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Peter Abdelmassih Waller

Licentiatuppsats

Den utsträckta TV:n
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Peter Abdelmassih Waller

Innehållsförteckning

Förord

Det är med glädje som jag äntligen lägger fram den här uppsatsen. Första steget togs för fyra år sedan, när jag bestämde mig för att byta från forskning inom teoretisk elektroteknik till mer människonära forskning utan att behöva släppa taget om tekniken. Jag ville med andra ord både äta kakan och behålla den. Var finns då sådana människor, som ger sig på det omöjliga — på Certec förstås. Jag ställde mig i kön, räckte upp handen, och till sist blev jag doktorand på Certec. Jag hade då, som forskningsingenjör vid Certec, tillskansat mig erfarenhet inom området tele-kommunikation och människor med funktionsnedsättning. Det blev, för mig som före detta antennforskare och radioamatör, en smidig ingång till det omöjliga. Min forskning om antenner var helt inom det naturvetenskapliga paradigmet, med goda möjligheter till kontrollerade mätsituationer, teoretiska och numeriska experiment. Med en sådan bakgrund blev det en utmaning att närma mig det designvetenskapliga forsknings-paradigmet, som är en förhållandevis ung forskningsdisciplin, med helt andra metoder, oklara metodval och liten möjlighet till objektiva mätningar. Till min förvåning upplevde jag att diskussionen om vilka krav som kan sättas på vetenskap var betydligt mer livlig inom designvetenskap än inom min tidigare forskning.

Samtidigt som jag blev doktorand och som en gåva från himlen fann Norma och jag varandra. Hennes tålamod, omtanke och engagemang har varit en grundsten i arbetet som jag är väldigt tacksam för. *Norma, vi klarade det!* Mina handledare Bodil Jönsson och Britt Östlund har varit en annan grundsten, utan deras stora kunskap och engagemang hade projektet såväl som mitt byte av forskningsparadigm blivit helt utan frukt. *Tack kära ni.* Tack också för de talrika genomläsningarna av forskningsplaner och olika manus. Jag vill rikta ett speciellt tack till Bodil för att låta mig ingå i myllret på Certec när jag ville byta inriktning. Ett tack också till kollegorna på Certec som lika gärna bjuder på skratt som på kunskap. *Keep on going!* Speciellt vill jag tacka Arne Svensk och Per-Olof Hedvall för att hålla mig på rätt kurs. Jag vill tacka de äldre, speciellt Berit, som lyst upp mina dagar när teknik-problemen tornat upp sig. Jag vill också tacka alla anhöriga och alla i personalen, speciellt TV-teamet, som ställt upp på min stora mängd frågor.

Vidare vill jag också tacka Attendo Care AB, som helt finansierat projektet, och där jag varit anställd, för att så bestämt ha satsat på projektet. Hoppas verkligen att det ger er utdelning i framtiden. Speciellt vill jag tacka Ann Söllgård, Malin Fredgardh

och Ann-Marie Johansson. Ett stort tack också till Statens ljud- och bildarkiv för att försett projektet med de filmer och den musik som jag beställt.

Abstract

The aim of this licentiate thesis is twofold: 1) to describe old people's interest in and prospects of using the television for something other than traditional TV viewing, and 2) to describe the nonlinearities in the design process in which this research was performed. A concept called *The Extended TV* was developed and tested (by old people, their relatives and care workers) in a new nursing home in the process of moving in, hiring employees, making final adjustments on the premises and in the technology. A total of thirty old people, between 60 and 100 years old, were included in the process which was carried out between June 2006 and February 2007.

A pivotal background factor was that the initial resistance to the technology itself was low when it came to such a frequently used product as the television set. This proved to also be the case in this study when it came to TVs with flat screens (installed in all rooms and entirely independent of this project). The functions in *The Extended TV* included both personal ones and ones in common with other residents. The common functions consisted of an internal TV channel and two media centres with the necessary equipment to view common internal productions, other programmes of general interest and material that relatives supplied. The personal function dealt with communication based on one individual's photo album presented on her own TV.

The function and usage of *The Extended TV* were developed in and through an interweaving of visions, expertise, relationships, responsibilities and logistical prerequisites. The results deal with the interface, the people themselves in action (the old people, their relatives, the staff, IT consultants, technology providers, myself and many others), our tools and the scope of our action.
What undoubtedly took the most time was the nonlinear design process. It was complex and by no means followed the initial plans. This is indeed more the rule than the exception in situated human design processes, but is documented all too seldom.
I hope that the lessons from the usage of *The Extended TV* will contribute to innovative ideas concerning old people's TV viewing.

Keywords: situated, design, participatory observation, action research, older, nursing home, TV

1 Sammanfattning

Syftet med den här licentiatuppsatsen är dels att beskriva äldre människors intresse av och möjligheter till att använda TV:n till annat än traditionellt TV-tittande, dels att beskriva olineariteterna i den designprocess i vilken detta arbete ägde rum. Konceptet "Den utsträckta TV:n" utvecklades och provades (av äldre människor, deras anhöriga och personal) i en ny vårdboendemiljö samtidigt som inflyttning, nyanställning och slutjustering av lokaler och teknik pågick. Totalt omfattades 30 äldre personer, med en ålder mellan 60 och 100 år, i den process som pågick mellan juni 2006 och februari 2007.

En avgörande bakgrundsfaktor var att initialmotståndet mot tekniken i sig är lågt när det handlar om en så flitigt använd produkt som TV-apparaten. Detta visade sig också vara sant när - som i detta fallet - det handlade om en TV med platt skärm (gäller för alla rum och är helt oberoende av detta projektet).

Funktionerna i den utsträckta TV:n var dels boende-gemensamma, dels personliga. De boendegemensamma funktionerna bestod av en intern TV-kanal och två media centers med goda möjligheter att visa gemensamma internproduktioner, annat av allmänt intresse och material som anhöriga tog med sig. Den personliga funktionen handlade om kommunikation utifrån det egna fotoalbumet i den egna TV:n.

Den utsträckta TV:ns funktion och användning utvecklades i och genom en väv av visioner, kompetenser, relationer, ansvarsområden och logistiska förutsättningar. Resultaten handlar både om gränssnitt och om de handlande människorna själva (de äldre, deras anhöriga, personalen, IT-konsulter, teknik-leverantörer, jag själv och många fler), våra verktyg och handlingsutrymmen.

Det som tagit den garanterat längsta tiden är det olineära i designprocessen. Den har varit komplex och ingalunda följt de initiala planerna. Detta är visserligen mer regel än undantag i situerade människonära designprocesser men det dokumenteras alltför sällan.

Jag hoppas att lärdomarna från användningen av den utsträckta TV:n skall medverka till nytänkande kring äldre människors TV-tittande.

Nyckelord: situerat, design, deltagande observation, aktionsforskning, äldre, vårdboende, TV

2 Syfte

Syftena med denna licentiatuppsats:

- Att beskriva olineariteterna i en praktisk designprocess.
- Att bidra med kunskap om vad som är möjligt respektive omöjligt i designprocesser i en ny vårdboendemiljö tillsammans med äldre, personal och anhöriga medan inflyttning pågår parallellt.
- Att inspirera till annorlunda TV-användningar för äldre människor.

3 Inledning

Forskningen syftade till att i samband med tillkomsten av ett vårdboende för äldre så lyhört som möjligt anpassa några av boendets tekniska möjligheter efter de nyinflyttade och därmed förbättra förutsättningarna för samspelet med närstående och personal liksom för den egna självständigheten. Därutöver syftade forskningen till en ökad förståelse för speciella behov och önskningar hos äldre människor och en analys av vilka konsekvenser detta har för teknik som stöd till minnes-, planerings- och kommunikationsförmåga.

Detta syfte stämmer väl överens med designforskning inom rehabiliteringsteknik (Jönsson et al., 2005), där mänskliga behov, drömmar och önskningar är utgångspunkten. Forskningen har som huvudsyfte att uppnådda resultat förr eller senare skall komma de berörda till godo.

Designprocessen berör ofta direkt ett fåtal personer men kan generera kunskap av värde för flera. Inspiration och information utbyts åt båda hållen mellan forskare och användare, och den stegvisa förbättringen av prototypen går hand i hand med förfiningen av forskarens kunskap om människornas upplevda verklighet.

De tekniska möjligheterna som designats kallas för "Den utsträckta TV:n", och kan delas in i två kategorier, den boendegemensamma och den personliga. De boendegemensamma funktionerna bestod av en intern TV-kanal med bilder från verksamheten och visning av filmer, samt två media centers, som användes för att se på DVD- filmer, medhavda digitala foton, media från Sveriges Televisions Internetsajt, m.m. Den personliga funktionen utformades för en person, Berit (vars riktiga namn inte skrivs ut), som kunde se utvalda foton från sina fotoalbum i sin egen TV. I designprocessen av ovanstående funktioner har jag utgått från kunskapen om att äldre människors användningsgrad

ökar om den nya tekniken bygger på teknik som de redan är vana vid (Östlund, 1995).

Äldre män och kvinnor, boende på vårdboendet, deras anhöriga och personal har använt den utsträckta TV:n. En fallstudie har utförts av Berits användning av sitt TV-fotoalbum. Genom observationer och intervjuer har den utsträckta TV:n förbättrats och kunskap samlats. De observationer som ligger till grund för forskningen utfördes mellan juni 2006 och februari 2007.

Arbetet har varit en del av det "Äldre och design"-program som lanserades vid Institutionen för designvetenskaper, Lunds Tekniska Högskola under 2003 (Jönsson, 2003).

Projektet har genomgått forskningsetisk prövning vid etikprövningsnämden i Lund (diarenummer: Etik H4 95/2006). Inga hinder förelåg.

3.1 Vårdboendet

Västra Varvsgatan, vårdboendet där den utsträckta TV:n designades, ligger i Malmö och drivs av företaget Attendo Care. De första äldre personerna flyttade in i maj 2006, därefter har det varit en gradvis ökning av både äldre människor och personal. Vårdboendet är fördelat på tre våningar och fem avdelningar, varav två avdelningar för äldre människor med diagnosticerad demens, två för äldre människor utan en sådan diagnos, samt en korttidsavdelning som öppnades för sent för deltagande i detta projekt. Minst 30 äldre individer har deltagit, en del mer än andra, och några av dem använde inte alls funktionaliteten i den utsträckta TV:n. Detta sporrade mig till att göra vidareutvecklingar och till att förstå projektets begränsningar.

Det anställdes vårdpersonal med dubbelkompetens dvs. personer som har både vårdutbildning och annan kompetens, till exempel bagare, frisör, datorprogrammerare, systemvetare, keramiker, etc.

3.2 Designprocessen

Alla projekt kräver sin plan. Det vet varje forskare, IT-utvecklare och organisationsansvarig. Trots noggrann planering uppstår en rad oförutsägbara problem, bland annat i form av försenade leveranser, tekniska problem, missförstånd eller att deltagarna inte reagerar som förväntat.

Innovationsprocesser är idag föremål för omfattande forskning, främst vad gäller innovationer på nationell nivå. Forskning börjar

också växa fram vad gäller strategier, begrepp och idéer för att möta sociala behov, s.k. sociala innovationer (Mumford, 2002). Forskningen på det här området handlar om hur innovationsprocesser går till och har bidragit till en utveckling från en linjär till en interaktiv modell. Den linjära modellen utgår från att innovationsprocessen sker i separata steg på ett förutsägbart sätt. Den börjar i forskningen, övergår sedan till att bli tillämpad och till en utveckling av produkter och tjänster som sedan sprids på marknaden eller till olika användare. Forskningsresultaten visar att en sådan modell stämmer dåligt med hur effektiva innovations-processer faktiskt fungerar. Resultaten visar istället att en ständig interaktion mellan aktörerna är nödvändig för att omsätta idéer till en fungerande process, produkt eller tjänst. Trots detta genomförs många processer som om innovationer är möjliga att utveckla linjärt (Godin, 2006).

Forskare som utgår från resultaten då tekniken landar i vardagen hos användaren, menar också att medvetenheten om hur man kombinerar teknisk utveckling och medvetenheten om mänskliga miljöer behöver öka (Karlsson & Östlund, 1999). Traditionellt har processer separerats i olika steg genom att formuleringen av designmålen, konceptualiseringen och utvecklingen av lösningen skiljts från implementeringen och användningen i verkliga livet. Men även här ökar medvetenheten om återkoppling. Designprocessens motsvarighet till tanken om interaktivitet i innovationsprocessen är iterativitet dvs. att den prototyp man arbetar med förfinas samtidigt som kunskapen om användarna ökar.

Både innovationssystemforskningen och designprocessernas utveckling är resultat av en generell utveckling av synen på förhållandet mellan människa och teknik. För att en teknik skall bli framgångsrik i praktiken krävs att den passar in i det sammanhang där den ska användas och i de sociala relationer den kommer att samspela med. Som Bruno Latour säger: "Vi ställs aldrig inför föremål eller sociala relationer, vi ställs inför kedjor som är förbindelser av människor och icke-människor. Ingen har någonsin sett en social relation ensam…"(Latour, 1998).

Det här projektet vill bidra till bättre samarbete mellan inblandade aktörer i designen av den äldre människans livsmiljö samt bättre teknikutveckling med och för människor, detta för att visa på sammanhangets betydelse. I utvecklingen av den utsträckta TV:n har jag därför lagt betoningen både vid en interaktiv innovationsprocess (genom olika företags inblandning i utvecklingen) och en iterativ designprocess där de berörda människorna ingått. Uppmärksamheten på och dokumenteringen av förutsägbarhet och oförutsägbarhet kan bidra till ökad effektivitet i innovations- och designprocesser som berör teknik

och teknikanvändning inom äldreomsorgen och till mer realistiska förväntningar. Speciellt viktigt att lyfta upp är den avsevärda tidsåtgången för en process med många inblandade parter. Interaktionen, tidsåtgången och oförutsägbarheten beskrivs här som en olineär process.

3.3 Publikationer

Forskningen redovisas i två vetenskapliga artiklar som ingår i denna uppsats.

I. The Extended Television: using tangible design to meet the needs of older persons at a nursing home [Den usträckta TV:n: att använda tangible design för att möta de äldres behov på ett vårdboende]. Antagen till Gerontechnology Journal under förutsättning att specificerade ändringar görs (ändringar inskickade 2007-05-31).

Denna artikel beskriver designprocessen av de olika delarna i den utsträckta TV:n, speciellt den interna TV-kanalen och Berits fotoalbum och det diskuteras huruvida den utsträckta TV:n erbjuder de äldre möjligheter till social inklusion i den närmaste omgivningen och om den stödjer deras egna reflektioner. Med "tangible design" menas i detta fall att datorkraft förlagts till kända vardagsföremål, såsom fotoram och TV.

II. Extended Television: A study of how investigations of use can inform design processes in nursing homes [Utsträckt television: En studie av hur undersökningar av användning kan ge information till designprocesser i vårdboenden]. Kommer att publiceras i PsychNology Journal, 5(2), 2007 (accepterad 2007-08-03).

