Personas for examining Digital Exclusion (UK 1.0)

These personas are also available online at www.inclusivedesigntoolkit.com/digitalpersonas

RSSB

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SIEMENS
Ingenuity for life

KEOLIS amey
DOCKLANDS

These personas were produced as part of a project to improve the inclusivity of railway journeys and information systems. It was funded by the DFT and delivered through RSSB's TOC'16 project: Towards the Inclusive Railway. The personas were created by the Engineering Design Centre, University of Cambridge. Collaborative partners were Siemens Mobility, Keolis Amey Docklands and Astutim.

Background details

Purpose of the personas

These personas are intended to encourage designers and other stakeholders to consider the range of people in their target user population. It is important to remember that many factors affect digital exclusion, including technology competence, prior technology experience, motivation and attitudes towards technology. The personas highlight these factors in a way that we hope is easy for designers to engage with.

An enhanced version of the personas has been created with more detailed information on a wider range of variables. This can be used to support an exclusion audit conducted by trained expert assessors. If you are interested in this, please contact edc-toolkit@eng.cam.ac.uk for more information about our consultancy services.

Interpreting the personas

Please note that the clusters that these personas were based on were created using only the technology variables. Ages, genders, life situations and capabilities were chosen to be appropriate for each cluster, and matching stock images have been used. However, the clusters are not restricted to people with these characteristics.

The clustering variables are shown in a table on each persona. Values of these variables have been banded into five levels (Very low, Low, Moderate, High, Very High) based on our practical interpretation of the underlying scales.

Underlying survey and persona development

The personas are based on data from a survey conducted in June-July 2019. It included 338 people aged 16 and over across multiple locations in England and Wales. Quota sampling was used to gain a good cross-section of the population.

The survey asked participants about various characteristics that impact one's ability to use digital technology successfully. Most of the questions were self-report, but participants also did eight performance tests. In these they were shown a picture of a smartphone interface and asked what they would do next to achieve certain goals.

The respondents were grouped into twelve clusters using cluster analysis with five key variables. Each cluster is represented by a persona in this set. The sizes of the clusters give an indication of how many people in the population each persona represents. The appendices to this document describe how each of these clustering variables relate to questions within the underlying survey.

We would like to thank the University of Cambridge Statistics Clinic for advice on the analysis.

Authors and contact

The personas were developed by researchers at the Engineering Design Centre, University of Cambridge. Please address any questions to Dr Joy Goodman-Deane at jag76@cam.ac.uk.

Overview of the persona set

Persona	Related cluster	Cluster size	Competence with technology*	Use of technology*		Attitudes to technology*	
				Frequency of use	Range of activities	Desire to engage	Willingness to explore
Derek	1	12%	Very low (0.5)	Very low	Very low	Very low	Very low
Joshua	2	3%	Very low (2.0)	Very high	Moderate	Moderate	Low
Ida	3	8%	Very low (2.5)	Very low	Very low	Low	Moderate
William	4	9%	Low (4.0)	Low	Low	Low	Low
Nancy	5	6%	Low (4.0)	High	Moderate	Low	High
Maria	6	6%	Low (4.5)	Very high	Very high	High	High
Kamal	7	7%	Moderate (6.0)	High	Moderate	Low	Low
Anna	8	14%	Moderate (6.5)	High	High	Moderate	High
Robert	9	2%	High (7.0)	Very low	Very low	Low	Moderate
Laura	10	8%	High (7.0)	High	Low	Low	High
Eric	11	9%	High (7.5)	Very high	Very high	High	Moderate
Sam	12	16%	High (7.5)	Very high	Very high	High	Very high

* All the variables are described in more detail in the Appendices. Willingness to explore refers to the willingness to explore an unfamiliar interface.

