"We were all the same age once" – Experiences of Intergenerational App Design

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SANDPiT is a novel intergenerational project whereby 40 school students and 12 older adults worked together over 9 months to design and prototype technology applications for mobile devices. The main remit of the project was to design applications that are of benefit to younger and older generations alike, focusing on the similarities between generations rather than the differences. This paper explores some of the successes and challenges of creating an intergenerational design team, highlighting issues surrounding collaboration, communication, engagement and mutual learning.

Intergenerational Design. Co-design. Intergenerational Learning. Collaboration. Inclusive Design

1. INTRODUCTION

"There is a wealth of life experience (in older adults)*, experience that doesn't panic, doesn't rush to judgement, and knows that someone needs to look out for the young. They might be whizzes with technology and iPads but emotionally they are as fragile as eggshells. And there is no one harder on teenagers than their peers and no one more understanding than their grandparents."*

The above is a comment from one of the older volunteers on the Schools ApplicatioN Development ProjecT (SANDPiT), highlighting the unique relationship that exists between teenagers and the older generation. The importance and benefits of fostering intergenerational relationships is well reported in the literature. A UN report states *"Solidarity between generations at all levels – in families, communities and nations – is fundamental for the achievement of a society for all ages."* (UN Report, 2002). There are also reports of the benefits of such relationships for older adults (Hanson & Carpenter, 1994), (Erikson, Erikson & Kivnick, 1986).

Of equal importance, given changing demographics, is the need for technology applications that are universally designed and that are inclusive to all, regardless of age, capabilities, culture etc. (Keates et al., 2000). Creating design teams that involve both younger and older adults is an ideal method to achieve this. However, such groups are typically not involved in the design process and rarely are they brought together into intergenerational design teams.

Thus, where co-design methods are actually implemented, they tend not to be fully intergenerational, in that they might involve older adults and design researchers co-designing applications that are useful and usable by older adults (McGee-Lennon, Smeaton & Brewster, 2012), or co-design methods *with* children to design technologies *for* children. Notable work in this latter area includes that from Druin et al. at the Human Computer Interaction Lab at the University of Maryland. Most of this work has focused on involving children in the co-design process with design researchers (Knudtzon et al., 2003). But more recently, their work has examined co-creation with children and older adults, with their findings suggesting that both generations need time together to collaborate, but also time apart to collaborate at a distance (Xie et al., 2010).

This paper describes the SANDPiT project – a collaborative project between four secondary schools (high schools) and CASALA – a research centre whose focus is on enhancing independent living for older adults. The project examines the process of application design and development from an intergenerational perspective. Nine design teams worked together over a 9-month period to design and prototype intergenerational applications. The novelty of this project is its longitudinal nature and the fact that the design teams consisted of design novices – 40 school students between the ages of 15 and 16, and 12 older adults between the ages of 62 and 84. While design researchers were present, facilitating the workshops, providing tutorials at the start of each and giving advice to the teams, the design teams

themselves had no prior experience of application design.

The motivation for creating an intergenerational design team arose from two sources. Firstly, tablet devices are increasingly being introduced into schools as learning tools and school authorities were eager for students to get practical experience outside of a classroom setting in using and creating applications for such devices. They were aware of our existing research involving older adults as part of the design process for health and wellness applications and felt the students would benefit from being part of such a process directly with older adults. From a research point of view, the authors were interested in exploring how teenagers and older adults might work together in designing inclusive applications. We were more interested in the *process* rather than ensuring fully functioning apps were developed. However, we wanted to ensure that application ideas were beneficial, novel and intergenerational, focusing on what is shared by the generations rather than what is different.

Given the large scale of the project, numerous interesting research findings emerged. At the outset, we were interested in exploring a number of things: (1) Whether teenagers and older adults who have not previously met could build a successful design team; (2) Whether the app ideas generated would be truly intergenerational; (3) What co-design methods would be most successful for such teams and (4) Participant reflections of the experience, including what they enjoyed (or didn't), reflection on relationships that were formed and what each generation learned from the other. In this paper, we focus mainly on participant experiences and reflections of the process, while briefly touching on the remaining points.

2. THE SANDPIT PROCESS

The SANDPiT project began in October 2012 and ran until May 2013. There were 9 teams, each consisting of 4-5 'Transition year' school students and at least 1 older adult. Transition year is an optional one-year school programme that can be taken before the final two exam years. The goal of this year is to "*promote the personal, social, educational and vocational development of pupils and to prepare them for their role as autonomous, participative and responsible members of society.*" Students were recruited based on their level of interest in the proposed SANDPiT process. Older adults were recruited from CASALA's existing network of research volunteers.

