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## ORIGINAL PRACTICE DEVELOPMENT AND RESEARCH

### Experiences of older adults and undergraduate students in co-creating age-friendly services in an educational living lab

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#### Abstract

*Background:* One of the purposes of an undergraduate programme in gerontology is to facilitate future professionals' development of co-creation competences. A newly designed living lab serves as a powerful learning environment, where students and older adults can work together in creating age-friendly services and products.

*Aim:* The aim of this study is to gain insight into the shared experiences of older adults and students in co-creating age-friendly services in an educational living lab.

*Methods:* The living lab and subsequently the research was informed by appreciative inquiry. The study has a qualitative, explorative and multistage design, with a six-stage alternating process of data collection and analysis. Data were collected from six individual interviews (three older adults and three students) followed by two group interviews with two other older adults and four other students. Data analysis resulted in a shared story of working together in the living lab.

*Findings:* The co-creation experiences of older adults and students are highlighted in a rich and meaningful narrative. A shared narrative has been constructed from both perspectives, older adults and students. There are three central themes: working together, our learning experiences and our best experience. This rich and meaningful narrative stresses the importance of building a relationship to foster co-creation and uncertainty as beneficial to equality and shared responsibility.

*Conclusion:* Co-creation in an educational context is meaningful to older adults and students. Appreciative inquiry in both the research and practice of the living lab can facilitate relationship equality, which is highly valued by participants.

*Implications for practice:*

- A co-creation approach in a living lab results in experiences of equality for both students and older adults
- Successful co-creation relies on investment in time and energy, and allowance of uncertainty
- Older adults bring valuable skills and expertise into age-friendly service design, challenging ageist assumptions

**Keywords:** Co-creation, living lab, older adults, undergraduate students, emotional touchpoints, appreciative inquiry

## Introduction

In today's ageing society, a growing number of older adults are critical and participatory consumers of services and products. Being active contributors and engagers is important to older adults, according to Barnett and Dean's (2012) Good Lives concept, which lists six features: being unique; being in control; being optimistic; belonging; contribution and engagement; and being healthy. In different fields, including public decision making (Michels, 2012), innovation (Dervojeda et al., 2014), service design (Oertzen et al., 2018) and science (Eitzel et al., 2017; Buffel, 2018), involvement of citizens is acknowledged as an important component for a democratic society, and for better, more sustainable products and services. All these types of active involvement and participation involve co-creation. Co-creation offers a promising approach to increase adults' involvement in design and can give designers more specific insights into and from end-users (Davidson and Jensen, 2013; Voorberg et al., 2014). Studies show co-creation can determine the success of new products (Ngugi et al., 2010; Sulhaini and Sulaimiah, 2017). There is currently no consensus about the definition of co-creation (Ramasmawmy and Ozcan, 2018); in general, it means a creation, or an enactment, of a product, process or service in interaction with others. This article's authors consider co-creation both as a value and as an element of practice development. As a value, co-creation acknowledges the unique and necessary contribution of older adults as active citizens and the contribution of professionals in the design of tailor-made services and products (Jukema et al., 2017). In practice, it involves methods and techniques, as well as the skills and attitudes of all the participants. Leminem and colleagues (2012) suggest that co-creation requires a working environment that is conducive to the contributions of professionals and of users – in this case older adults – in an attuned way. However, not much is known about the exact expertise and skills that professionals need to facilitate groups of older adults in developing and innovating different types of age-friendly services and products (Yi and Gong, 2013). Various studies underpin the complexity of co-creation, stressing the need for expertise and skills for professionals to facilitate older adults' involvement (Dewar, 2005; Escobar et al., 2014).