Derek

is in cluster 1, which contains 12% of survey participants

Competence with technology*	Use of technology*		Attitudes to technology*	
	Frequency of use	Range of activities	Desire to engage	Willingness to explore
Very low (0.5/8)	Very low	Very low	Very low	Very low

Lifestyle

Derek is retired. His wife died a few years ago and he now lives alone. His daughter lives in the same town, and his son a couple of hours' drive away. He has five grandchildren, the oldest of whom lives nearby and has two small children. He loves spending time with them whenever he can. He also enjoys spending time with friends, watching TV and following his local cricket team.

Physical and sensory capabilities

Uses reading glasses and finds it difficult to read without them. Needs to use a stick to walk, and struggles to walk long distances even with a stick. Derek can drive and also has a mobility scooter which he uses for shorter journeys. He takes pride in being independent.

Competence with technology

Did not know what to do in any of the performance tests. He might have been able to guess one of them correctly but was too uncertain to give it a go.

Attitudes to technology

Tends to avoid using technology and doesn't think that he would be any good at it. If he was not sure what to do on an interface, he would get stuck and stop using it rather than try out different things to see what would work.

Use of technology

Has not used a computer, smartphone or tablet device recently. His children tried to show him how to use a tablet so that he can use it to Skype them. But he got muddled and then gave up. He owns a basic mobile phone but only uses it in emergencies.

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* All the variables are described in more detail in the Appendices. Willingness to explore refers to the willingness to explore an unfamiliar interface.

Joshua

is in cluster 2, which contains 3% of survey participants

Competence with technology*
Very low (2.0/8)

Use of technology*	
Frequency of use	Range of activities
Very high	Moderate

Attitudes to technology*	
Desire to engage	Willingness to explore
Moderate	Low

Lifestyle

Joshua is studying hospitality at college, and lives at home with his parents and younger sister. He would like to move out but can't afford it. He enjoys hanging out with friends, playing football and going to the cinema.

Physical and sensory capabilities

Short-sighted but can see reasonably well with glasses.

Competence with technology

Gets stuck easily on an unfamiliar interface and only got two of the performance tests correct.

Attitudes to technology

Moderately keen to engage in technology use, although he is not interested in technology for its own sake. He is hesitant about tapping or clicking on things on an interface in case something breaks.

Use of technology

Uses a computer and smartphone everyday, mostly for news, e-mail, social media and browsing the internet. He can install a new app on his smartphone but does not install software or manage files on a computer.

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* All the variables are described in more detail in the Appendices. Willingness to explore refers to the willingness to explore an unfamiliar interface.

Ida

is in cluster 3, which contains 8% of survey participants

Competence with technology*	Use of technology*		Attitudes to technology*	
	Frequency of use	Range of activities	Desire to engage	Willingness to explore
Very low (2.5/8)	Very low	Very low	Low	Moderate

Lifestyle

Ida retired a few years ago from working in the kitchens at a local school. She lives alone and has no close family. However, she has many friends and is very involved in her local community – she belongs to a local church and gardening club and also volunteers at a charity shop once a week.

Physical and sensory capabilities

Recently had cataract surgery which has improved her eyesight, but still needs to use glasses for close work such as reading. Sometimes finds it hard to hear people in a crowded room.

Competence with technology

Got three of the performance tests correct (out of eight), but she wasn't very sure about one of those.

Attitudes to technology

Not interested in new technology and would rather not engage with it if given the choice. Not very confident about her ability to use new technology or to recover from errors. If she is unsure what to do on an interface, she would try a few things to see what they do.

Use of technology

Has used a computer occasionally in the past, mostly for communicating with work. However, she does not own her own computer and only occasionally uses one now. The only times she used one in the last few months was to look up some information on a friend's computer. She owns an old smartphone that a friend passed on to her but only uses it to make calls and send text messages.