Minnesprocessen är beroende av samspelet mellan individer och artefakter (Hutchins, 1995b; Hutchins, 1995a), och mycket av minnet finns distribuerat till omgivningen. Det innebär att en förändring i sociala relationer eller i fysisk närmiljö påverkar en individs distribuerade minne.

Denna artikel utgår från äldre människornas förluster i distribuerat minne, när de flyttar till ett vårdboende, samt hur nya artefakter kan ge stöd. Teorin om distribuerat minne och FACE (Anderberg, 2006), som är ett konceptuellt designverktyg, används som analysverktyg för att utröna olika artefakters bidrag.

4 Metod

Jag har arbetat för att genomföra en produktutveckling under pågående deltagande observation för att så lyhört som möjligt försöka anpassa några av boendets tekniska möjligheter till de nyinflyttade. Projektet hade alltså direkta förbättraravsikter, både för de medverkande forskningspersonerna och för andra äldre människor och för designforskningen som sådan genom att det ville medverka till insikter i äldre människors behov och önskningar. Därför har jag valt en aktionsforskningsinriktad ansats och en metod där den enskilda människan får träda fram både som användare i sitt sammanhang och i den här framställningen, nämligen fallstudiemetoden. Fallstudier är viktiga därför att de kan bidra till att förstärka människors tolkningsföreträde och nyansera maktbalansen mellan aktörer i en designprocess. I figuren nedan visas aktörerna som var inblandade i designprocessen (de äldre, anhöriga, personalen, jag själv, handledarna, verksamhetschefen på vårdboendet, teknikleverantörer samt marknadsavdelningen och IT-avdelningen på Attendo Care).
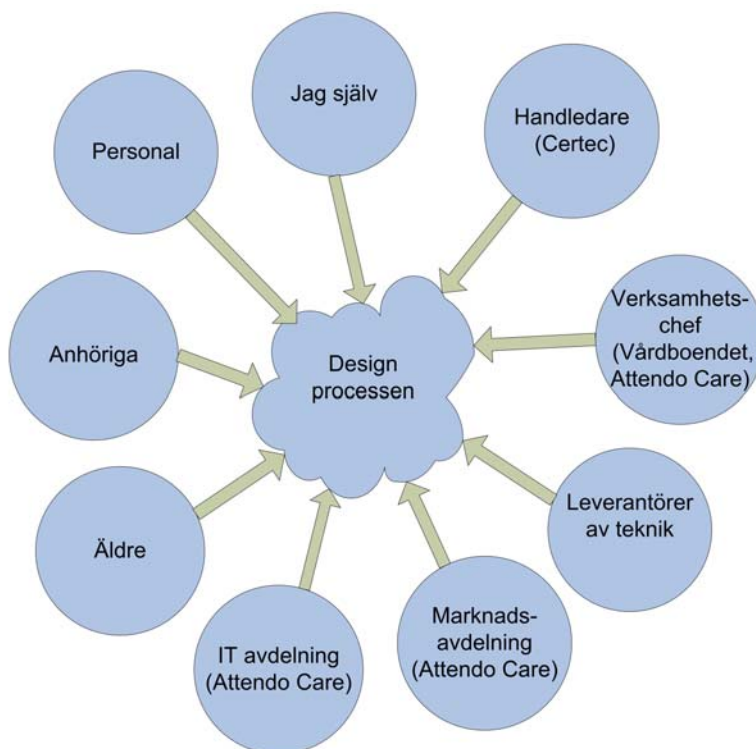
En översikt över de aktörer som påverkade designprocessen.

Man bör också vara medveten om att tolkningsföreträdet inte är lika stort för alla inblandade. Det är större för vissa och vanligtvis mindre för de äldre användarna (Östlund, 2005). Här fyller fallstudien en viktig funktion i syfte att lyfta fram deras perspektiv. Det skall också sägas att den stora mängden aktörer gjorde arbetet svårstyrt eftersom jag försökte balansera mellan deras olika, men oftast, legitima ståndpunkter. Till exempel hade företaget som drev vårdboendet inte bara målet att bringa ny kunskap i ljuset, utan också att arbetet skulle utmynna i en eller flera produkter. Vikten av att nå fram till färdiga produkter under projektets tid gjorde att endast designförslag som på ett överskådligt sätt skulle kunna leda till detta övervägdes.

Verksamhetschefen på vårdboendet har haft inflytande över hur projektet utformats, bland annat genom att ha uppgiften att fördela arbetsuppgifter till personalen. Speciellt har detta påverkat vem i vårdpersonalen som skulle ingå i det TV-team som, utöver alla anställdas engagemang i mån av tid, haft till uppgift att använda och utvärdera den utsträcka TV:n (se artikel I).

Nedan ges först en teoretisk bakgrund till det praktiska utförandet, sedan en beskrivning av hur urvalet av forskningspersoner gjorts och till sist beskrivs den iterativa designprocessen.

4.1 Teoretisk bakgrund

Designforskning har likheter med etnografiska metoder (Jönsson, 2000) som exempelvis "deltagande observation". I deltagande observation sker förfining av kunskap genom ett ständigt skifte mellan detaljperspektiv och helhetsförståelse. Detta skifte utförs exempelvis i textanalysen av gjorda dagboksanteckningar (Ely, Anzul, Friedman, Gardner, & McCormack Steinmetz, 1993), genom växlandet mellan att vara deltagare och observatör (Jönsson, 2000) samt genom växlandet mellan att anteckna och att vara deltagande observatör (Aspers, 2007).

Deltagande observation har stora likheter med mitt arbete, men kan dock inte ge den iterativa förfining av artefakter som design-forskning kan resultera i. I designforskning kan teknikutvecklingen bli till en dialog där forskaren och forskningspersonen inspirerar och informerar varandra, bland annat med hjälp av prototyper (Jönsson et al., 2005).

Mitt projekt var handlingsinriktat, både genom att forsknings-personernas handlingar stod i centrum och genom att jag själv handlade. Därför, och eftersom projektet hade en förbättringsavsikt, kan forskningen benämnas aktionsforskning. I sådan forskning genereras förståelse och teorier genom att man

praktiskt påverkar verkligheten och är lyhörd för effekterna. Aktionsforskning betonar "relevans, social förändring, och validitet testat i handling av de mest utsatta intressenterna" (Brydon-Miller, Greenwood, & Maguire, 2003). Personerna som ingick i designprocessen reflekterade över sitt användande av den utsträckta TV:n och förmedlade sina synpunkter till mig. Detta skedde under min närvaro på vårdboendet, i personal- och anhörigmöten. Dessutom rapporterade TV-teamet (bestående av fyra undersköterskor, se artikel I) veckovis till mig om hur projektet utvecklades. Möjligheten för deltagarna i design-processen att själva utvärdera resultaten är i linje med det demokratiska synsätt som kan förknippas med aktionsforskning (Brydon-Miller et al., 2003).

Djupdykningen i en enskild persons användning av den utsträckta TV:n och i designen av TV-fotoalbumet utgör en fallstudie. Djupdykningen motiveras med designprocessens frågor om vilka funktioner som används, varför och hur (Yin, 2003), detta till skillnad från statistiska undersökningar av hur många som använder den utsträckta TV:n. Fallstudier kan ha en betydelse utanför det enskilda fallet: One can often generalize on the basis of a single case, and the case study may be central to scientific development via generalization as supplement or alternative to other methods" (Flyvbjerg, 2006). Flyvbjerg menar att man kan lära sig genom fallstudier även om de inte alltid kan föra hypoteser i bevis, dessutom påstår han att enskilda fall precis som i naturvetenskapen kan användas i bevisföring, förutsatt att de väljs på rätt sätt.

Fallstudierapporter bör visa på hela det relevanta sammanhanget och därigenom ge läsaren möjligheter till att granska eventuella slutsatser (Yin, 2003). I mitt arbete kan endast designprocessen av Berits TV-fotoalbum sägas utgöra en fallstudie, eftersom endast den studien har den sammanhangsinsikt som kan krävas. Dock är fortfarande rapporteringen av detta något svag. Det är med denna reservation som jag menar att Berit har ingått i en fallstudie.

Människors teknikanvändning är situerad, det vill säga att den sker i, och påverkas av, sitt specifika sammanhang. Till exempel är det rimligt att anta att en persons TV-tittande påverkas av hur komfortabla möblerna framför TV:n är, av programutbud och av eventuellt sällskap. Det innebär att den kunskap som behövs för designforskning inkluderar kunskap om sammanhanget där tekniken används. Tillkomsten av sådan situerad kunskap beror på forskarens förförståelse (Jönsson et al., 2005). Min bakgrund som civilingenjör, radioamatör, biståndsarbetare och forsknings-ingenjör på Certec har påverkat vilken situerad förståelse jag har fått, och därmed också vilka designlösningar som jag föreslagit.

Förslagen påverkas också av tidigare designprocesser som jag deltagit i (till exempel användes erfarenheter från succén med den universella fjärrkontrollen som bakgrund för att föreslå en likadan för Berit, se artikel I och II). Det skall också sägas att innan vårdboendet där projektet genomfördes var byggt så praktiserade jag på två andra vårdboenden under två veckor för att bli familjär med forskningsmiljön. Dessa veckor av praktik gav en förförståelse om hur det är att bo och arbeta på ett vårdboende, vilket i sin tur påverkat designprocessen. Att använda och ifrågasätta sin egen förförståelse tillhör rutinarbetet inom deltagande observation (Aspers, 2007). Det tillhör också vanligheten att redovisa sin förförståelse.

4.2 Urval

De 30 äldre människor, med en ålder mellan 60 och 100 år, som ingått i studien har på ett eller annat sätt förhållit sig till den utsträckta TV:n. Deras engagemang varierar mellan att några inte använt någon funktionalitet alls till att Berit ingått i det som kan beskrivas som en fallstudie. Gemensamt för de 30 personerna är att jag har umgåtts med dem, lärt känna dem samt en del av deras vanor och preferenser. Av de 30 har vissa funnits på avdelningarna med och andra på avdelningarna utan krav på demensdiagnos.

Flertalet av de äldre utan demens hade tillgång till den interna TV-kanalen i sin lägenhet under början av projektet. Dock försvann tillgången på grund av slutjusteringar i huset (byten av TV-uttag), varpå nya frekvensinställningar av TV-apparaterna behövde göras. Den ursprungliga planen att alla äldre skulle ha tillgång till den interna TV-kanalen kunde på grund av denna försening inte genomföras. Istället gjordes nya frekvens-inställningar där den äldre människan eller anhöriga hade bett om detta (runt tio personer). Den interna TV-kanalen var som regel injusterad i alla gemensamma TV-utrymmen, vilket gjorde att de äldre människor som på eget eller andras initiativ tittade där, också kunde se den interna TV-kanalen. Vad gäller de två media centerna var det genomgående personal eller anhöriga som tog initiativ till deras användning.

Förutsättningarna medgav inte något övergripande urval av deltagarna på annat sätt än att de som var intresserade kom att ingå i studien, övriga inte. Valet att låta just Berit ingå i en fallstudie gjordes baserat på hennes erfarenhet och intresse av fotoalbum samt de anhörigas starka engagemang. Vidare kan valet av Berit vara ett kritiskt fall på så vis att om det fungerar för henne – så fungerar det för fler (se diskussionen om äldre människors minne i artikel II).

4.3 Den iterativa processen

Med iterativ menas alltså en ständigt pågående förfining av prototyper samtidigt som kunskapen om användningssituationen växer. Som forskare kan man alltså inte med en sådan ansats göra enstaka insatser i en miljö. Man måste vara där regelbundet. Jag var på plats på vårdboendet ungefär 15 timmar per vecka, men under tekniskt installations arbete, felsökningar och observationer av Berits användande av TV-fotoalbumet blev det ungefär 30 timmar per vecka.

Jag valde att vid varje besök på vårdboendet besöka dagrummen på avdelningarna för att ständigt hålla en levande dialog med de flesta äldre och anställda. Min attityd var att vara en extra hjälpande hand och kunskapskälla och på så vis fångade jag bland annat upp önskemål gällande injustering av den interna TV-kanalen i TV-apparater, media centers, filmval, förslag till inslag i den interna TV-kanalen. En del förfrågningar rörde också sådant som inte ingick i forskningsprojektet såsom garantireparationer av TV-apparater, elsäkringar som löst ut, lösa hjul, etc. Dessa behov försökte jag så gott det gick att tillmötesgå. Vidare var jag närvarande så ofta som jag kunde vid olika filmvisningar och vid Berits användande av sitt TV-fotoalbum för att hjälpa till och för att observera användandet.

En utmaning för alla forskare som använder deltagande observation är att komma nära sina forskningspersoner och att bli integrerade i forskningsmiljön (Aspers, 2007). Om man som jag faktiskt kunde tillföra situationen ett önskat görande genom att vara en hjälpande hand, blir integrationen mindre konstlad och leder också till att andra frågor kommer upp. Denna erfarenhet stämmer med tidigare resultat på Certec. Till exempel utförde Håkan Eftring en djupintervju med en forskningsperson i studien om användvärdhet av rullstolsmonterade robotar (Eftring, 1999). Intervjun utfördes efter designfasen och kom att innehålla viktig information som inte kommit fram tidigare. Gemensamt för Håkans och min attityd under designprocessen är att vi var påverkningsbara, och försökte rätta oss efter det som var bäst för forskningspersonen.

Intervjuerna, fallstudien, analysen och teknikutvecklingen som ingick in den iterativa designprocessen beskrivs kort nedan.

4.3.1 Intervjuer

Jag utförde intervjuer med äldre, anhöriga och personal. Det som var utmärkande var att jag visste vilka kunskapsområden som jag

ville komma åt med hjälp av intervjuerna och höll dessa i fokus under dialogerna. Jag försökte till exempel få reda på vilka funktioner som en person använde, hur, varför och när. Dock förberedde jag inte specifika detaljfrågor. Det var enbart med personal som jag höll planerade intervjuer, resten av intervjuerna skedde improviserat, på plats. Denna skillnad berodde på att personalen inte hade lika mycket tid till improviserade intervjuer som äldre och anhöriga.

Givetvis användes frågeställningar och teman, som jag observerat under min vistelse i övrigt på vårdboendet, som bakgrundsmaterial för intervjuerna. Ett sådant arbetssätt är ett standardförfarande inom deltagande observation (Ely et al., 1993).

4.3.2 Fallstudie

Berit och hennes anhöriga hade jag speciellt mycket kontakt med, se artikel I för en redogörelse för utvecklingen av hennes TV-fotoalbum. En fallstudie kan ses som en egen forskningsmetod, där deltagande observation och intervjuer kan ingå (Yin, 2003), vilket de också gjort i detta arbete. Kontakten med anhöriga bestod av att vi möttes i Berits lägenhet och tittade i hennes fotoalbum, både de traditionella och det utvecklade TV-fotoalbumet, samt av telefon-samtal och e-post. Denna kontinuerliga kontakt gjorde mig betydligt mer insatt i Berits önskningar än för de andra äldre, men det gjorde också att jag lättare kunde förstå situationen för andra i samma situation som Berit.