## Living lab in an undergraduate programme and appreciative inquiry

Given the complexity of co-creation, the foundation for the development of the required competences should be offered by undergraduate courses in different fields, such as health studies, social work, business and engineering. This is particularly relevant to undergraduate courses in gerontology that aim to educate future professionals in the field of developing age-friendly services (Schoenmakers and Harps-Timmerman, 2017). Two Dutch universities run such a course, which addresses five core competences: development and implementation of age-friendly services; applying knowledge of the ageing process; co-creation, connecting and cooperating; identifying and utilising opportunities; and professionalisation. As co-creation is one of these core elements, courses are needed that facilitate students' development in this domain. Therefore, faculty members from the department of applied gerontology at Windesheim University of Applied Sciences (AB, JJ) designed a powerful learning environment called living lab, based on learning and innovation principles from appreciative inquiry (Cooperrider and Whitney, 2005). In an educational setting, a living lab enables different stakeholders, including students, to learn how to work on user-driven innovation (Liedtjke et al., 2012). In general, a living lab aims to develop and create high-quality, creative innovations that answer the needs and aspirations of a particular group of end-users. The approach here builds on principles such as openness, continuity, realism and spontaneity (Bergvall-Kåreborn and Ståhlbröst, 2009). Although the concept of living labs in an educational setting is not new, Leminem et al. (2012) note that a user- or enabler-driven living lab, instead of a utiliser-driven living lab, in an educational setting is rather uncommon (utilisers in this context are described as companies that launch and promote living labs to develop their businesses). In this particular living lab – developed by the faculty in close collaboration with a retired faculty member from the social work programme – students, older adults, service providers, researchers, healthcare organisations and members of local businesses work together in the design and eventually in the realisation of age-friendly services. The aim of this living lab is twofold:

- To facilitate students' development of the core competences of the applied gerontology programme
- To develop knowledge on meaning and impact of this learning environment for students and older adults (Veerman et al., 2017)

This living lab is located in a particular neighbourhood (c.12,500 inhabitants) in a Dutch town with a population of around 125,000. Together, 30 second-year applied gerontology undergraduates, three lecturers and 20 older adults developed and realised tailor-made services and products. Mixed teams of two students and one or two older adults worked during one academic year for about eight hours per week on a number of projects aimed at enhancing the quality of older adults' life. Students took different roles, such as project leader, data collector and analyst, and presenter. The teams, and in particular the students, received support and guidance from their assigned lecturer. A main responsibility of the students was to sustain the process of co-creation. Older adults acted as providers of insights, networkers and, in some cases, mentors and trainers. The collaborative work of students and older adults was guided through four successive projects or assignments, two projects per semester, during one academic year (Jukema et al., 2017). In the first semester, project 1 involved jointly mapping out the good life of a particular older adult in the neighbourhood, while the main focus of project 2 was to develop a policy proposal relating to two chosen themes. In the second semester, project 3 emphasised the co-creation of adjustments in existing services for older adults with similar needs and wishes; project 4 consisted of a collaboration with students from other departments, such as engineering and technology to build tailor-made services and products. The four projects served equally as four student assignments. Among the products to emerge from these projects were a boardgame to get to know each other, and a historical walking trail where older persons can teach children about the history of their own village.

Appreciative inquiry (Cooperrider and Whitney, 2005) served as the general approach for these projects; this approach to participatory research explores what works well and what matters to each of us (Dewar et al., 2016; Sharp et al., 2018). The key principles of a living lab approach are applied research and innovation based on co-creation, real world context and impact, partnerships and user involvement. These align well with principles of appreciative inquiry, which include doing research with rather than on others, acknowledgment that we are all experts of our own experience, with positive framing and inquiry as intervention. This is a suitable approach to interviews in which both students and older people can explore together what has worked well and what mattered. It also provides an appropriate methodology as the inquiry explores possible outcomes (Dewar et al., 2016; Sharp et al., 2018). Moreover, the fundamentals of appreciative inquiry help engage all participants in co-creation by enhancing the feeling of personal agency and risk-taking (Sharp et al., 2016). A descriptive study shows how this living lab nurtures student's intrinsic motivation to co-create (Jukema et al., 2017).