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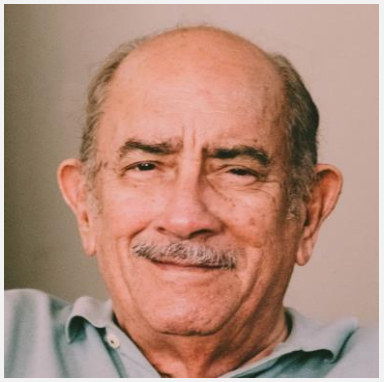

William

is in cluster 4, which contains 9% of survey participants

Competence with technology*	Use of technology*		Attitudes to technology*	
	Frequency of use	Range of activities	Desire to engage	Willingness to explore
Low (4.0/8)	Low	Low	Low	Low

Lifestyle

William manages the security at a local firm, having worked his way up in the business. He is married with grown-up children, and his wife works as a healthcare assistant. Due to family difficulties, they are currently looking after their eight year old grandson, which they find challenging.

Competence with technology

Got half of the performance tests correct.

Use of technology

Uses a computer fairly often but not every day, mostly for e-mail and internet searches. He also owns a smartphone which he uses daily, mostly to make calls and to check e-mails. He does not do many other technology activities, including installing apps or file management.

Physical and sensory capabilities

Struggles to see small print but does not want to wear reading glasses.

Attitudes to technology

Not confident in his ability to use new technology and not interested in technology for its own sake. He's slightly uneasy about tapping or clicking on things he doesn't recognise in case it makes something break.

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* All the variables are described in more detail in the Appendices. Willingness to explore refers to the willingness to explore an unfamiliar interface.

Nancy

is in cluster 5, which contains 6% of survey participants

Competence with technology*	Use of technology*		Attitudes to technology*	
	Frequency of use	Range of activities	Desire to engage	Willingness to explore
Low (4.0/8)	High	Moderate	Low	High

Lifestyle

Nancy used to work as an administrative assistant but left work many years ago to look after her four children. She now cares for her husband who has early stage dementia. Her children help out when they can, and the council provides support through a carer who comes in twice a week.

Physical and sensory capabilities

Starting to experience some minor arthritis in her hands which makes it a little harder to grip and pick up objects.

Competence with technology

Got half of the performance tests correct, including use of the back button to backtrack on an interface.

Attitudes to technology

Not interested in technology for its own sake and not very confident about her ability to use new technology. However, if she's not sure what to do on an interface, she will try out different things to see if any of them work. and can usually recover from simple errors when using an interface

Use of technology

Uses a smartphone and a computer most days. Her main activities on these are e-mail, searching for information on the internet and internet shopping. She also occasionally uses other applications.

Nancy knows how to install an app on her smartphone and does so occasionally. However, she doesn't know how to install software or manage files on her computer.

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* All the variables are described in more detail in the Appendices. Willingness to explore refers to the willingness to explore an unfamiliar interface.

Maria

is in cluster 6, which contains 6% of survey participants

Competence with technology*	Use of technology*		Attitudes to technology*	
	Frequency of use	Range of activities	Desire to engage	Willingness to explore
Low (4.5/8)	Very high	Very high	High	High

Lifestyle

Maria owns a small clothing shop, sourcing, altering and selling vintage clothes. She is divorced, with children in their twenties. Her youngest daughter lives at home with her but hopes to move out soon.

Physical and sensory capabilities

No particular physical or sensory capability losses.

Competence with technology

Got five (just over half) of the performance tests correct, though she had to guess on one of them.

Attitudes to technology

Maria isn't interested in technology for its own sake, but still has a tendency to actively engage in intensive technology interaction rather than to avoid it. She is willing to try out different things on an interface until something works. If the interface does something she didn't expect, she thinks that she can usually recover from the problem.

Use of technology

Uses a computer, smartphone and tablet most days, both to run her business and for personal use. She does most of the technology activities asked about in the questionnaire, except for computer programming. She particularly relies on e-mail, internet search, internet shopping and banking to run her business and does these primarily on her computer. Social media is also very important to her work and she often uses her smartphone or tablet for this. She is competent at file management and installing software on her computer, smartphone and tablet.

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Kamal

is in cluster 7, which contains 7% of survey participants

Competence with technology*	Use of technology*		Attitudes to technology*	
	Frequency of use	Range of activities	Desire to engage	Willingness to explore
Moderate (6.0/8)	High	Moderate	Low	Low

Lifestyle

Kamal is an electrician with a Level 3 NVQ diploma in Electrotechnical Services. He is self-employed, so has to manage his own accounts and admin on his computer. He lives on his own and enjoys the fact that being self-employed gives him time and flexibility for travelling and cycling.