4.3.3 Analys

Mina observationer och andra intryck under min tid på vårdboendet skrev jag ner med hjälp av en dator på vårdboendet, och lagrade på ett portabelt USB-minne. Dock antecknade jag aldrig inför de äldre personerna. Ett sådant förfaringssätt skulle lätt kunna uppfattas som integritetskränkande eftersom det kan vara svårt för forskningspersonerna att förstå forskarens behov av distans kombinerat med närvaro för att kunna dra slutsatser av vetenskaplig natur. Vidare förde jag så snabbt som möjligt över de förda anteckningarna till den kompletta dagboken som förvarades inlåst. Vidare editerades aldrig dagbok eller anteckningar på en dator som var uppkopplad mot ett nätverk. Dessa försiktighets-åtgärder gjordes för att försäkra mig att ingen otillbörlig hade tillgång till anteckningsmaterialet.

Analysen gjordes genom att undersöka dagboksanteckningarna utifrån givna frågeställningar. Frågeställningarna kunde vara konkreta, t.ex. "Reagerar Berit alltid likadant på en svart bild i fotoalbumet?", eller mer abstrakta: "Vilka brister i distribuerat

minne kan det vara som kommer fram här?". För de abstrakta frågorna behövdes väldefinierade begrepp, som till exempel distribuerat minne, eller en struktur som exempelvis den i Peter Anderbergs "FACE", se artikel II. Genom att analysera dagboks-anteckningarna på detta sätt uppträdde beteendemönster och samband som inte var klara för mig innan analysen.

Väldefinierade begrepp, ger forskaren olika vinklingar av den situerade kunskapen och kan vara ett värdefullt redskap i framtagandet av prototyper och även inom deltagande observation används teorier och begrepp för att analysera observationerna (Aspers, 2007). En likhet med aktionsforskning är att analysen användes som redskap för att implementera förbättringar (Brydon-Miller et al., 2003).

4.3.4   Teknikutveckling

En stor del av arbetet var traditionellt utvecklingsarbete i form av träslöjd, programmering, användande av datorprogram, lödande, inköp, etc. Detta arbete utfördes, förutom träslöjden, mest under vistelserna på vårdboendet.

När den tekniska förändringen var genomförd och tillgänglig (antingen genom att ny hårdvara fanns tillgänglig eller genom att ny funktionalitet hade lagts till i tidigare installerad hårdvara) behövde personal, äldre och anhöriga utbildas och informeras om användandet. Personalen hölls informerade genom att jag utbildade TV-teamet där fyra undersköterskor ingick, se artikel I.

5 Resultat

Resultaten består av lärdomar om designprocessen, bildanvändning, de handlande människorna själva och deras relation till artefakterna i den utsträckta TV:n. Dessutom diskuteras designen av fjärrkontrollen till Berits TV-fotoalbum.

5.1 Lärdomar om designprocessen

Under designprocessens krokiga väg framåt kom ett antal lärdomar fram som kan tjäna som vägmärken eller varningsflaggor för andra forskare i liknande designprojekt.

5.1.1 Tidsfaktorn

Det var först efter åtta månaders iterativ design som det var enkelt att fånga upp synpunkter och förändra tekniken, eftersom äldre, personal och anhöriga då hade blivit tydligt involverade i projektet och effekterna av att det var ett nyöppnat vårdboende hade mestadels klingat av. Det innebar att det var först efter åtta månaders iterativ design process som de stora förbättringarna skulle kunna göras.

Jag kunde alltså inte få alla parter involverade under den turbulenta fasen, men forskningen började vid dag ett, dvs vid första observationen.

5.1.2 Personalens och anhörigas förslag

Både de anhöriga och personal gjorde anspråk på att veta vad som var rätt val för äldre individer, och det hände att ingen av dem hade exakt rätt. Det var till exempel så att de anhöriga kände till det hur det brukade vara för den äldre individen, medan personalen visste mycket om den dagsaktuella situationen. Denna perspektivskillnad gav upphov till skillnader i anhörigas och personalens förslag.

I Berits fall upptäckte anhöriga en hälsoförbättring som personalen inte upptäckte, en förändring som kan ha varit beroende på de anhörigas närvaro (se artikel II).

Gammal är äldst!

5.1.3 Tolkningsföreträdet

Anhörigas och personalens åsikter har varit ett komplement till observationer av den äldre människans eget *görande,* dvs. när den äldre människan tar kontroll och bestämmer över den designade artefakten. Detta förmedlade tydligt den äldre människans önskemål, både till forskaren samt till personal och anhöriga.

Därmed kunde anhöriga och personal ge nya, förfinade, förslag. På så vis var designprocessen en lärprocess också för anhöriga och personal.

5.1.4 Personalens medverkan

Personalens medverkan som idégivare och informationspridare i projektet var nödvändig:

- Utan personalens kunskap om rutiner var det svårt att komma med designförslag som skulle passa in i verksamheten, detta gällde speciellt funktioner på den boendegemensamma nivån.
- Personalen var en ovärderlig resurs, tack vare sin professionella kunskap och stora närvaro. De spred information om den utsträckta TV:n och guidade de äldre i användandet.
- De kunde filtrera bort felaktiga designförslag, så att de äldre inte behövde utsättas för felaktig design.

Emellertid var det inte enkelt att hitta rätt samarbetsformer med personalen, eftersom det på grund av starten av vårdboendet ofta dök upp åtgärder som fick högre prioritet än forskningsprojektet. Dessutom fanns till en början ingen effektiv logistik för att sprida information på vårdboendet. Den kom efterhand i form av anslagstavlor, personalmöten, anhörigmöten, etc. Den överlägset bästa formen för samarbete med personalen inom ramen för den utsträckta TV:n var TV-teamet (se artikel I).

5.1.5 Ny och omogen teknik

Tidigt provade jag kommersiella media centers med funktioner för att enkelt se foto, DVD, TV och använda Internet genom TV-skärmen. Detta gjordes för att utröna om de äldre skulle kunna använda ett media center för personliga funktioner såsom fotoalbum, kalender, dagbok, videotelefoni, etc. Dock krävde interaktionen och felhanteringen förståelse för att det handlar om en dator som är kopplad till en TV-skärm och en vana vid att

hantera datorgränssnitt. För att behålla TV-känslan och undvika märkliga lägen som användaren inte vet hur man tar sig hur, valdes istället strategin att använda en dator med specialanpassade program för varje personlig funktion.

TV-apparaterna som installerades på vårdboendet var en nyutkommen vidareutveckling av en (enligt återförsäljaren) tidigare problemfri TV-modell. Det visade sig att de installerade TV-apparaterna hade många fel, och vid ett tillfälle byttes 21 felaktiga TV-apparater ut. Även om detta inte hade något med mitt projekt att göra påverkades jag givetvis ändå, då TV:n är central i arbetet.

Lärdomen är alltså att säkerställa kvalitén på varje produkt i designprocessen, även standardteknik såsom TV-apparater, och inte förvänta att nya produkter kan användas utan anpassning för äldre människor.

5.1.6   Ständigt beredd

I detta arbete var det, liksom i deltagande observation (Aspers, 2007), svårt att veta eller planera när jag i mina observationer skulle få reda på viktig information. En väl förberedd intervju kunde ge lika viktig information som en helt oplanerad testning av TV-fotoalbumet eller observationer gjorda under teknisk felsökning som inte rörde den utsträckta TV:n.

Det var alltså viktigt att ständigt vara beredd på att anteckna och att anteckna så mycket som möjligt. De tillfällen då jag avstått från att anteckna har jag ofta fått ångra.
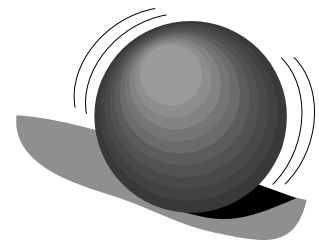
På rullande klot växer ingen mossa.

5.1.7   Alla designprocesser är oförutsägbara

Design av interaktiv TV är ett område med många parallella utvecklingsinsatser. Att arbeta i en sådan parallell utveckling har visat sig utmanande eftersom inte bara den egna designprocessen bär på överraskningar och hinder utan även samarbetspartnerns. Allas planeringar är temporära, och det behövs mycket kompromissvilja och alternativa lösningar för att driva sådana samarbeten.

Det är viktigt att inte skapa falska förhoppningar om nya funktioner som skall komma användarna till del utan att vara säker på att de verkligen kommer att finnas.

5.1.8   Nybyggt, rörigt och påverkningsbart

Det var svårplanerbart att genomföra ett designprojekt precis i starten av ett nybyggt vårdboende, till exempel (och som tidigare nämnts) skulle TV-uttagen bytas ut i alla rum, vilket gjorde att

frekvensen för den interna TV-kanalen behövde bytas. Det innebar att det injusteringsarbete som tidigare var nedlagt på detta blev omintetgjort.

Dock fanns också en vinst i att det gick enkelt att föreslå nya rutiner, eftersom dessa var under utveckling.

5.2 Lärdomar om bilder

5.2.1   Bra med bilder men inte hela tiden

I juni 2006 var min tanke att personalen dagligen skulle ta bilder av förmiddagsaktiviteter och visa dem på eftermiddagen i den interna TV-kanalen. Dock blev detta inte rutin utan bilderna uppdaterades som mest en eller två gånger i veckan. Detta kan bero på att personalen inte hade tid eller på att de äldre, anhöriga eller personalen inte fann något intressant i att titta på bilder från vardagen. Emellertid hände det flera gånger att personalen var angelägna att lägga in nya bilder innan helgen, då anhöriga ofta kom på besök. Det fanns äldre människor som vid tillfrågan om att se på den interna TV-kanalen sa att de redan sett bildspelet och gärna ville se något annat istället. För dessa människor så skulle det ha varit bra med ett kortare intervall mellan utbytet av bilderna i den interna TV-kanalen.

Inte heller Berit ville alltid titta i sitt TV-fotoalbum om hon fick frågan. Hon svarade att hon hade sett bilderna. Hennes intresse kunde ha varit högre om det funnits fler bilder i hennes fotoalbum, då hade hon inte lärt sig känna igen bilderna lika fort.

5.2.2   Bra med bilder men inte på allt

En del äldre människor kände att de (tyvärr) såg gamla ut när de såg sig själv i bildspelet på den interna TV-kanalen, men hade ändå en positiv attityd till att se bildspelet. Som policy i mitt utvecklingsarbete och i personalens uppladdning av bilder i den interna TV-kanalen gällde att aldrig visa bilder som skulle kunna uppfattas som generande för de äldre människorna.

5.2.3   Externa bilder, filmer och musik

Det var inte bara personalen som såg till att ta bilder, även de anhöriga hade med sig digitala foton, både från händelser på vårdboendet och från andra håll. De anhöriga visade dessa med hjälp av de media centers som fanns.

Jag hade ett avtal med statens ljud- och bildarkiv (SLBA), http://www.ljudochbildarkivet.se, vilket gjorde att jag lätt kunde få tag i den musik och de filmer som de äldre önskade. Normalt skall den media som lånas från SLBA inte lämna uppspelningsrummet, i detta fall beläget i Universitetsbiblioteket i Lund. För den utsträckta TV:n gjordes ett undantag så att det lånade materialet kunde spelas upp på vårdboendet. Detta har varit värdefullt för de äldre människorna och forskningsprojektet.

5.2.4 Ett nej är ett nej

Jag hade lagt tankemöda och utvecklingsarbete på att ha personalpresentationer med i den interna TV-kanalen. Dock sa personalen nej, nästan helt unisont. Och ett sådant nej måste respekteras, även om jag fortfarande tror att den funktionen vore viktig.

5.3 Artefakter och makt

Artefakter och teknik kan öka en människas frihet och kontroll, ja, makt, jämfört med att vara beroende av mänsklig assistans (se artikel II). Därför är det viktigt att fundera över hur maktbalansen påverkas genom införandet av en ny artefakt och vilken kunskap artefakten förmedlar till olika parter. Vidare bör man som forskare fundera kring vem/vad som avgör vad som är bäst för den enskilda äldre människan, samt ställa slutsatser från observationer mot varandra. Det senare benämns också triangulering (Ely et al., 1993).

5.4 Fotoram eller inte

Berit använde en fjärrkontroll i formen av en fotoram med tre knappar för att bläddra i sitt TV-fotoalbum, se artikel I och II. Mina handledares och min tanke var att hon skulle ha ett familjärt föremål som fjärrkontroll, och att fotot i ramen skulle föra Berits tankar till hennes foton. Hon kunde lära sig att använda bläddringsfunktionerna självständigt men inte att sätta på eller stänga av fotoalbumet. Vidare kom hon aldrig själv med förslaget att titta i sitt TV-fotoalbum, även om hon reagerade positivt när hon gjorde det. Tyvärr kände hon inte alltid igen fotot i fotoramen, och vid två tillfällen har hon indikerat att den är för tung och klumpig.

I ett tidigare projekt har en liknande design utvärderats (Cohene, Baecker, Marziali, & Mindy, 2007). Då använde en äldre

människa med demens ett fotoalbum som fjärrkontroll till sitt TV-fotoalbum, och bilderna på TV:n byttes när en sida i fotoalbumet vändes. Denna design övergavs till förmån för en fjärrkontroll med en stor knapp, eftersom fotoalbumets fjärrkontroll drog till sig för mycket av den äldres uppmärksamhet. Samma problem uppstod i inlärningsfasen av fotoramen. Berit förväntade då att fotot skulle bytas i fotoramen när knapparna trycks in. Denna initiala förväntning hade också flertalet andra människor som hört talats om projektet. Genom att lägga ljud till bilderna i TV:n förflyttades fokus till TV:n, dock krävdes det emellanåt två fokus för Berit; att titta ner och bläddra, samt att titta på TV:n.

Vid äldres användning av TV fjärrkontroller kan denna fokusförflyttning vara både en kognitiv belastning och medföra bekymmer med att byta glasögon då fjärrkontrollen och TV:n är på olika avstånd (Carmichael, 1999). Speciellt för äldre människor med demens skall hänsyn tas till att inte presentera för många samtidiga val för att undvika förvirring och stress. Ett exempel på detta är när vårdpersonal låter den äldre människan välja kläder, genom att visa ett plagg åt gången och fråga om det är rätt plagg (Fröling, 2005).

Bläddringsknapparna på fotoramen står ut cirka en centimeter från fotoramen, är stora och lätta att trycka in. Detta bidrar troligen till att Berit emellanåt kunde byta bild utan att flytta fokus till fotoramen.

Ett förslag för en framtida fotoram till TV-fotoalbumet är alltså: Gör fotot större, behåll knapparna, använd en mindre, mer greppvänlig och lättare fotoram. Dock är det viktigt att överväga om det finns en annan form än fotoramen, som lockar till att titta på foton men samtidigt inte drar fokus från TVn.