## **Aims**

Exploring the experiences of older adults and students when they are acting as co-creators can increase understanding of what facilitates or hinders co-creation, and what its value can be in an educational context. This knowledge is necessary for the further educational development of the living lab, and clarification of its role in educating future professionals in a valid and meaningful way. Therefore, the aim of this study was to gain insight into the experiences of older adults and undergraduate students working together in co-creation. The main research question was: 'What are the experiences of older adults and undergraduate students in co-creating age-friendly services or products?'

## **Method**

### ***Design***

An explorative, qualitative, multistage design was used. To be consistent with the context of this qualitative research, principles of appreciative inquiry and constructivism in the living lab were also used to gain insight into the experiences of all the participants simultaneously (Cooperrider and Whitney, 2005). Our group of researchers, students and older adults aimed to capture the enriched story of older adults' and students' experiences as co-creators. They progressed through several steps of collaborative data collection and analysis to achieve this purpose.

**Participants**

All the students and older adults of the living lab were invited to participate in this research. In the case of the group interviews, six participants were needed for each group in order to provide in-depth discussion and diversity of perceptions (Krueger and Casey, 2014). Six participants were also needed for the individual interviews, in accordance with guidelines for determining sample sizes in qualitative research and pragmatic factors such as the time and resources available (Guest et al., 2006; Malterud et al., 2016). Recruitment stopped when the desired number of participants was reached.

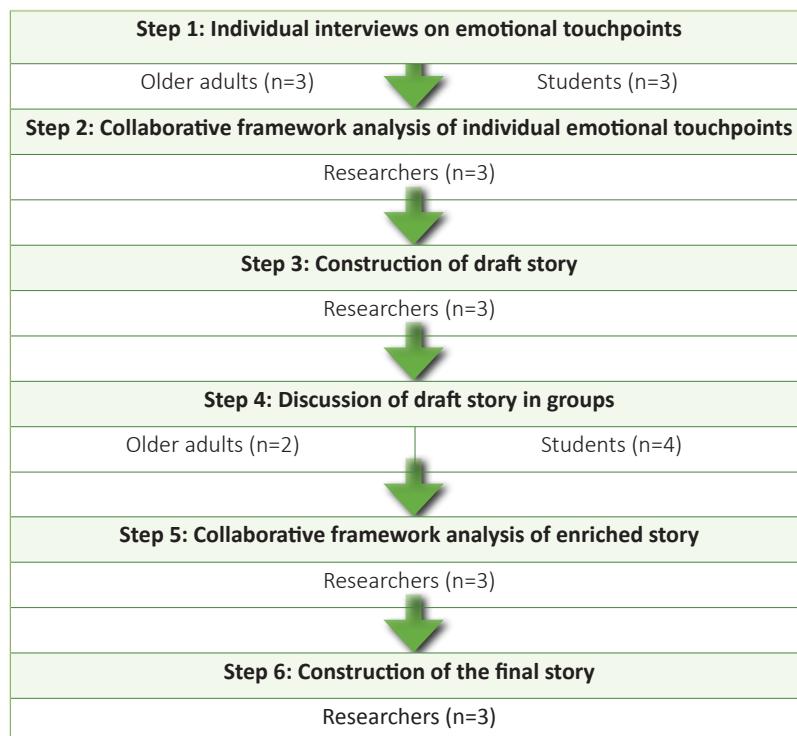
**Informed consent**

All the participants signed a consent form, after being informed of the purpose, methods, maintenance of confidentiality, and the right of withdrawal at any time. This represented a voluntary agreement to participate in the study. No formal ethical approval was required according to Dutch legislation (Central Committee on Research Involving Human Subjects, 2015).

**Data collection and analysis**

The process used for data analysis was the immersion/crystallisation technique described by Borkan (1999). This method encourages the researcher to access both cognitive and emotional processes to go beyond ‘obvious interpretations to hear, see and feel the data’ (Borkan, 1999, p 180). This approach to the analysis was in keeping with the philosophical groundings of the study in valuing other ways of knowing by including emotional and experiential reaction to the data. Individual interviews followed by group interviews of participating older adults and students were used to collect data. A team approach involving three researchers (AB, JJ, CS) was used for the analysis. Data were collected and analysed in six iterative and deductive steps. The researchers had to read, reread, discuss and reflect with an openness to uncertainty that allowed insights to crystallise from the beginning of the data collection (Borkan, 1999). Figure 1 displays an overview of the six steps, in which findings from each step informed the subsequent step.