Competence with technology

Reasonably competent with basic smartphone interfaces despite his lack of confidence. He got six of the eight performance tests correct.

Use of technology

Uses a computer and smartphone every day. He uses e-mail, reads news online, searches for information on the internet and does online banking and shopping. He uses both Citymapper and Google Maps to help him find clients' houses. He tends to keep things on his computer how they were originally set up. He has not installed any new programs or changed the settings on his computer in the past year, although he has installed apps on his smartphone.

Physical and sensory capabilities

No particular physical or sensory capability losses.

Attitudes to technology

Not interested in new technology for its own sake. He is not very confident in his ability to use technology. If he is unsure what to do on an interface, he might try a few things but is hesitant about it.

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Anna

is in cluster 8, which contains 14% of survey participants

Competence with technology*	Use of technology*		Attitudes to technology*	
	Frequency of use	Range of activities	Desire to engage	Willingness to explore
Moderate (6.5/8)	High	High	Moderate	High

Lifestyle

Anna works as a childcare worker in a local nursery and is working towards her Level 3 Diploma for the Early Years Workforce. She lives with 2 friends in a rented flat.

Competence with technology

Got most of the performance tests correct (seven out of eight), although she wasn't sure about one of those. In addition, she wasn't sure about some of the symbols when they were taken out of context.

Use of technology

Uses a computer most days for her studies and for keeping records at work. She also uses a smartphone daily, using a range of apps to chat with friends, engage in social media, shop online, listen to music and edit photos, among other things. She uses Google Maps to find her way around.

On the search task, she preferred to scroll to find an appointment rather than using the search feature.

Physical and sensory capabilities

Has a visual impairment that sometimes makes it difficult to focus her eyes properly. She can see to read (though sometimes has to concentrate to do so). Her eyesight is not good enough to drive.

Attitudes to technology

Fairly confident about her ability to use new technology and to recover from most errors. However, she does sometimes get stuck on more complex computer issues. She is not interested in technology for its own sake but for what she can achieve with it.

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Robert

is in cluster 9, which contains 2% of survey participants

Competence with technology*	Use of technology*		Attitudes to technology*	
	Frequency of use	Range of activities	Desire to engage	Willingness to explore
High (7.0/8)	Very low	Very low	Low	Moderate

Lifestyle

Robert (Rob) left school with no qualifications and worked as a construction worker for many years. He was made redundant a couple of years ago due to a downturn in the local housing market. He has struggled to find a new job because he found retraining difficult.

He lives with his wife and two young children. He also has a grown-up daughter from a previous marriage. He likes to watch sports and spend time with his children.

Competence with technology

Can use a basic smartphone interface competently when necessary, despite his dislike of computers. He got most of the performance tests correct (seven out of eight), although he could not recognise the smartphone symbols when they were taken out of context.

Use of technology

Only uses computers when he has to (e.g. to fill in forms online). He owns an old smartphone which he uses occasionally (not every day), usually for calls and texts rather than apps requiring the use of the internet. When he does use the internet, it is only for basic searches.

Physical and sensory capabilities

Chronic lower back pain, varying in severity. This can make walking and bending painful, but he can usually manage it OK with exercises and medication.

Attitudes to technology

Does not like using computers and only does so when necessary. If he is unsure what to do on an interface, he would try a few things but not engage in extensive exploration of the interface.

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* All the variables are described in more detail in the Appendices. Willingness to explore refers to the willingness to explore an unfamiliar interface.

Laura

is in cluster 10, which contains 8% of survey participants

Competence with technology*	Use of technology*		Attitudes to technology*	
	Frequency of use	Range of activities	Desire to engage	Willingness to explore
High (7.0/8)	High	Low	Low	High

Lifestyle

Laura works part-time in Human Resources at a large company. The part-time work allows Laura time to spend with and look after her children. She is separated from her husband and has two children at primary school and two at secondary.