6 Diskussion

Nedan följer en jämförelse mellan hur projektet planerades och hur det blev i verkligheten. Därefter diskussion om giltigheten av resultaten, råd till liknande designprocesser och diskussion om hur projektet inspirerar till annorlunda TV-användningar.

6.1 Planering — verklighet

Inflyttningen hade beräknats vara klar i maj 2006 men var inte färdig förrän våren 2007. I juni 2006 var det tänkt att 10 äldre människor skulle få en personlig TV-funktion installerad i sin lägenhet. Diverse problem med utveckling av en sådan plattform gjorde att detta inte fanns klart till utsatt tidpunkt. Vid tre tillfällen var det tänkt att utföra väl förberedda intervjuer med dessa tio äldre, deras anhöriga och berörd personal. Dessa intervjuer blev inte utförda, inte heller med den äldre person som fick en egen TV-funktion under hösten 2006. Istället utfördes improviserade intervjuer. Före inflyttningen var det planerat att bygga en gemensam filmvisningskanal, vars roll i forskningsprojektet var oklar. Denna interna TV-kanal vidareutvecklades under hela projektets tid som en del av den utsträckta TV:n. Existensen av media centers var inte planerad innan inflyttningen. Det fanns inga urvalskriterier för de 10 äldre som skulle ingå i projektet, utan urvalet skulle utföras genom att fråga de äldre och låta personalen bedöma vem som kan ha nytta av en personlig funktion. Urvalsprocessen visade sig vara svårare än tänkt och drog ut på tiden. En del av urvalet skedde kontinuerligt genom hela designprocessen.

De fel som fanns på de nya TV-apparaterna (se 5.1.5) bedömdes äventyra forskningsprojektet eftersom ett skadat förtroende för de nya TV-apparaterna lätt skulle påverka TV-projektet negativt. Därför beslutades det att jag skulle avhjälpa TV-problemen så snabbt som det gick. Detta gjorde att jag blev känd för merparten av de äldre, att de uppfattade mig som en hjälpande hand och att jag besökte många av de äldre människorna. Med andra ord skapades ett förtroende för mig och därmed för projektet. Detta var en ovärderlig resurs i designen av den utsträckta TV:n. Dock står det klart att designprocessen har hindrats från att komma framåt, eftersom teknikutvecklingen till stor del kommit att handla om att avhjälpa fel i standardteknik.

6.2 Reliabilitet & validitet

Det går inte att diskutera reliabilitet eller validitet i de resultat som artiklarna visar på. Det var helt enkelt för många faktorer som varierade, t.ex. inflyttning av äldre, slutjusteringar av den byggda miljön och av tekniska installationer, personalrekrytering och inledande personalomsättning. Sammanhanget där den utsträckta TV:n designats kan bäst beskrivas som en pågående anpassning av det nybyggda vårdboendet, eller med andra ord en designprocess. Detta har inneburit att tekniska såväl som personella förutsättningar för den utsträckta TV:n har ändrats snabbt, vilket komplicerat utvärdering såväl som designen av den utsträckta TV:n. Dessutom skall det sägas att de äldres behov och önskemål troligen varierar under den tillvänjningsfas (Lee, Woo, & Mackenzie, 2002; Wilson, 1997) som finns vid flytten till ett vårdboende (se även artikel I). Därmed bör forskningsresultaten ses som bakgrundskunskap för vidare undersökningar och som eye-openers.

6.3 Designprocessen

Det andra delsyftet i denna uppsats är att bidra med kunskap om vad som är möjligt respektive omöjligt i designprocesser i en ny vårdboendemiljö tillsammans med äldre, personal och anhöriga medan inflyttning pågår parallellt.

Att genomföra forskningsprojekt under sådana förutsättningar kräver improvisationsförmåga och en stor lyhörd för de äldres önskemål som kan vara varierande under tillvänjningsperioden. Troligtvis skulle det varit mer fruktbart att enbart blanda in ett fåtal aktörer t.ex. ett fåtal äldre personer och anställda som utgör en fast arbetsgrupp. På så vis skulle alla inblandade fått bättre översikt över processen och vissa informationsproblem skulle ha kunnat undvikas. Informationsutbyte mellan deltagare i en människonära designprocess bör säkerställas (Jönsson et al., 2005), och med ett fåtal äldre personer skulle det sannolikt också bli enklare att följa deras tillvänjningsfas.

Designprocessen av den utsträckta TV:n kunde ha vunnit på att jag hade tagit tydligare ståndpunkt, istället för att ständigt försöka mig på en balansgång mellan alla aktörers ståndpunkter (Bossen, 2006). Detta och reduceringen av antalet aktörer hade gjort designprocessen mer transparent för de ingående aktörerna, vilket hade gynnat informationsutbytet.

Det kan också ha funnits organisatoriska förbättringar att göra i ledningen av forskningsprojektet, för att bättre knyta

designprocessen av den utsträckta TV:n till utvecklingen av vårdboendet. Detta för att bättre kunna ta hänsyn till förändringar som utvecklingen av vårdboendet medförde.

Alla dessa åtgärder hade kunnat medföra att en större nytta för de inblandade aktörerna kunde ha åstadkommits under en kortare tid, vilket är viktigt för sociala innovationer (Mumford, 2002).

6.4 Inspiration

Det tredje delsyftet i uppsatsen är att inspirera till annorlunda TV-användningar. Inom projektet har äldre, anhöriga och personal använt TV-apparater på sätt som de inte gjort tidigare. Dessutom har flera av dem efterfrågat olika typer av funktionalitet i TV-apparater som inte funnits innan. Det har förekommit en strid ström av studiebesök, och en del telefonsamtal samt email-konversationer med personer utan anknytning till vårdboendet. Det är alltså tydligt att projektet har inspirerat andra, och min förhoppning är att rapporten också kommer att göra det. Dock skall det sägas att användandet av interna TV-kanaler på vårdboenden inte är en ny företeelse. På OakLodge Nursing home, Irland, används den interna TV-kanalen för utsändning av gudstjänster som äger rum på vårdboendet (OakLodge Nursing Home), i Hoog Schuilenburg, Nederländerna, används den för att berätta om dagens väder och händelser i omgivningen (Thomas & Roose, 1998). På Vrinnevisjukhuset i Norrköping finns en intern TV- och radiokanal där personalen kan "spela musik, taltidning sända bildspel informationsfilmer etc." (Themmer, Svensson, Linde, & Nygren, 2002). Det finns även kyrkor som sänder sina gudstjänster direkt till äldreboenden (Ericsson, 2007). Emellertid är inte användandet av interna TV-kanaler på vårdboenden vetenskapligt studerat i någon större omfattning.

Det har tidigare genomförts vetenskapliga studier av interaktiv TV för äldre människor, se till exempel (Mitchell, Nicolle, Maguire, & Boyle, 2007; Baille & Schatz, 2006; Carmichael, 1999). Ofta bygger förslag till funktioner i interaktiv TV på personliga preferenser (Eronen, 2006) och för äldre finns en arbetsriktning med utveckling av personanpassade funktioner (Mitchell et al., 2007). Detta stämmer väl överens med det positiva resultatet i utvecklingen av ett personligt TV-fotoalbum. Dessa resultat innehåller ny kunskap om hur ett TV-fotoalbum kan stödja äldre människors kommunikation med anhöriga, genom att vara ett minnesstöd. Även betydelsen av de andra delarna av den utsträckta TV:n för minnesprocesser har analyserats, se artikel II. Dock har inga slutsatser om teknik som stöd för äldres planering kunnat göras, även om detta var en del av arbetets syfte.

7 Slutsatser

Den här licentiat avhandlingen har givit röst åt äldre människors TV-tittande och har visat på vad som är möjligt respektive omöjligt i designprocesser i en ny vårdboendemiljö tillsammans med äldre, personal och anhöriga medan inflyttning pågår parallellt. Den äldre människan har erfarenheter av TV-tittande som en del av det dagliga livet. Några av dessa erfarenheter har utvecklats inom ramen för konceptet "Den utsträckta TV:n". Den interna TV-kanal och det fotoalbum som utvecklades och testades inspirerade de äldre och personal och anhöriga till att pröva nya sätt att använda TV-bilder. Detta visade sig stödja äldre människors kommunikation med anhöriga och personal, genom att vara ett minnesstöd. Forsknings- och utvecklingsarbetet har genomförts inom ramen för de förändringar och den organisering som ett nystartat vårdboende kräver. Detta har medfört restriktioner såväl som möjligheter. Framförallt har det visat på olineariteterna i reella designprocesser.

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Artikel I. The Extended Television: using tangible design to meet the needs of older persons at a nursing home

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The Extended Television: Using tangible computing to meet the needs of older persons at a nursing home

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Purpose This paper presents a person-centred model and a tangible computing approach to better adapt the TV media to meet two important needs of older people: social inclusion in the immediate surroundings and better support for one's own reflections. **Method** The research project was carried out as a part of the construction, planning and implementation of a new nursing home. The implemented infrastructure enabled TV watching at three levels: the regular (broadcasted programmes), the internal and the personal. The internal level consisted of an in-house broadcasted TV channel and two media centres placed in common areas. The personal level had individualised functions. The entire concept is referred to as "the extended television". This paper describes the early implementation phase of the internal TV channel and the personal TV photo album. It also examines the consequences of a person-centred model and a tangible computing approach. The care workers were invited to comment on the prototypes very early in the process. **Results** Both the internal channel and the personal TV photo album were used by older residents and iteratively adapted. However, too many factors and routines varied to get statistically sound results. On the other hand, the research shows that the person-centred study design utilised provided positive results in a setting with constantly changing conditions. **Discussion** It encourages further investigations regarding how new conceptual TV design can enrich the everyday lives of older people. The results also indicate the plausibility of TV photo albums providing new opportunities for reminiscence compared to traditional ones, and that the internal channel resulted in possibilities for social inclusion in the nursing home of the older people and their relatives.

Keywords: older, tangible computing, person-centred, social inclusion, reminiscence, photo

INTRODUCTION

The process of designing technologies for older people is often based on techno-centric rather than person-centred models as argued by Dickinson and Dewsbury[1]. A techno-centric design model represents older people as recipients of technology while a person-centred design seeks to find technological solutions that fit their life experiences, expectations, etc. Furthermore,

Dickinson and Dewsbury argue that user-centred design will decrease the likelihood of unsuccessful technology and decrease the unhealthy effects of negative stereotypes, such as seeing aging as functional decline. They also mention the challenge in the design phase where the older person is to "comment on technologies that do not exist yet".

One way to approach a person-centred model is through the development of tangible computing, which means moving the computing power from desktop computers to known everyday objects that have been present in the user's environment for a long time. In this way "specialised devices that are organised to work the way we do, in the world and on the move" are constructed[2]. Positive results have been reported on using familiar artefacts and tangible computing to support older people's recollection of memories[3,4] but also to support the relatives' emotional connection to the older person[5,6]. We have reached a level of technical saturation and in order to utilise the possibilities it offers, we should design with respect to human needs and not to computer limitations[2]. In other words, what is needed is not primarily more technical knowledge but knowledge about desired functionality[7]. Tangible computing requires, above all, knowledge about which everyday objects are suitable to use, and the needs the user has in relation to these objects.

TV watching reconsidered

Television is one object that we considered suitable to be part of tangible computing, both from the quantitative use of the TV among older people and available results on what TV watching means for them. Old people actually watch more TV than any other age group, an activity that seems to increase over the adult life span and has been constant through the years[8,9]. The TV media has not, by far, received the same attention as computers, in spite of the increased attention being paid to the development of interactive TV. This is in our view an example of how the main focus in the development of artefacts often has been on using the potential of new technology, rather than using the stored potential in the users, which in the case of television consists of about fifty years of experience. Our approach is the opposite. As recommended in a recently published article[10], we do not use interaction patterns originating from the computer paradigm, instead we use older people's long experiences of viewing TV.

TV watching is usually regarded as a passive activity, as well as one that makes viewers passive[11]. The care workers in nursing homes often express that they have a bad conscience because the older people spend such a big part of their day in front of the TV. The older people themselves state that relatives interpret their extensive TV watching as a sign of loneliness and abandonment[12]. Two Swedish studies, in 1995[12] and 2005[13], show the extent to which and at what times older people watch TV, how TV watching contributes to meeting their need of maintaining contact with the surrounding world, and how it affects feelings of social inclusion and exclusion. The results show that if they spend the larger part of their time at home, TV watching contributes to maintaining a feeling of being socially integrated and hence maintaining contacts with the surrounding world. The results indicate that others often misjudge their experience of watching TV, which for them does not only mean acquiring information or being entertained, but also provides them with opportunities to reflect in peace and quiet. This need is pointed out both as a part of the ageing process and as something

performed when watching TV. It is also pointed out that this need for reflection is hard to perform in our society where activity and being active is a dominant ideal[12,14].

The TV media is, however, poorly adapted to two of the older people's important needs, namely social inclusion in the immediate surroundings and better support for one's own reflections[12,13]. We have taken these two needs as a starting point. At the same time as you maintain a feeling of still being a part of society from the information flow that the TV contributes, the supply of TV programmes distances you from the immediate surroundings. You end up knowing much about what is happening far away, but hardly anything about what is happening in your own neighbourhood.

Aim

Based on this background, we decided to conduct a pilot study. The aim of this paper is to inspire further research on how the use of the TV can become more deliberate and developed in order to correspond to older people's needs and wishes, at home or in nursing homes, and also in the early stages of dementia.

THEORY

Reflection and reminiscence

We define "reflection" as the older person's need for reminiscence. In the field of reminiscence, hidden memories of experiences are activated by objects, pictures, sounds or other triggers and used to increase the understanding of a person. Reminiscence is used particularly in the treatment of persons with dementia and is defined as the memory activity; it works as a distribution of hidden memories. These kinds of hidden or unannounced memories are something that we can experience at any age, but they have a tendency to increase as we grow older[15,16]. Digital reminiscence devices has been designed and tried by elderly people with and without dementia[17-19]. Older peoples' use of TV watching to provide for their own reminiscence and social needs will most likely affect their expectations when they move into nursing homes.

Social inclusion in care settings

As older people move into nursing homes their social life and physical surroundings change, which leads to a transition period of adaptation to the new situation. In this transition it is stabilising to develop relationships with other residents[20]. After the transition, older people also often experience the opportunity to tell stories to others as something positive[21]. However, establishing new social contacts can be difficult[22] and positive results have, for example, been reported on letting older people use memory books with photos and simple sentences to facilitate communication[23].

Designing for old people

The project is a part of the *Ageing and Design Programme* that was launched at the Department of Design Sciences at Lund University based on rehabilitation engineering research and gerontological studies[24]. Some of the most important principles of the programme are found in the extended television project. When designing for older people it is a wise rule to change as little as possible[24]. Tangible computing enables the fulfilment of this requirement since familiar technology is used and functionality is supported in a non-intrusive way. This is important, for example, for older people with dementia. However, it is also important that the older person maintains control[25].