**Figure 1. Data collection and analyses**



*Step 1: Individual interviews about emotional touchpoints*

The first step of data collection comprised individual interviews with three students and three older adults. During the interviews, the method of emotional touchpoints was used to tap into the

experiences of participants at an emotional level (Bate and Robert, 2006; Dewar et al., 2009). This method uses positive and negative words to explore experiences (touchpoints) of the participants by asking what they felt and why (Adamson et al., 2011). Each interview was guided by these three touchpoints:

- Working together
- Learning experience
- Best experience

These formed the themes for the interviews. Working together was chosen to gain insight into the co-creation of older adults and students, while learning experience was based on research findings that suggest a link between a learning orientation and successful new products by valuing co-creation (Ngugi et al., 2010; Sulhaini and Sulaimiah, 2017). The third touchpoint, best experience, paid attention to positive experiences in accordance with the method of appreciative inquiry. Each participant was asked to choose one touchpoint to discuss first, followed by the other two. Then each was asked to select a few emotional words about this first touchpoint that summed up what the experience meant to him or her. Researcher AB then asked why the respondent felt that way. The mean duration of the interviews was approximately 30 minutes. The interviews were audiotaped and notes were typed up.

#### *Step 2: Collaborative framework analysis of individual emotional touchpoints*

The second step involved analyses of all six interviews in iterative immersion and crystallisation (Borkan, 1999), through which the aim was to construct one story to serve as the starting point for the two group interviews. A framework was used to condense the data from the first step (Ritchie and Spencer, 2002). The three researchers conducted the analysis via:

- A thorough reading of each interview by each researcher independently
- Independent selection of salient fragments of each interview related to the three touchpoints
- Critical dialogue among all three researchers to reach a shared selection of fragments from each theme for each interview
- A shared selection of fragments from each theme, from either older adults or students

#### *Step 3: Construction of draft story*

The third step was the construction of a coherent story capturing the mutually agreed fragments for each theme, including fragments from older adults and students. AB wrote up this story on the basis of the fragments, and JJ and CS discussed it.

#### *Step 4: Discussion of the draft story in groups*

The fourth step was a discussion and analysis of the story, put together with different older adults and students than those in the individual interviews. This step served as a mechanism to have the participants in the living lab refine, confirm or challenge our preliminary interpretations and to have them provide new data for analysis. There were two sessions, one with two students and another with two students and two older adults. A collaborative sense-making tool was used during the sessions; Sharp et al. (2016) developed and implemented this method, which consists of a number of cards with images with prompts. It is designed to promote further inquiry about data and supports dialogue that goes beyond reading and discussing data extracts. AB read the complete story out loud while the participants simultaneously read the story as text. Then the participants were invited as a group to choose one sense-making card from nine as a key element of the story for each theme, as a starting point for further discussion. The purpose was to help them reflect on their experiences, and collaboratively select those that were noteworthy (Patriotta, 2003). The card topics were: words of wisdom; surprises; recurring themes; voices and views; curious questions; almost unmentionable; policy links; hot topics; and diverse views. Each of the three themes or touchpoints – working together, learning experience and best experience – was discussed this way. The two sessions were audiotaped and transcribed verbatim.

*Step 5: Collaborative framework analysis of the enriched story*

The fifth step involved analysis of two group interviews in iterative immersion and crystallisation (Borkan, 1999), in which the aim was to construct one enriched story. The framework from the second step was used to further condense the data (Ritchie and Spencer, 2002). The framework encompassed the three touchpoints alongside the experiences of the older adults and students. The three researchers conducted the analysis as in the second step.

*Step 6: Construction of the final story*

In this sixth step, the researchers used the refined framework from the fifth step as the basis for refining the story, as in the third step. AB refined the first draft of the story and discussed it with CS and JJ. The three researchers repetitively discussed the draft until a shared story emerged.