There were a total of 8 half-day workshops held, culminating with an exhibition at the end of the project. Each workshop focused on a particular part

of the design process for applications, including idea generation and brainstorming, user requirements gathering, scenario and persona creation, application information architecture, interface design and application prototyping. Throughout the project, participants were reminded of the intergenerational goal and the importance of universal design, through short tutorials presented at workshops by the organising researchers.

Project ideas covered emotional wellbeing, local information for towns, including services and area safety reports, intergenerational games and quizzes, a driving education game to help younger people with driving theory and to provide older adults with a 'refresher' course on driving and rules of the road, and reminder systems. For each team, outcomes included a poster, a website (made in Google Sites or Weebly) and a prototype app developed in MIT App Inventor[1], all of which were presented at the final exhibition.

Figure 1: Participants brainstorming ideas at the first SANDPiT workshop

Figure 2: Participants discussing the content and functionality of their applications

3. EVALUATION

Due to the scale of the project and the number of participants, we took a pragmatic approach to evaluating the SANDPiT project. Evaluation methods included short video interviews with participants during the SANDPiT exhibition, post-project interviews with students from 3 schools (N=14) and a focus group with 8 of the older volunteers. Each group (including the older volunteers) were asked the same questions. Workshop facilitators also made observations and notes throughout the workshops. Interview and focus group data were transcribed which yielded data for content analysis. Two coders identified important themes based on the frequency and intensity of participant responses. This was done separately for both students and older volunteers. These themes, and participant reflections, are outlined below. Quotations from our older volunteers are highlighted by (V) and students by (S).

Overall, students and older volunteers alike had positive feedback on the experience. Older participants described the process as *"enlightening and enjoyable".* Another commented: *"It brought me back to my youth, it was fantastic." "I thought it was a lovely nine months. I enjoyed it, the kids were warm and hugs all round when they were going away and I thought it was just marvellous." "I found the process very enjoyable and really liked working with the older man on our team"* (S).

3.1 Team Collaboration

Team collaboration is an important factor of the design process and can determine the success of the process and resulting application. At the outset of the project, one of our volunteers commented: *"The teenagers have the facility with technology that older people lack. We have the confidence and wisdom that they lack. It's a match made in heaven."* In general, both students and volunteers felt that there was very good intergenerational collaboration. One volunteer described how his group 'melded together': *"I found that we were all of a one"* (V).

The process was a two-way one, with both generations helping each other. *"I thought they were very, very helpful now. Included you in, explained if you didn't know"* (V). Students also appreciated the help from the volunteers: *"He was a great help. I don't even think he realised that he was helping. He was just putting out the ideas"* (S).

Throughout the workshops, facilitators observed that the older people did not adopt a 'supervisory' role, but were rather an equal member of the team. This also emerged during interviews and focus groups. *"You weren't supervising them* (the students)*. You're not there to push them in any*

way" (V). Both students and volunteers felt that the presence of an older person on the team was beneficial to actually getting work done at each workshop: *"Our lady was getting everyone together and to work together, that was the good part"* (S). *"We have a calming effect on the students and they have an invigorating effect on us 'Oldies'. It's a win-win venture"* (V).

The teams were quite successful with division of work, particularly for the final exhibition: *"we kind of all found our strong points"* (S). One of our volunteers wrote on the project blog *"And so we got ready* (for the exhibition)*, each bringing our own talents to the project, Kim the art, Natasha the eloquence, Peter the common sense and I'm still looking for mine".* This volunteer went on to describe how the girls on his team had him 'colouring in' – an activity he hadn't performed since he was a child, but a 'job' he accepted gladly as it was *"what needed to be done".*

3.2 Communication

There were some barriers at first between the students and the older adults as well as between the students from different schools – *"it took them a while to blend"* (V). However participants felt this didn't last very long: *"After the very first day you could see the barriers breaking down"* (S). One of our volunteers commented: *"It was great fun for me watching the attitudes, stiff shoulders, shyness all gradually break down as they were forced together at a table with some old codger. I could see the awareness dawn that maybe that guy was nice, this beautiful girl was in no way conceited at all, the mind gradually opened and gave the stranger a chance to come in".*

Communication sometimes represented a challenge for the teams. During the focus group, older volunteers commented on struggling to understand the language used by the teenagers, likening their speech to 'textese'. Communication between workshops was encouraged by the facilitators but proved difficult for the teams and for the most part was non-existent. The facilitators set up a blog, where supporting documentation detailing various elements of the design process and principles of universal design were posted. Participants were also asked to contribute to the blog, by posting their experiences. However, only one older volunteer contributed regularly. The teams were also asked to set up their own means of 'internal' team communication that would suit all team members. However, this is where generational differences appeared. Students were eager to set up Facebook pages, but only 3 of our volunteers were Facebook members. Furthermore, many of the volunteers did not use email, while one didn't have access to a computer at all.