MATERIALS AND METHODS

We created the "the extended television" in connection with the design of a new nursing home in Malmö, in southern Sweden. The extended television consisted of a suite of added TV functions, which widened the opportunities for social inclusion in the immediate surroundings and reminiscence for the older residents.

Settings

In the nursing home there are 53 apartments, common day rooms and TV rooms. The apartments are spread over three floors, where the first floor is a short-term unit (11 apartments). This unit is excluded from the analysis and further description of the settings, due to the late initialisation of the unit. The TVs in the TV rooms are 42" plasma screens. In each of the apartments there is a 32" wall mounted LCD TV screen. The private company which runs the nursing home has been active in influencing its architecture and interior design and pays a genuine interest to if and how an extended television can enhance the quality of life for the residents. Both the number of older residents that were involved and the number of employed care workers increased during the period of observations, since the apartments were gradually becoming occupied. Floor two and three was filled to 40% capacity by May 2006, 80% at the end of August 2006 and 90% at the end of December 2006. At most, 30 residents were observed. They were of different genders, backgrounds (fisherman, singer, engineer, athlete, care worker, etc.) and ages (between 60 and 100 years). They all had some kind of functional limitation due to, for instance, different kinds of dementia, physical disabilities caused by rheumatism or cancer, and stroke related conditions such as aphasia or memory loss. The majority of the people who lived at the nursing home had some kind of memory loss. All of the permanently employed care workers had traditional health care training and several of them also had other experiences that were especially valuable at the nursing home, such as computer skills, painting, ceramics, baking, hairdressing, etc. There were, except for an imbalance at the opening of the nursing home, approximately the same number of employed care workers as older people. In May 2006, one day-time registered nurse was employed and in the autumn of 2006 it was decided to also have nurses on duty at night, resulting in the hiring of new nurses (five nurses were needed to cover all shifts).

The infrastructure enabled TV watching at three levels: the regular (regularly broadcasted programmes), the internal and the personal. The personal TV is analogous to a personal

computer, PC, but perceived as being part of the TV and presented on the same screen. All together this is what we call "the extended television". On the internal level there were several options: watching the internal channel, digital photos, DVDs or movies from the open archives of Swedish Television via Internet. The internal channel could easily be installed in all TVs and used to watch movies from a central DVD player or to view daily photos from the nursing home and receive information about personnel, meals, etc. Watching movies from the Internet, locally stored digital photos or locally played DVDs could only be done in one common TV room and in one day room since it required a TV connected to a computer.

One of the authors, Peter Abdelmassih Waller, was present approximately 15 hours a week at the nursing home. His presence was considerably higher, up to 30 hours a week, during installation of the technology, troubleshooting and observations of the initial use of the personal TV.

Method

The project was of an action research character with interactive design portions, continuous mutual feedback and direct observations. The design process covered design of functions for the internal TV as well as a personal photo album for the personal TV. Different approaches were used for the internal and personal levels – the latter was based on one case study while the former got its input from a continuous presence with the direct purpose of interaction for better understanding the needs and wishes of as many as possible. The two design processes also cross-fertilised each other.

The implementations in this research were tested during the turbulent period that followed the construction of the building. It was impossible to collect controlled and statistically sound results, since there were simply too many factors and routines that varied due to the unpredictable influx of older people, initial labour turnover, adjustments of the technical installations and built environment. The unpredictable influx of residents also made the need for recruitment of care workers unpredictable. On the other hand, the research shows that the study design utilised also provided positive results in a setting with constantly changing conditions. It is supported by recommendations in the literature to make use of pilot studies as a first step and through case studies to fill in for the lack of knowledge concerning therapeutic activities for older people with Alzheimer's disease[26]. The hope is that this project will encourage others to conduct studies in more controlled settings.

Observations, dialogues and interaction

The observations and dialogues were goal oriented and semi-structured with the outspoken aim of guiding the design processes. The first observations were carried out in July 2006, just after the opening of the nursing home, and the last ones included in this paper were carried out in January 2007. Notes were not taken in front of the older persons, instead they were written down soon after visiting an apartment or a day room.

A method often used in participatory research approaches and a main challenge for us was to involve the end users to interact through the use of mock ups or prototypes, both through their actions and their comments. Older people are critical and valuable users, since they tend to only accept technology that "saves energy and makes life easier"[27]. However, a direct approach can not be always applied [25]. Early prototypes can be totally rejected because they are not ready or – on the contrary – totally accepted with the consequence that the user does not want to switch to the final product since it requires too much effort to relearn. Older people with dementia can become upset or confused when trying something that does not work perfectly. We followed the advice of working with carers in the initial design phase to come up with a prototype and then letting the older person use it[25].

Revealing the requests on the contents of the internal TV

Waller visited more than 50% of the older persons in their apartments (mostly older people without dementia) and visited all day rooms routinely on each visit, to talk with the older persons. Waller also participated together with the older people, relatives and care workers in the use of the functions on the internal level. Furthermore, he trained potential users.   The care workers did not have time for long conversations when on duty. Instead appointments were made, or the conversations took place during their coffee breaks.

To some extent the relatives were also involved, both through direct contacts and through contacts via the care workers. The relatives were generally interested in the project and curious about the possibilities for their resident relatives. Information via the care workers was double checked as far as possible for consistency. Even if the care workers often had a prominent role in the design process, their observations and opinions were compared with those of the older people to try to get as close to them as possible. Whenever possible, the opinion of the older person herself took precedent.

Case study for the design of the personal TV photo album

One personal TV photo album was designed in an older persons' apartment. This older person, Berit, had Alzheimer's disease with significant short term memory loss (diagnosed in 2001 and at the time of the study had a moderately severe cognitive decline [mid-stage Alzheimer's disease]). She was almost 90 years old. Her husband had taken care of her until he became ill and died. During his illness she moved permanently to a nursing home, approximately one year before this study began. Her two daughters visited her at the nursing home, however, only one of the daughters and her husband were involved in the design process; they are hereafter denoted as Berit's relatives. Information about Berit's preferences was gathered by asking her, relatives and care workers, but also by looking in photo albums, watching TV, or having coffee together with Berit, alone or with relatives or care workers.

RESULTS

Design of functions on the internal level

The work process was divided into four phases. The first phase consisted of integrating the project into the setting and becoming familiar with the conditions, that is to say the technical applications to be tested and the people involved. In the second phase the older people and the care workers discovered the new possibilities, either by themselves or through an introduction. During the third phase, technical alternatives or modifications were considered with the user's first reactions in mind. In the fourth phase, the older people took more control over their usage of the internal TV. All four phases were affected by major repairs of the new TVs.

Phase 1: Project integration

Waller used a digital camera to take photos of the nursing home surroundings. These photos were later shown in several day rooms by connecting the digital camera to the TV. The slideshows were appreciated, especially on the ward where people with dementia lived. Many older people appreciated having their photo taken and displayed on the TV. These early trials laid the foundation for installing two media centres and developing the internal TV channel.

The early design of the internal TV channel involved showing care workers examples of how the channel could be used and asking them which features they thought would be useful for the residents. The first version of the internal channel was much like a slideshow presentation where a specific seasonally inspired picture was shown each weekday. This was followed by approximately 20 photos from outside and inside the nursing home. Digital cameras were purchased and the care workers documented memorable events with photos, such as the midsummer dinner party. These photos were later added by the researcher to the slideshow. A code of ethics was adapted for the use of cameras. Photos were only taken in common areas such as the day rooms, the balconies and outside of the nursing home. Furthermore, photos showing possibly embarrassing situations, for example an older person sitting on a visible urinary protection pad, were not shown on the internal TV channel. Care was taken to avoid photos of older persons who did not wish their photo to be taken.

By placing a computer next to two TVs in common areas where the care workers could use the computer together with the residents to watch movies, digital images or media from the Internet, the researchers and the care workers were able to understand which functions and media were of interest for the older persons. The computers did not contain any media centre software, such as Microsoft Media Centre Edition, but we still denoted them as media centres.

One of the most important steps in the integration of the research project into the research environment was the creation of a group of four care workers who willingly formed a "TV team". Their tasks were to:

- Try different functions of the "extended television" and to regularly use the functions of their choice.
- Be a part of the design process. Take notes on what was used, why and how the different residents referred to the possibilities and what the effects were.
- Inform and inspire others in the personnel to try the extended television.
- Report technical errors.

Phase 2: Discoveries

It was evident that those who were able to use the TV in their apartments did not have a diagnosis of dementia, but many of them had problems handling the original remote control. They did not understand how to operate it, and often got stuck in peculiar modes such as watching two channels at the same time, or with an altered screen resolution.

The internal TV channel was seldom switched on by the care workers; however, a rumour spread among the older people without dementia about the channel, inspiring several of them to watch it in their own apartments. The pictures on the internal TV channel were seldom updated, though, since the care workers rarely used the cameras on their own to document events and had to rely on the researcher to upload them. This resulted in most of the residents losing interest in watching the internal TV channel after a while. A major reason for the low usage of the digital cameras was the turbulent situation that followed after the nursing home first opened.

The media centres were used to organise slideshows containing old (scanned) and new photos which at times triggered lively discussions among the residents. Furthermore, there was a spontaneous interest from the relatives to use the media centres to interact with their parents or grandparents using personal digital photos. On several occasions the media centre in the day room for people with a diagnosis of dementia had been used to show streaming media through Internet from the open archives of Swedish Television. When a talk show from the 1960s with a famous Swedish actress was shown, the room went totally quiet. Afterwards, many expressed happy memories of the actress. Several also knew that there was a second part of the show and insisted on seeing it directly.

Phase 3: Alternatives and modifications

The problems of using the remote controls made us consider another remote control that would only have a few buttons. Six buttons were needed: one to turn on the TV, two to change channels back and forth, two for increasing or decreasing the volume, and one to turn it off. We did not manage to find a six-button control compatible with the 32" TVs but used instead a programmable universal remote control with ten large buttons, see Figure 1. A logo was placed in the upper right corner of the internal TV channel screen image and on one of the buttons (VVG in Figure 1) of the universal remote making it easy to find the internal TV channel.

The comments from older persons without dementia indicated that their limited viewing of the internal TV channel was due to the limited variation of the contents. The process of uploading photos was improved so that the care workers could do it themselves and the TV team took shape. Within a week, one member started independently to upload pictures, resulting in an increased interest in the internal TV channel among the older people (with and without dementia) and care workers. For the internal channel to be attractive there needs to be continuous variation and awareness of the users' interests.

Phase 4: Users taking control of the internal TV channel

The increased use of the internal channel and the need for variation made us remove the limitation on the number of photos in the slide-show. As the slideshow grew in length, we broke it down into separate shows for different floors of the nursing home and broadcasted them at different times. When the older residents with dementia watched the internal TV channel, they mainly did so together in their day room. However, several people without dementia watched the internal channel in their own apartments. The older people themselves, care workers, and relatives all took the initiative to spread the usage. Both older persons with and without dementia reacted positively to seeing themselves on the TV channel,

Figure 1. The Universal remote control.

and they often commented on the events that took place, or on an event which was associated with it. However, some of the older people who enjoyed watching the channel did not switch it on themselves, and in those cases it was the care workers and the relatives who initiated usage. The relatives used the channel to communicate with their older relative, either by asking the older person about the contents or by telling about the contents. There seems to be an interest in photos from activities that took place a month ago, as well as in recent photos. Suggestions have been made to include music, old movies and accounts of trips. Maintenance in the cable TV network made it necessary to change the frequency of the internal TV channel and to reinstall the TV channel in the TVs.

Case study: Berit

It was clear that viewing photos on a TV was a promising idea and as we became better acquainted with the older persons at the nursing home, we were told by Berit's relatives that she used to be interested in looking at her photo albums. Her relatives were informed of the project and four suggestions were made: use the TV as a diary, a calendar, a mailbox or a photo album. The TV photo album function was chosen and informed consents were signed by the daughter, some of the care workers and Berit's trustee.

Design of the tangible TV photo album

Approximately 5 hours of looking at traditional photo albums with Berit, spread over 5 sessions, confirmed her interest in this activity. She was always attentive when she saw her photos, looked happy and often said "great". However, she did not suggest looking at photos, although the albums were left visible. We had a good idea of what and whom she recognised and how she reacted. She was, for example, interested in photos of her late husband. Emotions were involved and on one occasion she started singing. She indicated that the older black and white photos were too small for her to see. Forty photos were initially selected to be in her personal TV photo album on the basis of Berit's positive associations with them.The non-digital images chosen were scanned and digital photos from relatives were included. This became the first version of Berit's digital photo album.

It was clear from the beginning that Berit had problems operating her TV using the original remote control. Based on our positive experiences with the universal remote control (Figure 1) we gave one to Berit. She was trained in using it by one of the researches and her daughter with limited success, making it clear that another interface was needed for Berit to interact with her digital photo album. The authors came up with the idea for her to use a wooden photo frame with integrated remote control buttons to browse among the photos, shown in full screen on the TV (not in the photo frame). This would merge two activities familiar to Berit: looking at a photo in a frame and watching TV (she had photos in frames in her apartment and had been watching TV before she developed dementia). The photos were not categorised, thus keeping Berit from having to make choices that could cause stress. Menus on the TV screen were avoided to keep the interaction with the TV simple, as well as to maintain the feeling of watching TV. The photo in the handheld frame was one of her own and the hope was that this would prompt her to want to view the TV photo album. The idea was that this interaction should be easier to learn than that of the universal remote control.

A wooden photo frame was fitted with an IR remote control unit that had an inbuilt button and two external buttons connected with hidden cables, see Figure 2. The glass was replaced with glass fibre, and the screws painted over to avoid any problems with nickel allergy. The upper yellow button was the on/off switch. The white button next to the photo browsed in one direction and the green button in the other. These buttons stand out physically and are easy to find and push. The colours of the buttons were chosen to contrast against the black background of the photo frame.

One care worker who knew Berit tried the first version of the TV photo album, browsing through the selected photos with the photo frame control. She needed an explanation to use the photo frame but was open to the idea of using it. She agreed that Berit should not use the universal remote control and affirmed the need to rearrange the furniture in Berit's apartment to make it easier for her to view the TV screen. Berit and her relatives gave their consent to rearranging the furniture and an armchair was placed in front of the TV. No confusion due to relocation was observed by relatives and researchers or reported by care workers. This is probably due to the fact that Berit did not use this part of the apartment when she was alone.

Figure 2. The first working prototype of the photo frame remote control with a small yellow on/off button, and large white and green browsing buttons to the left and right of the photo.