**Findings**

**Participants**

Table 1 shows the participants’ characteristics. First, three older adults and three students participated in individual interviews, followed by two independent group interviews. Two students and two older adults participated in the first group interview and two other students participated in the second.

Table 1: Characteristics of participants			
Respondents for individual interviews	Year of birth	Gender	Student or older adult
S1	1986	Female	Student
S2	1995	Female	Student
S3	1994	Female	Student
O1	1928	Female	Older adult
O2	1930	Female	Older adult
O3	1940	Female	Older adult
Respondents for group interviews	Year of birth/ age	Gender	Student or older adult
S1	1995	Female	Student
S2	1994	Female	Student
S3	1994	Female	Student
S4	1995	Female	Student
O1	1953	Female	Older adult
O2	1928	Female	Older adult

**A story of co-creation: older adults’ and student’s experiences and meaning**

This is a framework-based story of older adults’ and students’ experiences in co-creation in the context of developing an age-friendly service. The past tense is used in the story to refer to the participants’ experiences in the living lab (for example: ‘As an older adult, I worked closely together with the students’). The present tense is used to refer to participants’ reflections after the living lab and during the interviews (for example: ‘As a student, I consider the visits at the older adult’s home as very meaningful and authentic’). The story focuses on the three themes set out above: working together, our learning experiences, and our best experience.



### **Working together**

*'As an older adult, I worked closely together with the students. I really felt that they appreciated me. I could give them something – coach them, for example. It's nice that I mattered. Students kept asking me questions that made me think. Just be together, experience and explore the neighbourhood together, learn about each other's differences. Learn more about the life of students. It was special that students came to our home. It was informal, friendly, comfortable. That made it easier for me to open up. Practically speaking, agreements with the students went well. I've heard from others that there was some tension in collaborating with students. Older adults felt insecure about what they could and could not do. I think that the students should have been more critical there. If it had been my experience, I would have confronted them with my opinion that students are too set in their ways. It was sometimes irritating that there was little information about school assignments. This made both the students and me insecure in a positive way. When there is a mutual willingness to invest, to build on a relationship, to see each other as equally important, to look at your one role, then these little tensions mean nothing. It's only time-consuming.'*

*'As a student, I consider the visits at the older adult's home as very meaningful and authentic. It made the relationship more intimate. Over time, working together with older adults improved. It became more open and meaningful. Difficult questions could be asked. We learned how to handle the balance between distance and proximity, between freedom and frameworks. Looking back, I think that the nature of the collaboration depended on the personalities of the participants. Sharing emotions creates a bond. I've heard about a [case] where the collaboration collapsed. To be honest, I'm jealous of the deeper connection between some participants. It was more of a business relationship with us. At first, we as students were very uncertain. That felt uncomfortable, but also challenging. When I look back, I think uncertainty functions as a stimulator to ask the best of oneself, to keep asking the other person questions, to look beyond borders. Sometimes I thought it would be more efficient not to co-create with older adults. I was also worried about getting too close, about the older adult perhaps expecting me to keep visiting after the project. Later, I tried to be interested in an informal way, but the older adult did not want to socialise. I assumed that, as students, we should be in the lead of the process. We needed the older adults to open up, because they were experts. Looking back, we could have done a better job. Then we would probably have passed the assignment. From now on we will definitely co-create.'*

### **Our learning experiences**

*'As an older adult, I'm really relieved that young people have so much interest in older adults. I matter. Age doesn't matter. It was clear that I'm acknowledged. And that we're a socially recognised group. In fact, we are very privileged as older adults. This project made me start doing new things. It encouraged me to do them. Meeting students at my home made me flourish. I really learned from another generation, about their lives, their education. We learned from each other during our mutual experiences. The students made me reflect on the neighbourhood. Because of the discussions with the students, I said things that I've never said before and gained insight into my own life. For example, the insight that I still take my old personality with me. My working role emerged, activated by responsibilities and pressures that arose when working with others. Strange that I was unaware of my learning until afterwards. I really see the value of co-creation from both perspectives.'*