Competence with technology

Got most of the performance tests correct (seven out of eight). However, she didn't recognise some of the symbols when they were taken out of context.

Use of technology

Uses a computer every day for work and less often at home. Laura uses a smartphone daily and has a tablet, although it is mostly used by her children. Her main technology activities are e-mail, social media and searching for information on the internet. She doesn't know how to install new software on her computer. She can install new apps on her phone but does not do so very often.

Physical and sensory capabilities

Recently started wearing reading glasses, but is still not used to it and doesn't always take them with her. She has a sore shoulder and finds reaching above her head painful.

Attitudes to technology

Fairly confident in her ability to use new technology and to recover from most errors, although she does get stuck on more complex computer issues. If she is not sure what to do next on an interface, she will try out a variety of different things. She is only interested in technology for what she can achieve with it.

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Eric

is in cluster 11, which contains 9% of survey participants

Competence with technology*	Use of technology*		Attitudes to technology*	
	Frequency of use	Range of activities	Desire to engage	Willingness to explore
High (7.5/8)	Very high	Very high	High	Moderate

Lifestyle

Eric lives in a small village and works as a GP at a medical practice in a nearby town. He and his partner, George, have recently bought a house together. His parents and sister live overseas and he tries to visit them at least once a year. He also enjoys cooking and DIY.

Competence with technology

Got all of the performance tests correct, although he was not sure about one of them. If something happens on an interface that he did not expect, he can usually sort it out by himself.

Use of technology

Uses a computer and smartphone every day both for work and personal use. He also uses a tablet several times a week for entertainment and to video call his relatives. He does all the technology activities asked about in the questionnaire, except for writing computer code. He has booked travel online but not in the last three months.

Physical and sensory capabilities

No particular physical or sensory capability losses.

Attitudes to technology

Fairly confident in his use of technology and ability to recover from errors. If he's not sure what to do on an interface, he is willing to try out a few different things to see what they do.

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* All the variables are described in more detail in the Appendices. Willingness to explore refers to the willingness to explore an unfamiliar interface.

Sam

is in cluster 12, which contains 16% of survey participants

Competence with technology*	Use of technology*		Attitudes to technology*	
	Frequency of use	Range of activities	Desire to engage	Willingness to explore
High (7.5/8)	Very high	Very high	High	Very high

Lifestyle

Sam (Samantha) works as a software engineer for a start-up company. She and her husband recently had their first baby, and she has just returned to work after eight months' maternity leave. Her daughter is not sleeping very well at the moment. As a result, she is a little sleep-deprived and her concentration is not as good as it usually is. She enjoys playing computer and board games, but she doesn't have the time or energy to do so at the moment.

Competence with technology

Got all the performance tests in the questionnaire correct, although she wasn't sure about the Search task because she was used to doing this kind of task in a different way. She knew what the smartphone symbols meant, even out of context.

Use of technology

Uses a computer intensively, both in her job and personal life. She relies on her smartphone to organise her life and uses a tablet fairly frequently. She does most of the technology activities asked about in the questionnaire.

Physical and sensory capabilities

No particular physical or sensory capability losses.

Attitudes to technology

Confident about her ability to use new technology and to recover from errors. If she's not sure what to do on an interface, she tries out different things until something works. She can sort out problems on her computer, including fairly complex ones. She enjoys trying out new technology.

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Appendix 1: Creating the 'technology competence' variables

The performance tests in the survey

In the survey, participants were shown mock-ups of a smartphone interface and asked what was the first thing that they would do to achieve eight simple tasks. The tasks were:

- Search for an event in a calendar
- Access the settings menu
- Create a new event in a calendar
- Bring up a menu with more options
- Go back to the previous screen
- Bring up a drop-down menu
- Make the onscreen keyboard appear
- Set a webpage to be a favourite/bookmark

These tasks were deliberately kept simple. Common icons or interface elements for these actions were clearly visible on the screen – participants did not have to search through menus to find them. In addition, they did not have to complete the entire task successfully. Only the first action taken was recorded.