Berit's usage of the tangible TV photo album

During the first three days after installation, Berit viewed the TV photo album on four occasions. Each lasted between 30 minutes and one hour, and all the photos were often viewed several times on each occasion. At the beginning she did not want to control any function of the TV photo album, and trusted the designer to change photos. However, she clearly enjoyed the images, and often seemed to think about the contents in the images. She spoke in more detail than while looking at the same photos in the traditional album and also recognised more of the photos than before. This was probably due to the larger format that makes more details visible, the selection of recognisable photos and by looking at the photos repeatedly. If she was asked to change photo, she sometimes pushed the forward button, imitating the designer's behaviour; at other times she said *"No, that is for you to do"*. When she pushed the button, she was looking down at the photo in the photo frame, clearly anticipating something to happen there. She did not let go of the button, probably since she did not see any change. If she was reminded by the designer to look up at the TV she did not always notice that the photo had changed. This can be due to short term memory loss. A short recording of her singing was added to one image which made her look at the TV screen. On the third occasion she was handed the TV photo album remote after the TV had been switched on. She repeatedly pushed one of the large buttons, let it go, looked at the TV screen and commented. One of the images was missing and a white screen appeared instead. She experienced this as the end of the photo album. After this, an empty image was always included since she appeared to be pleased that the photo album slideshow had ended. This may be because she was standing and did not find a convenient way to hold the photo frame remote control. On the fourth occasion she did not want to change photos herself, which can be either due to memory loss or increased insecurity since she had visitors from other apartments in her room. Weeks after this intense period of using the photo frame, she easily found her way back to operating the TV photo album herself by imitating the researcher's use

of the photo frame as she was handed it. Even though Berit never suggested herself to watch the TV photo album, it was an enjoyable activity for her that she was *never* forced into. Furthermore, by watching the photos on the TV, the relatives could easily watch the photos with her.

Case study summary

There was a clear difference when Berit's experience was included in the design process of the new TV photo album remote control, compared to just giving her the universal remote control to use. She never pushed the buttons on the universal remote herself and needed to be convinced to use it even after many hours of TV watching. But she was able to remember how to browse among the photos using the photo frame remote and she also did it on her own. On several occasions, though, Berit did not want to change pictures herself, most likely from a feeling of insecurity. Due to time constraints a second improved version of the photo frame was not developed. The photos inspired her to more verbal reflections on the content than the traditional photo album did, and she also recognised the photos easier. Furthermore, it would not have been possible to handle printed photos of the same enlargement as the TV screen with the same ease as with the TV photo album. It is thus plausible to assume that the TV photo album provides new opportunities for reminiscence when compared to traditional ones. Due to time constraints, Berit's archive of music and home movies was not added to the TV photo album. However, this possibility should be considered as a major advantage of the TV photo album compared to traditional photo albums or printed photos.

CONCLUSIONS

The results clearly demonstrated that the internal TV channel gave information about the immediate surroundings that was enjoyable or useful for several of the older people and their relatives. It became a tool for reminiscence and interaction between the older people, the care workers and relatives and increased the possibilities of social inclusion in the nursing home.

The results make it plausible that the TV is a suitable artefact in tangible computing solutions for older people with dementia and their recollection of memories. Furthermore, the TV photo album offered new opportunities for reminiscence when compared to old photo albums and the pilot study strongly encourages further investigations regarding how new conceptual TV design can enrich the everyday lives of older people.

This work started with determining the older person's wishes and continued by listening to their opinions. Consequently, the positive results of the design process clearly support the use of a person-centred model. However, it was fruitful to involve both the older person, relatives, and care workers since everyone contributed constructively with knowledge and inspiration to the design process. The team of care workers working with the project was necessary for integrating the technology and gaining information about the usage of the extended TV. They will also play a key role in the project's continuation.

Acknowledgement

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Artikel II. Extended Television: A study of how investigations of use can inform design processes in nursing homes

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Extended Television:
A study of how investigations of use can inform design processes in nursing homes

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ABSTRACT

This paper describes the shortcomings in the support that replaces the lost distributed cognition in older people who move to nursing homes and how artifacts can improve this by functioning as distributed cognition. The 30 older persons in the study were men and women of different backgrounds and ages (between 60 and 100 years), all of whom had some kind of functional limitation. The observations and analysis were carried out as a part of the iterative design phase of TV functions for the older people, and the analysis was based on distributed cognition theory and the FACE conceptual design tool. Poorly designed artifacts resulted in the older person's loss of control, and hindered the creation of distributed cognition. However, these aspects improved in the older persons' TV watching when individually adapted assistive technology was used.

Keywords: *Distributed cognition, older people, assistive devices, design, television.*

1. Introduction

Distributed cognition describes how human acts or artifacts can mediate knowledge and memory (Hutchins, 1995a, 1995b; Norman, 1993), without people necessarily being aware of it (Norman, 1993, p. 143). Systems with distributed cognition can not be reduced to cognitive properties of individuals (Hutchins, 1995b, p. 355). Empirical investigations of the role of technology in collaboration and in distributed cognition in nursing homes are scarce. This is especially true for investigations with a focus on the older individuals.

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This paper discusses the memory aspects of distributed cognition. This means other aspects of distributed cognition, such as decision making, inference, reasoning and learning (Hutchins, 2001), are not analyzed. The term *distributed memory* is used to denote the segment of distributed cognition that concerns memory. Distributed memory processes are disrupted when older people move into nursing homes and need to be rebuilt there. The relocation results in new routines, changes in relations with relatives, new people to interact with and loss of old artifacts. The old artifacts that are kept in the one-room apartment in the nursing home can originate from several different rooms in the former home and from different places where the older person used to stay before the relocation, for instance, from an apartment or a summer cottage. New artifacts are introduced and new arrangements of these and old artifacts are made. Furthermore, this happens at a time in life where memory problems can arise without a disruption in the distributed memory. In the relocation, the older person's self-image can change from one of self reliance to one of becoming a burden (Svidén, Wikstrom, & Hjortsjö-Norberg, 2002), and older people with dementia can become confused and experience discomfort (Son, Therrien, & Whall, 2002). However, there are also older people who experience relief and security after the relocation to a nursing home (Lee, Woo, & Mackenzie, 2002).

The observations in this study were made as a part of the design of a suite of TV functions in a nursing home that are referred to as *Extended Television* (see section 4 for a description of the functionality). The overall research question is how the conceptual design tool FACE [Function, Attitude, Control, Enabling] (Anderberg, 2006) and distributed cognition analysis of the usage can contribute to the design process. Furthermore, the purpose of the article is to describe the shortcomings in the support that replaces the lost distributed memory of older people in nursing homes, and to understand how artifacts can strengthen the older person's actions and control, when they are a part of his or her distributed memory (meaning that they act as representations in distributed memory processes). The study also seeks to understand how this knowledge can be used in the design process. The focus is on the older persons, although care workers and relatives are included in the analysis.

The use of extended television is analyzed using distributed memory and FACE (Anderberg, 2006), which is a conceptual design tool to analyze perceived attitudes, the individuals' control, and enabling of the analyzed function, such as watching TV. The main contribution of this article is in the qualitative empirical study of older

people's use of extended television in a nursing home, and in the use of a combined FACE and distributed memory analysis in this context.

The design phase (which involved older persons, relatives and care workers) and usage of extended TV is described by Abdelmassih Waller, Östlund, and Jönsson (2007).

It is important to acknowledge that older people watch more television than other age groups, that the activity seems to increase over the adult life span and that this increase has been constant through time (Nordicom, 2006; Robinson & Skill, 1995). Television is poorly adapted to older people's social inclusion in their immediate surroundings, but is used by older people to support their own reflections (Östlund, 1995, p. 137, 147). These factors were an early inspiration in the design phase of extended television.

Some of the prerequisites of designing for older people in a nursing home are described in section 2, and in section 3 FACE and distributed memory are discussed in greater detail. Section 4 describes the settings and the participants, while section 5 is devoted to presenting the method used. Section 6 describes the use of extended television, as well as an analysis thereof. A concluding discussion is presented in section 7 and conclusions in section 8.

2. Design for Older People

In this section, general considerations on how to design for older people are discussed first, then how photos can strengthen communication with older people, and finally how older people's memory changes with age.

Familiarity with visible parts of technology increases the probability for acceptance of a "new" artifact by older people (Östlund, 1995, pp. 234-235). In addition to this, poor health, unsatisfactory contact with others, and high education can contribute to older people's acceptance of new technology that enhances the quality of life (Zimmer & Chapell, 1999). The need to minimize physical and mental efforts probably influences "their choice of technology and their willingness to learn." Furthermore, older people "tend to accept technology that saves energy and makes life easier" (Östlund, 2005, p. 38), and it is important that new devices are constructed so that the older person is in control (Anderberg, 2006; Norman, 1999, p. 174; Orpwood, Bjørneby, Hagen, Mäki, Faulkner, & Topo, 2004). There is also a design recommendation to change as little as

possible, and to design for the older person's own actions (Jönsson, 2003, p. 11). This can mean that the older person would like to keep a familiar artifact, but also that there is a familiar function that the older person wishes to keep. Furthermore, to design for the older person's own actions does not necessarily mean that the older person should be physically active; it could also be a design facilitating the older person's reflections on the past.

For people with dementia it can be advantageous if new features are included imperceptibly, so that the new device (that looks like equipment that existed in their home) operates just like the ones they are used to (Orpwood et al., 2004; Orpwood, Gibbs, Adlam, Faulkner, & Meegahawatte, 2005). Such devices are not necessarily a part of compensatory memory aids that are consciously used by older persons, such as those discussed by Caprani, Greaney, and Porter (2006). The importance of adapting the artifact to past experiences and utilizing external cues as well as environmental ones is also stressed by Gamberini, Alcaniz, Barresi, Fabregat, Ibanez, and Prontu (2006).

Human support can be valuable, among other things, for its assistance in adapting to a changing environment; however, the supported person's loss of control is always a problem. Well-adapted technology, on the other hand, can be an extension of the individual's own wishes (Anderberg, 2006). However, a study by Drageset (2004) indicates that help from care workers in performing activities of daily living can counteract feelings of loneliness.

In order for care workers to provide quality care, their actions should preferably be based on a mental image of the older person that includes the time before living at a nursing home. One possible consequence of lack of knowledge is a spiral of increasing dissociation of the older person and the care worker. In this situation the care worker can feel stressed, and come to believe that he or she carries the entire responsibility (Rahm Hallberg, 2002, p. 48). Beck-Friis states that people with dementia need a trail blazed down to their memory, such as a scent, a melody or a photo. She states that this is important to consider in the care of people with dementia, and that support is to be given in order to *"*help to bring forth the mental images that are still there/that still exist.*"* (Beck-Friis, 2000, p. 41)

2.1 Using Photos for Communication

Technical support in the form of digital and printed photos has proven to be a valuable communication and memory tool. An example of this is the extensive use of

personal photos by adults with developmental disabilities as described by Plato and Jönsson (2001). They report that photos

> "support and confirm memory as well as working as a written language. In addition, they are a source of inspiration for conversation, that is, they work as a spoken language or support to such as a written language" (Plato & Jönsson, 2001, p. 7).

The personal photos were much better suited for these purposes than non-personal, symbolic, photos (Jönsson, Philipson, & Svensk, 1998). A photo can be experienced as personal if the concerned individuals have memories associated with it. In this way, photos can act as representations of memories to individuals in processes with distributed memory. A photo that only one person has memories tied to can be used for communication; however, a photo works better as a conversation support if both persons have memories tied to it. Furthermore, memory books with sentences described by either personal photos or general sketches have been found to augment the communication between care workers and older people with dementia (Allen-Burge, Burgio, Bourgeois, Sims, & Nunnikhoven, 2001; Bourgeois, Dijkstra, Burgio, & Allen-Burge, 2001). Multimedia solutions for older people with dementia using photos and music have also shown positive results (Cohene, Baecker, Marziali, & Mindy, 2007; Topo et al., 2004).

2.2 Memory and Familiarity

Human implicit memory categorizes the effects of prior experience without conscious recollection thereof. This means that unconscious procedural skills such as bicycling and combing hair are included in implicit memory. Furthermore, the usage of implicit memory can give a feeling of familiarity (Son et al., 2002). The performance of explicit memory tasks, such as conscious recall, often becomes poorer with age, but implicit memory is often unaffected (Fisher, 1998, and as summarized in Caprani et al., 2006) or is only slightly affected (Woodruff-Pak & Lemieux, 2001). This deficit in explicit memory is observable among older people with dementia, and it is recommended that new interventions should use aspects of prior familiar environments including objects and pictures "to maximize functional ability in elders with dementia" (Son et al., 2002, p. 266).

Investigation of how older people with dementia, who have a working implicit memory but poor explicit memory, use technology could shed light on design issues for older people in general as well as older people with dementia. Their poor explicit memory

means that they have difficulties with conscious learning. Consequently, artifacts that the older person with dementia does not use but wants to use become indicators of what is difficult to learn. People with a working explicit memory can consciously compensate for poorly designed artifacts, while older people with dementia are unable to do so. Strengths in the implicit memory of people with dementia can be used to design artifacts that give a feeling of familiarity and may also be appreciated by a wider range of older people.

3. Theory

This section provides a theoretical background for the distributed cognition and FACE analysis. Distributed cognition is described first, and discussed from the viewpoint of activity theory and situated action. Thereafter, distributed cognition is discussed from the perspective of aging, and finally FACE is described.

3.1 Distributed Cognition

Distributed cognition is one of the conceptual frameworks that can be used to analyze the use of extended television in its context. Examples of other possible frameworks are activity theory and situated action (Johansson & Gärdenfors 2005; Kaptelinin et al., 2003). These frameworks all focus on both users and context. As stated earlier, this paper uses the memory aspects of the distributed cognition framework to analyze the use of extended television. This non-reductionist analysis treats complete processes, such as watching TV. The analysis shows how memory in a process is represented in the different steps needed to carry out the process. For instance, the idea of watching a certain TV program can be presented orally by a relative, and later the presence of the TV acts as a reminder to watch the program. In this example, the idea of watching TV was first represented by the relative and later by the TV. This transformation of different representations of memory is also treated by Hutchins (1995a).

A disrupted distributed memory can result in the loss of representations needed to carry out one or several of the steps in a process, thus making the activity difficult or impossible to perform. Consequently, a distributed memory analysis can find the missing representations needed for the older people and discuss how to assure the existence of such representations.

The theory of distributed cognition (Hutchins, 1995b) is symmetric, meaning that both artifacts and humans can be thought of as cognitive representations. This is different from activity theory, which distinguishes between the user (subject) and the artifact (object) (Nardi, 1996, p. 73). Distributed cognition can be used to analyze processes where the user plays a significant role without necessarily being aware of it (Norman, 1993, p. 143), while activity theory focuses on intentional actions. In fact, activity theory "seeks to understand the unity of consciousness and activity" (Kaptelinin & Nardi, 2006, p. 8). In the design of extended television, it has been important to analyze situations where people's intent has been unclear due to difficulties of interviewing people with dementia. Furthermore, it has been necessary to use a framework that highlights the role of artifacts. This is a frequently used and acknowledged property of distributed cognition (Nardi, 1996, p. 85). However, there is a risk that human intentionality and creativity can be neglected with a symmetric analysis like distributed cognition (Kaptelinin & Nardi, 2006, p. 241).