*'As students, we're grateful for the meaningful conversations with the older adults in their homes. We also learned a lot. We compared ourselves with others. Every learning trajectory seems different. I learned the most in the living lab. Discussing our different experiences between students made us learn from each other. The most profound effect was the impact of the project on the older adults. It is very important that we now have insight into the skills and requirements you need to co-create. Our confidence has grown. Uncertainty was not just fuss. It was also helpful to make you ask the best of yourself. My mindset has really changed: now I know how important it is to consider the*

*older adults as a target group. I learned that you really need the other as an expert. I see now that older adults are important contributors. And that older adults continue to develop – that was new to me. We also learned that older adults have a stereotyped image of students as well. That image became more realistic and nuanced during the process.'*

### **Our best experience**

*'That would be me as an older adult showing daily life in the neighbourhood to the students. Take a walk or ride a bike in the environment. Share the same experience. Explore together. I started doing new things, became more socially engaged than before. Moreover, I discovered my own neighbourhood. Certainly, I've learned from these young people, especially how they live life digitally. I also helped my students with their research by taking surveys. We participated in something new and exciting. The whole neighbourhood knew about it. Oh, it sounds a little weird, but I have shown that older adults are normal people. I gave that image to a new generation. I'm glad the students recognised that the negative stereotype of older adults is not realistic. We are not boring and do not whine all the time. Not all of us are frail and expensive for society. We can do things on our own.'*

*'As students, our best experience was the reciprocal way of collaborating with older adults. The project had a profound effect on the older adults. Other students saw older adults flourish. This was not our experience. We're just glad we finished the assignment. We have experienced no gain for ourselves other than the skills to co-create. I really admire the beautiful and sometimes quite distinctive forms of ageing and coping strategies other students saw. Conversations with older adults made students think about their own interests. That made the mutual interaction so inspiring. Discovering together what a good life could be like for the other person. In the end, I learned that regular contact is a necessary but time-consuming investment for best results. We should have invested more, if I had only known what I know now.'*

### **Discussion**

This qualitative research explored the experiences of older adults and students as co-creators in a particular educational context. The resulting story 'Our experience with the living lab and what it means for us' turned out to be rich in factual and practical information relating to the three themes of working together, learning experience and best experience. Furthermore, constructing the story by means of appreciative inquiry also facilitated the presentation and discussion of emotions and evaluations. The older adults appeared to be more positive in their approach to the three themes with less negativity. For students, it was the other way around, and they made several negative comments. The story also shows how the three themes intertwine and merge. It illustrates what older adults and students share in the co-creation process and what they do not share. This co-creation requires building new relationships between individuals with different motivations to relate and to learn, in an environment that is essentially the home of the older adult. Not surprisingly, this co-creation process involves uncertainty, but this may also be the key to co-creation success. These findings will be discussed in the context of the three themes.

### **Working together**

Working together highlights the interaction between participants during shared experiences and building relationships. The key elements of this theme are the balance between distance and proximity, the quality of the relationships and the paradox of insecurity.

Finding the right balance between distance and proximity in this interaction was a challenge for both students and older adults. This element of social interaction relates to the self-determination theory and the facilitation of intrinsic motivation (Ryan and Deci, 2000). In particular, the lack of a sense of relatedness recurs during the group interviews. Other research has found a causal relationship between sharing memories of the same experience and closeness (Beike et al., 2017). Some participants mentioned a more businesslike relationship without informal exploring and experiencing together; this hindered the co-creation process.