There was also a difficulty in communication between the facilitators and the teams in terms of the 'new' language that the teams had to get accustomed to. Language used to describe the design process, for example, was an issue. This was a problem not only for the volunteers, but also for the students. For example, understanding storyboards, information architecture, prototyping etc. While the facilitators explained these at the start of each workshop, it would be beneficial to provide a glossary of sorts to all participants.

3.3 Motivation and Engagement

Motivation and engagement througout the 9-month process appeared to peak and ebb. Both students and volunteers found some workshops more engaging than others. *"I remember on the very first day, brainstorming – that was annoying"* (S). The teams found it difficult to come up with ideas for applications that would be useful to older and younger alike. They were asked to brainstorm as many ideas as possible, then to reduce this to their top 3 ideas. The teams then expanded these 3 ideas and pitched them to a panel of judges. During their pitch team members were to outline their idea, explain why they wanted to work on it, highlight the benefits to potential end users, young and old, and outline how it differed/improved on other similar apps in the space. The groups had one minute per idea, after which time the judges conferred and decided which project to choose as the team's project going forward. In follow-up interviews, students suggested that more guidance on idea generation from facilitators would be beneficial: *"Like I suppose maybe a theme on what apps to actually design"* (S); *"It would have been better if we kind of had the theme or backup ideas for people"* (S). Despite this, the facilitators felt that each team generated at least one interesting, useful and intergeneration idea, and in many cases more.

Participants seemed to particularly enjoy storyboarding and scenario creation. The facilitators noticed a 'lull' after the second workshop, during which teams were continuing to expand their ideas and consider the needs of end users. Thus during the third workshop we encouraged the teams to become more creative – to storyboard and to think of characters to represent their users. We then encouraged the teams to use these characters to build personas. We handed out art materials and encouraged teams to draw. This completely engaged all participants, increased their enjoyment and was invaluable in helping them to fully understand the needs of potential end users of their applications.

Workshops were held roughly once per month and as mentioned, there was a lack of team communication between these. Therefore, this led to a drop in momentum that many of the participants commented on: *"When we came back after a month, awh God I hadn't a clue what was going on and they hadn't either. So I feel maybe a more intensive kind of a nine weeks, or nine sessions might be better"* (V). The students felt the same about this, commenting *"There was a slump in between* (workshops)*"* and *"I almost felt like it sapped out all the energy"*.

Most of the volunteers felt they were less engaged during the final workshops, when the teams were using MIT App Inventor to protoytpe their applications: *"I felt a little bit lost at the end, a little bit lost you know"*. Despite this, all the volunteers felt that the students continued to keep them included in the decisions during this phase of the process. They also stated that if they were to take part again, they would like further information or training in regard to the more technical aspects. None said that they would prefer not to be part of this phase of the process.

Figure 3: Participants creating personas

3.4 Benefits for Participants

Mutual Learning
All participants, both students and volunteers included, felt they learned a lot from the process overall, as well as from each other. Learning was not just about technology or how to design inclusive applications. For the students, learning to work as part of a team, to voice their opinions and 'be heard', was a successful outcome of the project. For example, during the initial workshops, our volunteers reported that the students were quite reluctant to voice their ideas, for fear of being made to look foolish in front of their peers. Some students confirmed this during interviews and acknowledged that the older person on their team was instrumental in helping to overcome this fear or embarrassment. Furthermore, during the final exhibition, some of the students' teachers

commented on how the process had helped the students grow as individuals. For example, one particular student who was very shy and usually very quiet in class, was enthusiastically describing his project to the many visitors to the exhibition. One volunteer commented on the willingness of the teenagers to *"listen to a retired person's point of view and to learn from it"*, while a student commented on how he learned patience from the volunteer on his team. Another volunteer said: *"What I learned was that… I just found them to be lovely kids and they'd do anything for you. And I'm interested to see if there's different ways that they can be motivated and taught other than in classroom situations which is boring them out of their minds"*.

Building Relationships and Trust

Throughout the process, the older volunteers held the students in very high regard praising and highlighting their individuality and their particular talents and contributions for example with regard to designing, ideas, programming, speaking in public, recording notes etc. Reflecting on working with the students they noted: *"Some of them were absolutely marvellous"*. Volunteers also described the students as *"A rock of sense"* and *"Sharp as lances"*. They were extrememly grateful that the students *"accepted us as completely natural, a part of the whole process"*. One volunteer spoke about how before the project, he felt that many teenagers were lacking in respect for others and were always thinking of themselves. However, when the project concluded he commented: *"My understanding of the youth of today now leaves me to think our future is in safe hands"* (V). Similarly, the students reported that the project completely changed their perceptions of older adults. *"Like in all honesty I didn't really expect it like cos my grandad, he'd nearly have a nervous breakdown when he can't get the teletext to work"* (S). The students reported how 'cool' it was that the volunteers were using iPads during the workshops and they genuinely enjoyed talking to the volunteers over the course of the 9 months. The volunteers spoke about the trust that was built between younger and older members of the team and how personal relationships were developed. One student spoke at length with the volunteer on his team about his parents' separation, for example.