Suchman points out that situated action stresses the uniqueness of human action, compared to machine operation. Furthermore, she thinks that in order to make a situated analysis of human action, it is necessary to consider the "unique, unrepresented circumstances in which action in every instance and invariably occurs" (Suchman, 1987, p. 189). This means that human improvisation is emphasized (Nardi, 1996, p. 85).

The design in this project draws on the user's earlier experience with television and on familiar patterns of actions concerning TV viewing. It seeks to limit the learning needed to use extended television, especially due to possible deficits in the explicit memory among older people. This means that the designed artifacts should well suit the implicit memory in which routine actions are stored. This makes distributed cognition a suitable framework of analysis, with consideration taken to human preferences.

3.2 Distributed Cognition and Aging

Distributed cognition, as mentioned in the introduction, can not be reduced to cognitive properties of individuals. This presents opportunities to support older people's cognitive processes through adapting the environment to the mental processes of the individual. Such a procedure has been proposed by Palen and Aaløkke (2006). They made a study of how older people in a Danish home nursing setting remembered their intake of medications by how they were spatially arranged.

This arrangement was in accordance with the routines they normally carried out. For instance, one older person placed midnight medications on the nightstand. Furthermore, it was found that the spatial arrangement of medications was used in the communication between care workers and older people. Recommendations were made that a computer supported medication management system should take its starting point in the personalized, spatially distributed systems that the older person is already using.

In this way, the cognitive processes of the individual and the uniqueness of the human actors are taken into consideration by using a distributed cognition approach.

Older people's social networks and routines may have changed before the relocation due to fewer relatives or physical constraints (Östlund, 2005, p. 29). This means that the distributed cognition can have started to change before the relocation to the nursing home. As mentioned in the introduction, the relocation to a nursing home can cause a serious disruption in distributed memory. Furthermore, it is reported in medical literature that the relocation to a nursing home can cause much stress for the older person (as summarized in Manion and Rantz, 1995). Feelings of loneliness, sadness and crying can occur after relocation. However, this can be decreased if the older persons' decision making and contact with relatives is supported, and also if there are familiar artifacts in the apartment (Wilson, 1997). The need for contact with relatives and for familiar artifacts emphasizes the importance of designing in a way that retains the distributed memory that the older person had before the relocation. In other words, to change as little as possible.

3.3 Function, Attitude, Control, Enabling (FACE)

FACE is a conceptual design tool for analyzing individual functions and functional support, including support from both technology and other persons. According to Peter Anderberg, who developed the tool, functions are the activities we carry out in everyday living such as reading, telephoning, going to work or school, and meeting friends and co-workers. The chosen function is analyzed in the framework of the following three factors: attitude, control and enabling. "Attitude" means the social response to the function; how the user himself as well as others perceive it in the setting where it is used. "Control" involves how much the user, who is the owner of the function, has the power and right to define it and carry it out. "Enabling" deals with how the function support (the technological solution or artifact) is constructed and

implemented. FACE can be used to compare the suitability of different function supports (Anderberg, 2005; Anderberg, 2006).

4. Setting and Participants

This section describes the setting, influx of older people, care workers, and the selection of participants to the project. In addition to this the older persons who will exemplify the use of extended television is described.

In a newly built nursing home for older people in the south of Sweden there are 53 apartments, common day rooms and TV rooms. The 53 apartments are distributed over three floors and five divisions, where the first floor is a short-term division that is excluded from the analysis and further description of the settings due to its late inauguration. In each of the apartments there was a 32" wall-mounted LCD TV screen. Both the number of older residents that were involved and the number of employed care workers increased during the period of observations, since the apartments were gradually becoming occupied. Floors two and three were filled to 40% capacity by May 2006, 80% at the end of August 2006 and 90% at the end of December 2006. The older persons that moved into the nursing home did so because they could not manage on their own, even if they had home nursing. A regional ethical vetting board scrutinized the project before the older people moved into the nursing home. The board found no obstacles to proceeding with the research project.

The unpredictable influx of older people and final adjustments of the nursing home made it impossible, at the outset, to find a static group of older persons who were using and evaluating the extended television. Instead, I included any of the older people who became acquainted with extended television, either because they themselves expressed a wish to use it, or because relatives or care workers expressed such a wish. Also the few older people who deliberately refrained from using extended television were included in the study. In total, 30 older persons were included. They were men and women of different backgrounds (fisherman, singer, engineer, athlete, care worker, etc.) and ages (between 60 and 100 years). They all had some kind of functional limitation due to, for instance, different kinds of dementia, physical disabilities caused by rheumatism or cancer, and stroke-related conditions such as aphasia or memory loss. Actually, the majority of the people living at the nursing home had some kind of memory loss.

All of the permanently employed care workers had traditional health care training, and several of them also had other training that was especially valuable at the nursing home, such as computer skills, painting, pottery, baking, hairdressing, etc. There are care workers present at the nursing home, ready to help the older persons, around the clock. Each older resident has a contact person among the care workers who has additional responsibility to assure proper care of the older person.

The apartment TVs were delivered with a remote control, denoted in this paper as "original remote control", which had approximately 40 grey buttons, several with multiple functions, see Figure 1a. In some apartments this remote control was exchanged for a universal remote control with ten buttons, see Figure 1b.

There is also an internal TV channel at the nursing home, showing movies and photos that the care workers have taken using digital cameras. The photos were taken of events at the nursing home such as the Midsummer Eve dinner, Christmas, bingo, visits to the nursing home, etc. A code of ethics was adopted. This meant that no photos were taken inside apartments or in situations that could be experienced as embarrassing by the older people. Two media centers were present in the nursing home in one day room and in one TV room. It was possible to view photo CDs, movies from the open archive at Swedish Television, DVDs, etc., using the media centers. They consisted of PCs connected to the Internet and the TV.

Of the older people who used the internal TV channel in their own apartment (at least 8 older people), Anna was chosen to exemplify the use. Anna was 90 years old and had memory deficits due to stroke and a brain tumor. However she did not have dementia. Her reaction to the photos in the internal TV channel is representative for most of the older people who watched the internal TV channel (including those who only watched it in the day rooms). Of the four older persons who had a universal remote control in their apartment, Marie was chosen to exemplify the use. However, her use can not be seen as representative since she was the only one with dementia. Marie was 92 years old and had a diagnosis of vascular dementia.

(a)   (b)

Figure 1. The "original remote control" (to the left)
and the universal remote control (to the right).

One older person, Berit, had a personal TV photo album installed in her TV. She had significant short-term memory loss due to mid-stage Alzheimer's disease, and was almost 90 years old. The TV photo album was filled with scanned photos from her old photo albums and controlled by a special remote control in the shape of a photo frame, see Figure 2 in section 6.2.2. The decision to let Berit try a personal TV photo album was based on her interest in photo albums, and her relatives' strong involvement in the design process.

In general the relatives included in this study were selected on the basis of two criteria. First, their older relative must participate in the usage of extended television, and secondly, they should have a great deal of contact with the nursing home.

5. Method

This section describes data gathering techniques, my presence at the nursing home and the treatment of data. The section also discusses measures to increase the validity of the results.

This project was action oriented, since the research persons' actions were analyzed and since I, as a researcher, also acted. Hence, and because the project sought to arrive at improvements, the project can be called action research (Robson, 2002, pp. 215-216). The action research approach was combined with participatory observation (Ely, Friedman, Gardner, & McCormack Steinmetz, 1993, p. 49), which is in line with Hutchins' suggestion of being situated through the use of cognitive ethnography to make a distributed cognition analysis (Hutchins, 1995b, p. 371). I was present at the nursing home about 15 hours a week between June 2006 and January 2007. However, during installation of technology and during observations of Berit's use of her photo album, my presence was considerably higher, up to 30 hours a week.

During my presence at the nursing home, I participated in the usage of all the functions of the extended television, routinely visited all the day rooms to listen to complaints or comments, conducted interviews with older people, relatives and care workers. I did not prepare questionnaires, but knew which areas of knowledge I was seeking to understand and concentrated of those during the interviews, as described in (Ely et al., 1993, p. 67). I wanted to know which functions a person used, how, why and when. In conversations with the older people, I had to take special care not to point out gaps in their memory, since this could risk upsetting them. I mostly scheduled the interviews with the care workers since they did not have time during working hours; however, interviews with older people and relatives were carried out on the spot as the opportunity came up. The care workers who were interviewed were either a contact person for an older person who used extended television, used it together with the older person, had ideas about usage or was a member of the TV team.

I also trained potential older users, relatives and four care workers in a TV team. The TV team used the functionality of extended television together with the older people, gave feedback to me and trained other care workers.

In addition to the design of extended television I helped out with everyday technical problems, which made me known and integrated in the research environment. In this role I visited more than 50 % of the older persons (mostly older people without dementia).

The design process was carried out in cycles containing data gathering, analysis, and manipulation of artifacts. I continuously wrote notes about observations and interviews. The notes were stored digitally on securely stored USB memory sticks, and never edited using an online computer, to avoid uncontrolled dissemination of the material. The notes were analyzed by posing questions like "Does she always react in this way

to this photo?" or by utilizing analytical frameworks as in this article. The outcome of this analysis fuelled further changes in the design of extended television, with the aim of improving and adapting its functionality. I constantly sought after data that would be divergent from my interpretations of the data or would falsify conclusions, and I always used multiple sources of information. I also consulted research articles during the design process, in order to confirm or reject interpretations. This approach strengthens the validity of the method (Figueiredo & Cunha, 2007).

In accordance with the democratic motives of action research (Brydon-Miller, Greenwood, & Maguire, 2003), the different functions of extended television were evaluated by the older people, relatives and care workers, since they gave their continuous feedback in the project to me or to members of the TV team.

I interacted with all of the 30 older persons included in the study, but I spent significantly more time with Berit than with the other individuals. This is due to the detailed analysis needed to design the TV photo album. Hence, after Berit agreed to participate in the project, informed consents were signed by her trustee, involved relatives and care workers.

6. The Use of Extended TV

This section describes the usage and analysis of extended TV. The usage is divided into two categories: "Marie watching TV alone" and "with others in front of the TV"; the second category includes Anna's reaction to the internal TV channel, Berit's use of her TV photo album and the use of the media centers.

The analysis is divided into two parts, the FACE analysis and the distributed memory analysis. The FACE analysis is made separately for Marie, Berit and Anna, while the distributed memory analysis is divided into the categories of distributed memory in artifacts and together in front of the TV.

6.1 Marie Watching TV Alone

Marie is slightly over 90 years old and used to live in an apartment next to one of her daughters. She has been an avid viewer of national ice hockey competitions on TV for forty years. Before Marie moved into the nursing home, her daughter used to suggest programs for her to watch, and Marie was able to operate the TV herself. She knew that the TV was there and could come up with the idea of watching TV herself. She

was told to always switch off the TV using the button on the TV set that made the red light go out. When Marie moved into the nursing home she had a diagnosis of dementia. The new TV was installed in her room with the "original remote control", see Figure 1a. Marie could not handle this remote control, and most often forgot that there even was a TV in her apartment. Her daughter was unable to help her by telephone since the remote control was too difficult to use, and thus there was no point in suggesting a program to watch over the phone. The relatives who visited her on almost a daily basis suggested she have a universal remote control, and she was provided with one, see Figure 1b. Now it became possible for Marie's daughter to call her to remind her of an ice hockey game on TV and guide her in using the remote control. Marie would then watch TV for hours, and she was able to change the channels herself, since she recognized the channel logotypes placed on the buttons on the universal remote control. Marie stated that she tried different buttons to find the right one. She could also turn off the TV; however, on several occasions the TV was unplugged. Marie probably did this to be sure that the red light went out. She did not remember this, however, when the TV was to be switched on again.

In one instance, a care worker came into her apartment as she was watching ice hockey. The care worker wondered if this was what she really wanted to see and the answer was positive. The care worker was surprised to find out that Marie liked to watch ice hockey. Later the care workers also understood that she liked to watch figure skating. After this, it seemed that the care workers remembered to turn on Marie's TV if ice hockey was showing.

To sum up, after the relocation Marie could not operate the TV without assistance of care workers or relatives being physically present, and not all care workers knew about her TV watching habits. When Marie was handed the universal remote control, it became possible for her daughter to assist her in watching TV, an arrangement that had also existed before the relocation.

6.2 Together in Front of the TV

There are many different constellations of where, who and what people watch together. Three cases are described here: Anna's reaction to the internal TV channel, Berit using her photo album, and viewing photos using a media center. The importance of the involved people having memories to share became evident in the following.

6.2.1 Anna's Reaction to the Internal TV Channel

One of the older resident's of the nursing home and the care workers told me that Anna, another resident who did not have a diagnosis of dementia, wanted to watch the internal TV channel in her apartment, and that her grandchildren where asking for this. Anna had earlier only been fond of watching SVT1 and SVT2 (the two oldest terrestrial broadcast channels in Sweden). I tuned Anna's TV to the internal TV channel and she was very happy to see the photos from her floor of the nursing home. She recognized many people, related things about them, and about what had happened as the photos where taken. She said, *"It is the Christmas celebrations,"* and, *"Look at that handsome man!"* She did not speak much if she did not recognize the event in the photo, and she thought she looked old in some photos. As I was about to leave, she raised her voice and pointed at the screen saying, *"Look!"* Shortly thereafter a care worker entered the apartment, and asked about the names of the people in the photos. The care worker corrected Anna when she said the wrong name of a neighbor shown on a photo. Anna mentioned that it is *"So good with these photos."* It was time for afternoon tea and the TV was turned off. A few days after this event, Anna did not remember that she had the internal TV channel, but she was happy to watch it when it was turned on.

To sum up, Anna's interest in viewing photos from the nursing home was not noted by the care workers until they watched the photos on the internal TV channel together with her. The photos made it possible for Anna to express her thoughts and for the care workers to communicate with her in a way not possible prior to the existence of the internal TV channel.

6.2.2 Berit's Photo Album

Berit had short-term memory loss and Alzheimer's disease, and was almost 90 years old. She did not take the initiative to look at her old photo albums, even if they were left visible. Berit was given and trained in using a universal remote control to watch TV programs, but she always had to be reminded to push the buttons on the remote control. The selection of photos for the TV photo album was made carefully, and required that Berit look through all her photos and that I learn the pattern of which photos she recognized. Berit could browse through the TV photo album if she were handed the photo frame, see Figure 2.

Figure 2. The photo frame remote control used
with Berit's personal TV photo album.