It seems necessary to invest time and effort in building relationships between co-creators. When working together did not go well, it appeared that students did not invest in the relationship outside the school assignment. It was more like a business relationship, about finishing the assignment. Some students saw that older adults felt positive to take forward new things (flourish), but that was not the case with some of the students, who were reserved and worried about getting too close or who fostered false expectations. The extent of the effect of co-creation depends on a mutual recognition of the importance of building a relationship; this seems to be in line with recent research into co-creation, which shows that the relational dimension is the most important for innovation (Ehlen, 2015). Moreover, the quality of the relationship greatly affects the value of co-creation and the willingness to learn about and from each other. These, in turn, influence the quality of the relationship (Sulhaini and Sulaimiah, 2017). During the interviews, some participants mentioned a lack of interest in the other, which hindered co-creation. It seems that a mutual willingness to open up to the other is important to achieve a more enriched result. A few students were surprised by the profound effect the living lab had on the older adults; it is noted that these students preferred a more distant or businesslike relationship, in which a more one-way type of sharing was expected.

Insecurity is a recurrent term when people work together. There is a duality in this. On the one hand, older adults and students mentioned insecurity as inconvenient – for example, uncertainty over who was to take the lead was cited by both older adults and students. On the other hand, this shared feeling of insecurity or unease encourages a shared responsibility and equality. Perhaps a mutual sense of insecurity helps co-creation to take place. Sturm (2013) mentions the ability to deal with uncertainty as one of the competences of co-creation. Brown (2012, p 33) defines vulnerability as: ‘uncertainty, risk and emotional exposure’. Vulnerability may also play a role in achieving co-creation, as the need to explore new ways of collaborating imply that former expectations do not fit or are uncomfortable. Taylor (2007, p 187) states that ‘some discomfort and instability is necessary to change insights’. At the same time, lecturers have to be aware of students who are ‘at the edge of their knowing’, help them become self-aware and support them as they work through the discomfort (p 183). This support implies being ‘good company’ (p 183), recognising their experiences and validating their feelings.

### ***Our learning experiences***

The key element in the learning experience is the distinction in the level and content of learning and in the level of reflection between older adults and students. Both students and older adults saw the effects on the older adults as being more profound than on the students. When asked, the students only talked about the assignment they had fulfilled. It seems essential that the co-creating be beneficial to both parties. This was the case in this research in the living lab, as it was in previous research into co-creation and innovation (Ngugi et al., 2010). There might be a distinction in the level of learning benefits between students and older adults – perhaps the living lab is more incisive for older adults than for students. For older adults, it is about their environment, their homes, their personal emotions and their values. For students, it is more about accomplishing their learning assignment as part of their studies, making it likely that more cognitive, skill-oriented learning and less person-related emotional learning took place for them than for the older adults. This difference may relate to differences in life stage and tasks (Erikson, 1950). During the living lab, the older participants were at a stage of adulthood (40-64 years) or older age (65 years or older). The important task in the stage of adulthood is generativity towards society and the next generations. The task in the stage of older age is retrospection. All the students were at a stage of early adulthood (18-39 years). According to Erikson (1950) they face the task of identity versus role confusion and the task of intimacy versus isolation. Isolation is a factor when they are struggling to build relationships. Development through the life stages results in the achievement of important skills. Surprisingly, the older adults had no difficulty describing their own learning experiences but the students did have difficulty reflecting on their own learning. Nevertheless, they did give several examples of their learning during interviews. Perhaps it is difficult for students to achieve a more abstract perspective on their learning process.

Critical reflection may be a more common task for adults aged over 64. It is also a higher educational competence that students are still learning (Schoenmakers and Harps-Timmerman, 2016).

### ***Our best experience***

The best experiences highlight interaction in a personal environment. The key element here was stereotyping. Although the emphasis in the living lab was on nuancing the possibly negative stereotyping of older adults, the students noticed a stereotyped image of students in the minds of the older adults as well. Presenting a more nuanced image of older adults was an important task for older adults in the living lab and the students' acknowledgement was important to them. Stereotypical views of older adults are essentially part of ageism and are harmful to their wellbeing (Ayalon and Tech-Römer, 2018). Co-creation in our living lab offers coexistence and participation in a common space. According to intergroup contact theories, positive interpersonal relations requiring personal involvement beyond mere co-existence can reduce implicit ageist attitudes and values (del Carmen Requena et al., 2018). The living lab offers a space conducive to this. The results also resonate with the elements of contribution and engagement in Barnett and Dean's (2012) concept of a good life. Interestingly, both students and older adults interpreted the feelings of others in the story during the interviews without any hesitation.

