily life. The approach included detailed readings and interpretation of the raw data in the transcripts. The objectives of the study served as key domains for investigation and helped guide the coding and process of analysis. Observational notes were reviewed to support the analysis and provide clarifications.

**Results**

The sample included 18 participants: six people with dementia and 12 carers (Table 2). The sample was mostly made up of female participants and included a mix of spousal and adult child caring dyads. In addition, all participants except for one person with dementia had some experience with using technology in their daily lives ranging from assistive technology such as mobile phones to touch-screen apps such as YouTube or WhatsApp to support activities in daily living. More details on the exact usage are included in the thematic analyses below.

**Table 2.** Demographics of people with dementia and carers in the focus groups.

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Person with dementia (n = 6)</th>
<th>Carers (n = 12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>Female</td>
</tr>
<tr>
<td>Age</td>
<td>Mean age (years)</td>
<td>74.5 (SD = 8.41, range 60 - 83)</td>
</tr>
<tr>
<td>Living status of person with dementia</td>
<td>Person lives with family 5 (83.3)</td>
<td>Person lives alone 1 (16.7)</td>
</tr>
<tr>
<td>Relationship</td>
<td>Spouse</td>
<td>3 (25)</td>
</tr>
<tr>
<td></td>
<td>Child</td>
<td>5 (41.7)</td>
</tr>
<tr>
<td></td>
<td>Neighbour</td>
<td>2 (16.7)</td>
</tr>
<tr>
<td></td>
<td>Home care worker</td>
<td>2 (16.7)</td>
</tr>
</tbody>
</table>
Thematic analysis of the data led to the formation of three main themes (perceptions of technology, using technology to support daily life, and technology for mental stimulation and interaction), and three subthemes.

**Theme 1 – Perceptions of technology**

Due to the advancement of technology in Indonesia, use of technology in all forms is quickly becoming more widespread in both urban and rural areas. Most participants had a positive attitude towards technology to support activities in their daily life. Carers found this kind of technology to be very helpful and beneficial for themselves, and also for people with dementia:

*At the end of the day, I see that technology helps them.* – Family carer, Focus group 2.

Although they also agreed that people should not solely rely on technology as the interaction between people is an important aspect:

*For me, how advanced the technology is, there should be a human touch. The purpose of the technology is to help us. (...) At the end of the day, the human touch and affection is more effective than screen touch.* – Family carer, Focus group 1.

When asked how they perceived technology in general, most people with dementia responded by saying that technology makes them feel happy.

**Theme 2 – Using technology to support daily life**

*Perceived benefits of using technology*

Participants described a range of different benefits for the usage of technology of which communication was mentioned most often. Others mentioned using technology for religious
purposes in order to listen to prayer, which could help to remedy tense moments between
the person with dementia and carer.

*For me it is easy to contact my children who live abroad for 3 years. So, if I don't have a*
*mobile phone it will be very hard. With that, I can make a video call and see my children and*
*grandchildren's faces.* – Person with dementia, Focus group 3.

A carer mentioned she uses it to access information about Alzheimer's disease. Information
sharing was further reflected upon by a person with dementia:

*I have a group of ex co-workers from the office (on WhatsApp) and there are many*
*members, so we share information or news such as health articles.* – Person with dementia,
Focus group 3.

*Yes, and I love to read regarding health. I spend my time reading rather than just sleeping. I*
*do not feel comfortable if I do nothing’* – Person with dementia, Focus Group 2.

Some carers mentioned they did not use technology specifically in their interactions or care
for people with dementia. However, one carer used technology to look at pictures together
and to play games. Another carer valued the use of YouTube:

*For me, I like Youtube because I can find everything there, such as my favourite art and*
*craft. I will find the tutorial or other creative video that I can use as an activity for my mother.*
*For now, it is very important and I cannot live without it.* – Family carer, Focus group 4.

Other beneficial uses for technology included transportation and shopping e.g. ordering
groceries. In terms of platforms, the majority used smartphones or another type of mobile
phone, and some additionally used computers. Use of a touch-screen tablet was less
popular especially among the older participants.