However, there was no evidence that she did this alone or took the initiative to do so. The contact person did not have much time to sit down with Berit, but turned on the photo album, leaving a picture visible on the screen during the day. On the occasions when she sat down with Berit to discuss the contents of the photos, Berit mostly wanted to hand over the control to her. However, Berit became more of an individual to the contact person as she saw glimpses of her life. As Berit viewed the photos in my presence, she wanted to browse for herself, imitating how I did it. The relatives found that Berit became happy as she browsed among the photos. They noticed a considerable positive change in Berit's health and memory, a change that the contact person did not recognize. Berit reacted positively several times to a totally black image that was included in the TV photo album. She interpreted this as the end, which made it possible for her to interrupt the photo album activity. This could otherwise be difficult, as she sometimes forgot which pictures she had already seen.

Berit's understanding of which decade it is, or where she is, depends on where in the nursing home she is, or with whom she is interacting. As she sits in her room with me, she most often thinks that she still lives with her deceased husband, while with her relatives she is more aware of the present situation. Her understanding of where she is, is probably also affected by the photos she views.

To sum up, when Berit came to the nursing home the conversations were often guided by care workers or relatives, but Berit could guide the conversations with her relatives when the TV photo album was installed. Furthermore, Berit became more of

an individual to the contact person, meaning that more of Berit's preferences and capabilities became visible to the contact person.

6.2.3 Viewing Photos Using the Media Centers

At first, the author was the only one who used the media centre to show photos taken inside the nursing home and from the surroundings. The care workers took on the task enthusiastically when they received written instructions on how to do so. They reported that the older people watching reacted positively.

Months later, one of the older persons with dementia still pointed at the media center in the day room when she saw me and said, *"When will you play?"*

On several occasions, relatives brought CDs with family photos, which they watched together with their older relative, either in the day room or in the TV room. This seemed to be a compensation for not having a personal media center in the older relative's room. The comments on photos by relatives and older people were interrupted by the automatic change of photos, and both groups proposed a manual browsing system.

6.3 FACE Analysis

The care workers support the older residents in many of their daily routines, resulting in their having less control than when they lived independently. The following sections analyze the usage of extended TV by means of FACE. The care workers and older residents both desire that the older residents have more control, and, to a certain extent, *extended TV* became a means of transferring some of this control. The media centers were not evaluated. It was clear, however, that the older person should have more control over the photo browsing function. First Marie's TV watching is analyzed, then the usage of Berit's photo album, and finally Anna's reaction to the internal TV channel.

6.3.1 Marie Watching TV Alone

The function to be evaluated is Marie's TV watching. She watched TV by herself before moving into the nursing home, and has used the universal remote control and watched TV for hours in her apartment at the nursing home. Hence, it is assumed that she is interested in watching TV.

Before Marie used the universal remote control, it was necessary for relatives or care workers to remind her to watch TV, operate the remote control, choose channels and

switch the set off. The enabling aspect of this was low, and Marie's control was limited to reacting to others' initiative. The "original remote control" strengthened the attitude that older people need help and cannot be in control, and her relatives wanted Marie to have a universal remote control.

When Marie was given the universal remote control, she could change TV channels and turn off the TV. The enabling and Marie's control were higher than with the "original remote control"; however, she still relied on others to remind her to watch TV. Marie's attitude is difficult to assess, but her description of her trial and error handling of the universal remote control was made without seeing it as a problem. The care worker who understood Marie's interest in ice hockey was positively surprised, and the relatives thought the new remote control was a great improvement. The universal remote control strengthened the attitude of Marie as an individual with her own will.

To sum up, before Marie had a universal remote control the assistance given by care workers and relatives strengthened the conception that older people are helpless. However, the control Marie gained with the universal remote control proved this wrong.

6.3.2 Berit's Photo Album

The function to be evaluated is watching the TV photo album. Berit's interest in old photo albums and her comments while viewing her photos on the TV show that she is interested in having this function.

The technology did enable her to change photos, but she still needed to be reminded about the possibility of watching them. This was also the case with the old photo albums. She had control over what photo to watch, and it gave her influence over the discussions with her relatives. The black photo empowered Berit to end the viewing session if she was tired. Her relatives see the TV photo album as an improvement, and it mediated the message that Berit is an individual with a living history who can contribute constructively to a conversation.

On the other hand, Berit's use of the universal remote control to watch TV programs did not become enabling, since she always needed someone else to tell her to push the buttons. This made her control of the TV low, and she did not really accept the remote control as hers. This conveyed a message of a person being in need of assistance to make a decision.

To sum up, the universal remote control did not drastically alter the situation for Berit; her TV watching was still in need of human assistance in most aspects. This is in

contrast to her use of the TV photo album. The difference between these two outcomes stresses the importance of individually designed artifacts.

6.3.3 Anna's Reaction to the Internal TV Channel

The function to be evaluated is talking about memories by using the internal TV channel. Anna's positive reactions to the photos and the reminders from her neighbors indicate that Anna desires this function.

The presence of photos with content to talk about enabled Anna to discuss her memories. Her control was low, since it was the older persons at the nursing home, care workers and relatives who reminded her to watch the internal TV channel. However, she could operate the remote control by herself. Anna was very positive about the internal TV channel, and a care worker used it to train her memory. Anna's need of reminders conveys a message of being in need of assistance; however Anna's reaction to the images shows that she has knowledge to share, and enjoys talking about her memories.

To sum up, it is clear that the presence of the internal TV channel enabled memory training that could not have taken place without it, and that care workers took the opportunity to use it.

6.4 Distributed Memory Analysis

The distributed memory analysis is divided into two parts. First the artifacts are analyzed and then the processes taking placing while watching together with Anna and Berit are analyzed.

6.4.1 Distributed Memory in Artifacts

Both Marie and Berit had memory loss, and actually both of them had problems coming up with the idea of watching TV programs. However, both of them could get the idea of turning off the TV. The activity of watching TV probably reminded them of this, but without this activity it is not certain that they would remember that the TV was there. If they were to turn the TV on or off, they occasionally looked for a button on the TV, as on their old TV. This button was missing, and the red light that came on when the TV was switched off was confusing, which resulted in their unplugging the TV set.

For Marie, the universal remote control worked well in several processes with distributed memory. Her relatives assisted her by telephone (thus enabling an arrangement of assistance that existed before the relocation); the care workers

understood her interests; and she could operate the TV by understanding the logotypes on the remote control. For Berit, the universal remote control did not represent any memories that supported her TV watching. However, the black photo represented a memory since it gave her the information that she had watched all the photos and that the album had come to its end.

6.4.2 Together in Front of the TV

The photos in the internal TV channel, Berit's personal photo album, and the family photos shown using the media centers all made situations arise where the older person could contribute to the interaction. However, the interaction seemed to be most lively from all involved parties if everyone had shared memories concerning the photos. Otherwise, it was more of a situation where one party was telling and the other was asking questions. Older people and their relatives had shared memories or associations with the family photos shown at the media centers, in photos from the internal TV channel in which they had been present, and in Berit's personal photo album. The older person and the care workers had shared memories of the photos shown in the internal TV channel.

This means that the interaction was most lively if the memory was distributed between the older person, the photos and the relative or care worker. However, the relatives also expressed an interest in other photos in the internal TV channel than those they had experienced.

One of the care workers described the use of the internal TV channel as "an aid for gaining an understanding of what their [the older people] view is, and of what they apprehend." This care worker, who used the internal TV channel to ask the older people without dementia about its contents, also mentioned that it provided memory training for the older people. Her use of the photos in this way is possible because she knew what had happened as the photos were taken. She could easily compare the apprehension of the older person with her own mental image. It was observed that both people with dementia and people without learned the names of neighbors at the nursing home after they had repeatedly watched the internal TV channel.

Berit's use of her photo album depends on with whom she viewed it. With her contact person, she insisted on handing over the remote control, but with me she browsed more independently, and her relatives noticed a considerable change in Berit's memory, vitality and health. The relatives also noted that they always had enjoyable times when they met Berit to browse through the photos and that she participated

constructively in the dialogues that took place. This can be because the selection of photos was made to reflect what Berit remembered, and furthermore she guided the conversation by changing photos. Probably the discussions came to focus on topics that Berit could contribute to, and that the relatives had associations with. This is different from the photos on the internal TV channel to which Berit did not have much to contribute, even if she was told about the contents.

7. Discussion

It is clear that some artifacts do not become involved in the intended use, for instance, poorly designed remote controls. However, the everyday problem solving attitudes among older people, relatives and care workers can break such barriers in innovative ways through distributed memory processes, although there are barriers that can be broken more easily if the "right" artifact is introduced or iteratively designed. It is also clear that TV watching at the nursing home exploits distributed memory, where the outcome cannot be solely attributed to the memory of individuals.

7.1 Designing for Distributed Memory

Marie's use of the universal remote control, Berit's use of the TV photo frame, the significance of Berit's TV photo album for the interaction between her and her relatives and Anna's interaction with care workers are examples of situations where the older person took an initiative. These examples show that it is important that the artifacts of *extended TV* are parts of the users' distributed memory, meaning that they should represent memories to the individual that can be used in processes with distributed memory. This gives them greater opportunities to be in control and to choose what to do. In fact, this gives more freedom to the older person.

Furthermore, in cases where the older person enjoys a functionality, for example viewing photos, the designer should see the older person as the main user, asking questions such as, "How can the older person maintain control?" and "How can the older individual's desired interaction with others be maximized?" A designer should not start with the thought, "Let's make a simple interface; the functions that are too difficult for the older person to operate are for the care workers to handle."

With a different approach, the care workers and relatives can better understand where their human support is needed. This means that their support becomes more

individualized in nature. Furthermore, to design systems in this empowering way makes the older person's wishes visible, and thus the care workers and relatives can learn more about them. The preferences of the older person may change with time, and a deteriorating health status can indicate the need for more human assistance; hence the need for more memory functions distributed to care workers and other individuals.

One example of this design approach is an individualized TV channel, which shows all the programs the older person normally watches on the same channel. The selection of TV programs will be a direct translation from the older person, relatives and care workers to an artifact. Furthermore, browsing among channels should be possible through a trial and error method. This means that it should be impossible to end up in modes that the older person is unable to handle.

It can also be worth considering whether the older person's TV should accompany them into the nursing home to increase familiarity in the new setting. This could influence the distributed memory and draw on the older person's earlier experiences of operating the TV. However, if the TV is old, one can argue that it should be exchanged for a new one due to fire hazards and the space occupied.

Empirical findings suggest that assistive technology can reduce the need for the personal assistance given to older people (Hoenig, Taylor, & Sloan, 2003). As earlier mentioned, personal assistance can be of vital importance in lowering the feelings of loneliness among older people at a nursing home (Drageset, 2004). Hence, there is a danger that individually adapted technical solutions may leave older people lonelier than before, even if that was not the case in this study. In addition, the heightened level of social contact for the older people due to the interest shown by me as a researcher can have affected the results in a positive direction, since it undoubtedly also counteracted their loneliness. This can, of course, be very significant during periods of stress after relocations. However, Berit, Anna and Marie did not show clear symptoms of relocation stress.

7.2 Method

The design method for extended TV is described, analyzed and commented on in (Abdelmassih Waller et al., 2007). Especially, the considerations taken to include older people with dementia in the design process are commented. Hence the discussion here is limited to discussing the use of distributed memory and FACE as tools in the design process. The results indicate that the artifacts support the older people if the

artifacts act as representations in distributed memory processes. This interpretation was used to suggest modifications during the design process, but has been made more explicit in this article. The design process would most probably benefit from using a distributed memory analysis as well as a FACE analysis during the ongoing collection of data.

The lack of analysis of creativity and intentionality in this article suggests that this analysis should be combined with another type of scrutiny, perhaps by the use of situated action or activity theory. Indications of this need are Berit's lack of spontaneous use of her TV photo album, Anna's need to be reminded about the internal TV channel and Marie's problems of remembering the existence of her TV. This all concerns design for situations were the older person does not have a plan to use extended television. However, my belief is that a distributed cognition analysis directs the designer towards consistent structures that act as cognitive contours (Svensk, 2001, p. 51). These contours increases the older person's understanding of what to do, when to do it and what to expect. This is vital for the easy of use of a device (Norman, 1999, p. 174) and can be expected to be important for older people with dementia, since they have difficulties in compensating for badly designed artifacts. Furthermore, such contours can also support creative activities (Jönsson et al., 2006, p. 175).

7.3 Validity, Reliability, and Generalization

Here I define validity as the degree to which I have identified the correct causal links and explanations. This can also be called internal validity (Yin, 2003, p. 34). Action research obtains much of its validity from testing improvements in action by most at-risk stakeholders. This can give action research, in some regards, strong validity as compared to conventional social science (Brydon-Miller et al., 2003). There are, however, several threats to the validity of the conclusions drawn. These threats can be reduced by adding rigor to the research process (Figueiredo & Cunha 2007, p. 89). However, I have not, as recommended, used a theoretical framework from the beginning. Furthermore, I have not challenged the analysis using competing theoretical frameworks as suggested by Robson (2002, p. 174).

The reliability of action research projects, in the sense that it should be possible to repeat them, is generally low due to the uniqueness of each intervention. However, by using the analytical frameworks in this article (FACE and distributed memory), my interventions have given rise to recommendations that are consistent to literature on

older peoples' memory and literature on how to design for older people. This makes it possible to generalize from the research setting.

8. Conclusions

The shortcomings in the support that replaces the lost distributed memory (the memory aspects of distributed cognition) of older people moving to nursing homes were described, and it was shown, by using distributed memory analysis and FACE analysis, how artifacts can strengthen the older person's actions and control when they are a part of his or her distributed memory. It was found benificiary if the artifacts represented memories to the individual that could be used in processes with distributed memory. In addition, it was shown that used analysis, can be useful for the design processes for extended television in nursing homes, in order to provide cognitive contours. However, design processes would benefit from being combined with an analytical framework that takes human creativity and intentionality into account. Further research is recommended.

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Syftet med den här licentiatuppsatsen är dels att beskriva äldre människors in-tresse av och möjligheter till att använda TV:n till annat än traditionellt TV-tit-tande, dels att beskriva olineariteterna i den designprocess i vilken detta arbete ägde rum. Konceptet "Den utsträckta TV:n" utvecklades och provades (av äldre människor, deras anhöriga och personal) i en ny vårdboendemiljö samtidigt som inflyttning, nyanställning och slutjustering av lokaler och teknik pågick.

Funktionerna i den utsträckta TV:n var dels boendegemensamma, dels personliga. De boendegemensamma funktionerna bestod av en intern TV kanal och två media centers, medan den personliga funktionen handlade om kommunikation utifrån det egna fotoalbumet i den egna TV:n. Det som tagit den garanterat längsta tiden är det olineära i designprocessen. Den har varit komplex och ingalunda följt de initiala planerna. Detta är visserligen mer regel än undantag i situerade männi-skonära designprocesser men det dokumenteras alltför sällan.

Den här uppsatsen hittar du också på internet:
www.certec.lth.se/dok/denutstracktatvn

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Certecs forskning och utbildning har en uttalad avsikt: att människor med funktionsnedsättningar skall få bättre förutsättningar genom en mer användvärd teknik, nya designkoncept och nya individnära former för lärande och sökande. Drygt 25 människor arbetar på Certec.