The environment seems to have a profound effect on building a relationship. Meeting the students at home and in their neighbourhood was essential for the co-creation experiences. Gerontological theories underline the importance of person-environment interactions for ageing well (Wahl et al., 2012). Experiencing the older adults in their environment demonstrated both the belonging and the agency of the older adult to the students.

The home context also created an informal atmosphere. Ngugi et al. (2010) also mentioned an 'on the job' environment as a catalyst for interactive learning. Other research about co-designing with older adults reveals the importance of facilitating informal socialising before the design phase, to build a strong team (Davidson and Jensen, 2013). Our study shows not just socialising before but during the whole living lab is experienced as beneficial for older adults and students. It's not just socialising but discovering together; both students and older adults experienced the regular visits to the older adults' homes as beneficial to opening up to each other. In other words, the environment links the themes of working together, learning experience and best experience.

Living labs differ in the actor facilitating them (Leminem et al., 2012). Therefore, they also differ in purpose, structure, and outcomes. Usually living labs are either utiliser- or provider-driven. Less commonly, they are user-driven. Living labs stand out in their context of communities of everyday life (Leminem et al., 2012). The living lab of this research lies somewhere between the user-driven and enabler-driven categories, which might explain the differences in experiences between students and older adults.

### **Research limitations and strengths**

In common with all studies, this one has limitations. Efforts were made to involve older adults and students in the research and they became involved in developing the story's ingredients. However, researchers put the final story together, but not in co-creation with all the participants. Another limitation is that one of the touchpoints (themes) used in the individual interviews was not neutral but valued positively (best experiences). Although this was congruent with the method of appreciative inquiry, the touchpoints here were meant to be neutral, and this might have affected the participants' responses. The study's findings are not generalisable, but do provide important insights about what is needed to support successful co-creation in a living lab.

The strength of this study lies in the findings' trustworthiness. The following measures were taken:

- A team approach to the analysis was taken, in order to constantly evaluate the researchers' influence on the findings
- The research was designed to offer multiple steps that allowed for crystallisation during data collection and analyses
- Triangulation of methods was used
- All the research steps were written down in detail to ensure a clear audit trail
- Although there was no member check of the final story, the validity of the data was checked indirectly by asking new participants during group interviews about their recognition of the first draft of the story in an analytic way

Despite the limitations, the results have value and invite corroboration by future studies, which will lead to fresh theories of how co-creation with older adults works. New studies could then test the hypotheses emerging from such comparative analyses. Future research should also explore taking co-creation a step further, not only co-analysing with older adults, but also co-researching with them at every step.

### Implications for practice

Education was the enabler in the living lab programme. As mentioned above, this particular living lab is partly user-driven and partly enabler-driven (Leminem et al., 2012). It might be interesting to look for ways to facilitate an even more user-driven living lab that focuses primarily on older adults' everyday life. It might be possible not to give students an assignment beforehand but to let one emerge in a bottom-up way during interaction with older adults. There is a tension between what is beneficial for a user-driven living lab and what is appropriate for an educational system with a focus on control and prediction. Finding the right balance between freedom and frameworks is necessary here.

### Conclusion

The research began with co-creation as an element of practice development. It involves various methods and approaches, as well as the specific competences of the professionals who take part. The method of appreciative inquiry, in both the research and practice in the living lab, served as a facilitator of equality not only between students and older adults, but also between researchers and participants. The current findings confirm this and add the importance of taking the time and effort to invest in the relationship. The findings also confirm the importance of maintaining equality in co-creation in order to deal with uncertainty and learning possibilities. Overall, this study challenges ageism by providing a positive example of older adults bringing valuable skills and expertise into age-friendly service design. Additionally, it meets the desire for new ways of conducting research into ageing by promoting a shift from a facilitator-led approach to a co-creation approach in doing research and teaching with older adults.

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