*Barriers*
Participants also felt like there were several challenges and barriers towards using technology. Some of these could be explained through a lack of experience with technology even prior to receiving the diagnosis of dementia or challenges related to operating systems:

*Before (being) diagnosed with dementia, my mother always refused to use gadgets. We try to convince her to use mobile phone, but she did not want it. So, since then she rarely used technology and even now, when she has dementia, she never wants to use it.* – Family carer, Focus Group 1

*Oh, sometimes when I want to type something, a different letter pops out. So I have to erase all and start again.* – Person with dementia, Focus Group 3

Visual impairments such as poor eyesight were also mentioned as making it more difficult to use technology. Other concerns included privacy and safety:

*For me the negative side is … because the information can be accessed easily by everybody, we have difficulties in differentiating between true information and hoax.* – Home care worker, Focus Group 4

**Need of support**

Both people with dementia and carers acknowledged the need of support when using technology in daily life. This was especially the case for people with dementia and older carers. Participants most frequently reached out to either their children or grandchildren as they were considered to be more ‘technology savvy’:

*No, I go upstairs and ask help from my grandchildren. They are expert on this. I try to ask for help first rather than switch off.* – Person with dementia, Focus group 3.

Others mentioned reaching out to friends and one carer reached out to her younger co-workers for support. Some did not reach out for support in case of difficulties with technology but rather tried to find a solution themselves or would switch the piece of technology off if the problem persisted.
Theme 3 – Technology for mental stimulation and interaction

Family carers in particular valued mental stimulation for the person they were caring for and expressed a need for more resources:

*However, at the end the stimulation is very important because it can be a habit if we do it repeatedly.* – Family carer, Focus group 2.

*I want to know what we as a caregiver can do for our person with dementia, such as a game, to stimulate their brain so they can interact, play and communicate more.* – Family carer, Focus group 4.

One carer wanted more resources to keep her husband’s brain active and felt she was relying too much on medication. Others expressed already taking part in some mentally stimulating activities such as doing crosswords or discussing the news on TV. One person with dementia reflected on the use of music to promote mental stimulation and interaction with others:

*Or we can interact through music. Through memorising the lyrics, our brain can be stimulated as well. We can memorise songs from different areas: Java, Sunda, Padang, Betawi.* – Person with dementia, Focus group 3.

When asked about using something like the iCST application for both mental stimulation and interaction, participants responded positively:

*That would be great if there is an application like that, because that is what we need. Sometimes it is difficult to find an activity that can be done together. In my case, since my husband is bored easily, it is difficult to interact. So, I’m happy if there is an application that can foster interaction together.* – Family carer, Focus group 1.

Some carers mentioned that such an application would be most helpful in the early stages of dementia and would need to be fully adapted to the Indonesian cultural context in order for people to be able to use it, and the involvement of a relative or friend in using the application is necessary as it would make the experience more useful but also more meaningful.
Usability and Acceptability Questionnaire

Table 3 contains the usability and acceptability ratings of the iCST application as given by 17 participants of the focus groups. Carers gave uniformly high ratings to each aspect of the application but ratings by people with dementia were more dispersed. For example, carers found the application useful and were also more willing to use the application frequently. Most people with dementia found the instructions easy and agreed that the application could be used in multiple contexts however, there was no strong consensus in other areas including suitability of font and button size, and usefulness of the application. Both people with dementia and carers indicated they knew what to do at all times while using the application but people with dementia felt less confident about their ability to do so. This suggests people with dementia may need more support and encouragement to use new technology.

Table 3. Results from the Usability and Acceptability Questionnaire.

<table>
<thead>
<tr>
<th>Questionnaire item</th>
<th>People with dementia (n = 6)</th>
<th>Carer (n = 11)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% agree or strongly agree</td>
<td>% agree or strongly agree</td>
</tr>
<tr>
<td>1. I think most people could learn very quickly how to use Thinkability.</td>
<td>50</td>
<td>91</td>
</tr>
<tr>
<td>2. I felt confident about my ability to use Thinkability.</td>
<td>33</td>
<td>91</td>
</tr>
<tr>
<td>3. Overall, I knew what to do at all times.</td>
<td>83</td>
<td>91</td>
</tr>
<tr>
<td>4. Once I had learned to use Thinkability, I could perform tasks quickly.</td>
<td>17</td>
<td>100</td>
</tr>
<tr>
<td>5. Thinkability can be used anywhere and in any context.</td>
<td>67</td>
<td>91</td>
</tr>
<tr>
<td>6. The instructions in Thinkability are easy.</td>
<td>67</td>
<td>91</td>
</tr>
<tr>
<td>7. The font and button sizes are sufficient for me.</td>
<td>50</td>
<td>64</td>
</tr>
<tr>
<td>8. I would like to use Thinkability frequently.</td>
<td>67</td>
<td>91</td>
</tr>
<tr>
<td>9. Overall, I think Thinkability is very useful to me.</td>
<td>50</td>
<td>91</td>
</tr>
<tr>
<td>10. Overall, I think Thinkability is easy to use.</td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>
While using the application, observations showed that carers were able to lead the activities on the app, and the interactive features and content seemed to support engagement among people with dementia leading to conversations among the dyads. Participants reflected on the content of the Sounds and Food activities and how these could be adapted for the Indonesian version of the application. A carer mentioned different Indonesian musical instruments whereas a person with dementia talked about different Indonesian dishes or ingredients useful for the Foods activity such as rice or tempe (a soy-based food).