Pride

Pride was evident during the exhibition, when teams were given the opportunity to showcase their work to the community. There were a number of 'VIPs' in attendance, including the president of the university where the workshops were held, lecturers and university students, the principals of the schools, teachers and parents, in addition to reporters and photgraphers. The students and volunteers eagerly discussed their projects with all

attendees, with one of the volunteers ensuring that a reporter came to talk to 'his team' about their project. In the follow up interviews and focus groups, this theme emerged further. *"There was a lot of pride from my point of view, how that intially there was a shyness and then they came out, they spoke, their talents shone through"* (V). Both students and volunteers also reported feeling proud that they had working prototypes for their apps, as well as websites.

Figure 4: One of the teams presenting their work, including their prototype, at the exhibition

4. DISCUSSION

Referring back to the initial exploratory questions we had at the start of the SANDPiT project, we feel that the creation of design teams involving younger and older adults, who are not only strangers but also novice designers, was not only possible, but also highly successful. While only 4 groups had fully functioning prototypes, each group gained an excellent understanding of the design process for creating applications, but more importantly the students came to understand the importance of inclusive design and genuinely aimed to ensure their apps were inclusive and truly intergenerational. However, the main success of the project was its ability to connect generations, fostering new friendships and relationships.

As one would expect, not all team members enjoyed all aspects of the design process and thus keeping participants motivated was one of the major challenges of the project. As facilitators, we were initially trying to ensure that team members adhered to a rigours design process. However, we learned that a less formal approach was beneficial in counteracting lack of enthusiasm – for example, encouraging participants to draw and be creative rather than listing functionality and content etc.

The goal of the project was to focus on the similarities between the generations, rather than the differences. And for the most part, this was the

case. For example, all of the discussions around application ideas, determining the end users and the content and functionality of the applications focused on how younger and older generations alike could benefit from them. However, there were some exceptions to this. Two of the older participants felt *"useless"* on the team when it came to the prototyping stage. However, they noted that even though they felt they could not contribute as much during this stage, the students still ensured they included them in all decisions.

Our findings have helped us to determine what was successful and what was less so in terms of setting up intergenerational design teams and we will aim to integrate these findings into the next SANDPiT project which will commence in the new school term. In summary we found: (1) Intergenerational teams collaborate and communicate well during face-to-face design sessions, though not between these. Given the difficulty in finding a communication method that suits younger and older participants alike, we intend to run workshops at least every two weeks to try to avoid losing momentum between sessions. (2) While younger and older participants appeared to work well together, there were difficultites with some students not contributing. This appeared mainly due to lack of interest but often had a negative effect on project outcomes, in terms of members not producing work. When creating teams, it is necessary to try to find a better balance of expertise within them and to ensure all members are interested in the project. (3) Separate sessions may be required with older volunteers around the more 'technical' aspects of the process, particularly prototyping and explaining language, to help them feel that they can effectively contribute to all parts of the project. We are not aware of any research that currently exists that involves older adults in prototyping. However, it is something we will explore further during the next SANDPiT project.

5. CONCLUSION

This paper has shared our experiences of creating an intergenerational design team, and more importantly the reflections of our participants on being part of the process. We believe that technology-based applications should be designed to be inclusive and that potential users from all generations should therefore be included in a co-design process. Our experiences demonstrate that this can be very successful while highlighting some challenges that future work should address. Three of the prototype applications are currently being implemented by the team at CASALA in conjunction with the intergenerational design teams and these will be evaluated with younger and older adults to determine usability and usefulness. We

aim to run this project again during the next school term, integrating our learnings and re-evaluating the process. Future work will also examine the impact of the SANDPiT process on teaching and learning of computer science within schools.

We conclude with the words of one of the project volunteers: *"I am looking forward to the project tomorrow with the Transition Year students. They are a great bunch and their enthusiasm is infectious. Their knowledge of technology and total confidence with iPads is amazing to behold. I have no idea what the end product will be like but as a social experiment it has been a huge success already. Teenagers need the constant affirmation of an adult and only the older generation has the wisdom to give this unconditionally. There is a beautiful Irish proverb "Mol on Óige agus tiochfaidh siad" (praise the young and they will improve) and only the grandparents know the wisdom of this"* (V).

ACKNOWLEDGEMENTS

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