**Expert meeting**

The expert meeting was attended by 21 healthcare professionals: seven nurses, six social workers, three medical doctors, two care home staff members, one psychologist, one community leader, and one researcher. Their experience working in dementia care ranged from two months to 33 years. When asked about experiences with technology in dementia care, various tools were mentioned such as a community-based tracking application to report missing people but also technology in the workplace such as electronic patient systems. However, only one person described how she used technology together with people with dementia to promote communication through video calls with family members, stating that this often helped to reduce anxiety:

*It is quite helpful for people with dementia. For example when they are missing their family, we can play a video from the family.*

All professionals mentioned multiple barriers in the implementation of technology for people with dementia. On a structural level, someone shared that the health and social sectors are currently not integrated in Indonesia. This leads to a lack of clarity on which sector should support people with dementia in their care and needs. In addition, due to a lack of awareness of dementia in Indonesia, some professionals emphasized a need for technology to support the diagnostic and screening process of people with dementia rather
than technology for post-diagnostic support. Other barriers included practical issues, such as access to a stable Internet connection for data, and the relative lack of development of technology in Indonesia especially in more rural areas. This was seen as an important issue because older people in retirement from work may move out of the city to more rural areas. This may mean that they have poor access to the Internet compared to more developed areas such as Jakarta. Another person mentioned that residents at her nursing home were often unfamiliar with technology, which she said was because residents often came from lower socio-economic backgrounds.

Professionals shared some insights on how to overcome some of these barriers. For instance, like in the iCST application, combining technology with face-to-face interaction could be helpful. There was a consensus that it would be good to involve members of the family in the use of technology for people with dementia to provide support whenever needed:

*In Indonesia it is better to combine technology and face-to-face (approaches). For example, a family support programme, the support comes from family of the older person who can already use apps.*

This would include the younger generation as they often take care of their grandparents and tend to be more ‘technology-savvy’. When discussing the benefits of offering CST on a computerised platform, one person mentioned:

*There is a benefit of that: it is more standardized, and can be done earlier/quicker without much training. But the carer would still need guidance in its use (of the iCST application).*

With regard to the iCST application in particular, professionals felt it could be useful as it includes various audio-visual stimuli, which may be interesting for people with dementia. However, the content would need local adaptation to the individual Indonesian contexts, and people with dementia would need to be involved in this process.

Professionals also felt that the following measures would need to be in place for successful implementation of the application: electricity, access to internet connection and
appropriate devices, and adoption in current policy. Finally, a range of stakeholders would need to be informed about the application including caregivers, family members, physiotherapists, occupational therapists, and other medical professionals in order to promote awareness.

**Discussion**

This is the first study in Indonesia to explore the attitudes of people with dementia, carers, and healthcare professionals towards the use and implementation of technology to support daily life and dementia care. While this study set out to focus on the iCST application in particular within the context of using technology in daily life, our findings more generally reflected views on technology as whole. Therefore, some of the findings regarding the perceived impact of the iCST application could not be entirely differentiated from the perceived impact of using technology in general. Carers described a need for additional resources to keep the brain active and welcomed the idea of an application for the mental stimulation and interaction of people with dementia. Healthcare professionals reflected on structural and practical barriers, which currently prevent the implementation of technology-based interventions for people with dementia, such as the iCST application, and shared ideas on how to overcome these.

**Perceptions of technology**

All participants had a positive attitude towards technology. Carers were especially positive about how it can be beneficial to themselves and the person they were caring for but also pointed out that technology should support the interaction between people with dementia and carers rather than replace it. People with dementia provided less elaboration than carers and said that using technology makes them feel happy. This is in line with a previous review which found that people with dementia valued being able to use technology for fun and for more enjoyable activities (van Boekel, Wouters, Grimberg, van der Meer, & Luijkx, 2019). The review also found that healthcare professionals such as GPs had concerns about the loss of face-to-face interactions due to technology (van Boekel et al., 2019). In this study,
similar concerns were voiced by family carers. The findings from this study are also consistent with the UK qualitative evaluation of iCST application which found that people with dementia and carers welcomed the idea of using such technology together and found it to be enjoyable (Rai, Griffiths, Yates, Schneider, & Orrell, 2020). Healthcare professionals in Indonesia were receptive to implementing technology within dementia care but were more concerned about the need for technology to strengthen the diagnostic process of dementia rather than providing post-diagnostic support. (van Boekel et al., 2019) have validated two short cognitive screening tests in rural Java which can be used for a diagnosis of dementia. In terms of technology, the study also included an in-depth examination of different types of dementia using a computerised post-mortem assessment tool. This could further support an accurate representation of dementia rates and the accompanying sub-types in Indonesia (van Boekel et al., 2019).

Using technology in daily life

All participants used technology in some way in their daily lives and found it to be beneficial. Uses ranged from communication and transportation to leisure such as listening to music or watching videos. Few had experience of using technology in dementia care. Despite having positive attitudes towards technology, participants also encountered a range of barriers towards its use including reluctance to use technology, physical limitations, lack of familiarity with technology, limited accessibility, and current organisation of dementia care. Carers stated that the people they were caring for were at times unwilling to use technology. This was supported by people with dementia but they identified additional barriers related to difficulties with operating technology. These included physical limitations (e.g. visual impairments) or lack of familiarity with technology of which the latter was also identified by healthcare professionals. A scoping review largely identified similar barriers while operating touch-screen tablets in particular. These included physical accessibility, privacy issues, and technical problems (Nygard & Starkhammar, 2007). Privacy issues were also voiced by a home care worker in this study. In addition, previous research found similar
results where people with dementia who lived alone in Sweden, stated they had difficulties with operating different kinds of technology (e.g. alarm clocks, computers) (Nygard & Starkhammar, 2007). Healthcare professionals discussed some structural barriers such as the organisation of dementia care, and limited accessibility problems due to poor Internet networks and older people living in more remote areas. Lastly, inadequate knowledge and understanding of the potential of technology can be an additional problem (Nygard & Starkhammar, 2007). Peer support could be a possible solution to promote a better understanding of how to use technology among the older age group. Previous research recommends creating opportunities for peer-to-peer learning in specific locations, such as libraries or cafes, in order to share experiences and information regarding digital health, internet sites, and technology in general as this is how regular technology use could potentially be maintained (Marston, Genoe, Freeman, Kulczycki, & Musselwhite, 2019).

All participants in this study agreed that it would be best to use technology, which has been designed for people with dementia, together with family members. Most people with dementia and carers already involved family members or friends when using technology. Professionals from the expert meeting found that this, and especially the involvement of the younger generation, could help overcome some of the barriers mentioned before. In addition, more than 51% percent of the older population in Indonesia has less than 6 years of formal education and the additional support from a family member or friend could help them to better navigate the iCST application (Maylasari, Sulistyowati, Ramadani, & Annisa, 2017). This involvement could be helpful for the successful implementation of resources such as the iCST application, which are meant to be used together.

**Technology for mental stimulation and interaction**

A previous systematic review has shown that computerised cognitive interventions can have moderate, positive effects on the cognition of people with dementia (Garcia-Casal et al., 2017). The availability of such resources could be helpful as some carers in this study described a need for alternatives to medication to help keep the brain of people with
dementia active. This indicates the importance of mental stimulation, which was a common theme in previous paper-based iCST research (Yates, Orrell, Spector, & Orgeta, 2015). Especially when discussing the potential of technology, carers were keen on using something like the iCST application. This is supported by the findings from the Usability and Acceptability questionnaire as almost all carers gave high ratings to the usefulness of the iCST application and indicated they would like to use it frequently. People with dementia rated the iCST application slightly lower possibly explained by the barriers to using technology such as limited familiarity or overall difficulty with operating devices. However, people with dementia were keen to try-out the iCST application, were engaged while using it, and liked to use technology to make themselves feel happy and for other leisure activities. This indicates that the iCST application could be a welcome resource for people with dementia. Healthcare professionals were positive about the interactive features of the iCST application. To implement the iCST application successfully, it would need to be carefully adapted to the cultural contexts of various users and there would need to be awareness among not only people with dementia and carers, but also healthcare professionals so they could recommend use of the application.

Limitations and strengths

Our sample included few participants who regularly used technology specifically designed for people with dementia. Therefore, the majority of participants were unfamiliar with such technology and at times, facilitators had to provide more support and examples to guide the discussion. This led to a more structured discussion than anticipated.

More carers than people with dementia participated in this study, which reflects low and often delayed diagnosis rates. Therefore, it can be difficult to recruit people with dementia for research as they may lack capacity by the time they are diagnosed, making participation more challenging. At times in this study, people with dementia did not fully participate in the discussion and required lots of support from their carers. These factors may have limited the richness of the data.
There were limited activities that participants could try-out due to differing cultural contexts and language barriers. Therefore, participants were not able to comment on the full application. The presence of multiple bilingual facilitators did help to remedy some of the cultural barriers.

The strengths of this study lie in the in-depth data from a variety of participants. This is reinforced by observations and a usability and acceptability questionnaire. Combining research methods can help to confirm findings across the methods but more importantly, provide complementary data (Small, 2011). By including a diverse sample of people with dementia, carers, and healthcare professionals, we were able to gather a variety of opinions and a well-rounded view on the iCST application and technology for people with dementia in general. It also helped to uncover more structural barriers towards implementation from the perspective of healthcare professionals with experience in the field. The sample included a mix of spousal and adult child caring dyads and therefore, carers were included from a wide age range with different levels of familiarity with technology. Lastly, the focus groups were organised in different parts of Java, Indonesia and included both an urban (Jakarta) and rural area (Depok). This further improved the richness of the data by including a more diverse population and allowed participants with different backgrounds to share their ideas and opinions.

Implications for future research

Overall, more research in the area of technology for people with dementia is needed to better understand its potential in Indonesia and to develop the evidence-base. People with dementia mentioned a few barriers towards using technology including visual impairments. Technology in itself is well placed to support people experiencing such disabilities through specific features e.g. voice-overs, personalised design, and the option to enlarge text and images. Future research could include the development and piloting of technology-based interventions tailored to the needs of the Indonesian population e.g. mental stimulation applications which can be used on mobile devices.
Considering that group CST is already being used on a small scale in Indonesia and the need for additional resources for mental stimulation and interaction, there may be some potential for the iCST application to be implemented as well. Future research activities could include stakeholder workshops to better understand how the content can be adapted to the various Indonesia cultural contexts. However, access to and awareness of available technology will need to be improved across the country, and the dementia care system should be strengthened. Indonesia is already taking steps towards this by launching its National Dementia Plan in 2016. It includes key aspects such as awareness, access to information and quality services, strengthening human resources and overall system – infrastructure, and supporting research on cognitive and dementia issues. Through this plan and the continued work of Alzheimer Indonesia, which includes awareness raising and capacity building, there will be an opportunity to adapt the iCST application to the cultural contexts in Indonesia and to implement it successfully in the future.

**Conclusion**

This is the first study in a LMIC to investigate the attitudes of people with dementia, carers, and healthcare professionals towards the iCST application, and the use and implementation of related technology in their daily lives. Most participants were positive about the use of technology and shared various beneficial uses such as communication and other leisure activities. Some barriers included difficulties with operating the devices, lack of familiarity with technology, limited accessibility and overall readiness for technology adoption in Indonesia. Participants acknowledged the need for support when using technology which could help remedy some of the challenges.

There is a need for more resources developed specifically for people with dementia which provide mental stimulation and promote social interaction. The iCST application was viewed as a useful tool for this by carers in particular who also rated it well in terms of usability and acceptability. People with dementia were engaged while using the iCST application but found it more difficult to use without support. In addition to improving the
awareness of dementia and technology, there is a need to consider the various cultures across Indonesia and adapt the iCST application using the existing CST adaptation guidelines.
References