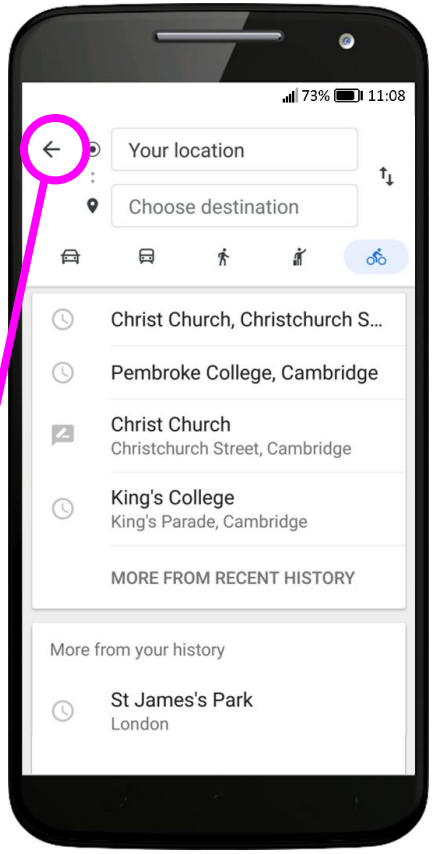
Example test

Participants were shown the screenshot on the right (without the pink circle) and told:

Imagine that you pressed something by mistake and the screen changed to the one shown in this picture. What would you do to get back to the previous screen?

The full set of screenshots that were shown to participants are available online, together with more detail on how the scores were rounded to the nearest 0.5.

The correct response is to touch this arrow



Interpreting the results

The tasks provide an assessment of basic technology competence in using a touchscreen. The tasks are simple, so getting even a few wrong indicates that a person is likely to have difficulties operating a touchscreen interface. All of the other variables are rated between 'Very low' and 'Very high'. However, technology competence only goes up to 'High', because the tests were too easy to measure 'Very high' competence.

- Very low competence: Less than 3 tests correct
- Low competence: At least 3 but less than 5 tests correct. Note that this includes people who got half the tests correct. Because the tests are so basic, this still indicates a low level of competence.
- Moderate competence: At least 5 but less than 7 tests correct.
- High competence: At least 7 tests correct.

Appendix 2: Creating the 'use of technology' variables

Frequency of use

In the survey, participants were asked how frequently they used a range of technologies, as in the following example question:

In the last 3 months, how often (on average) have you used **the Internet**? Please include use at home, work or any other place, and on any device.

- Every day or almost every day
- At least once a week
- Less than once a week but at least once in the last 3 months
- I last did this more than 3 months ago
- I have never done this
- Don't know

Similar questions were asked regarding the use of a computer, a smartphone and a tablet.

The 'Frequency of use' variable reports the number (out of 4) of these questions that were answered: 'Every day or almost every day'. This relatively simple score was created to give a ballpark understanding of the extent to which the participant uses technology.

Range of activities

In the survey, participants were asked if they had carried out any of the following activities for personal use, on any device, in the last 3 months:

- Sending and/or receiving emails
- Making video or voice calls over the internet (e.g. Skype, FaceTime)
- Social networking (e.g. Facebook, Twitter)
- Reading online news sites, newspapers or news magazines
- Searching for information on the internet
- Finding information about goods or services on the internet
- Buying or ordering goods or services on the internet
- Internet banking
- Booking travel on the internet
- Using a mapping application

They were also asked if they had carried out other, more specialist activities, for personal or work use, over the last 12 months.

- Copying or moving a file or folder on a computer or mobile device
- Transferring files between computers and other devices such as a camera or smartphone
- Installing software or applications on a computer
- Installing an app on a tablet or smartphone
- Changing the settings of any software, including apps
- Using word-processing software
- Using software to edit photos, videos or audio files
- Writing computer code using a programming language

The 'Range of activities' variable adds up the number of activities reported out of 18.

Appendix 3: Creating the 'attitudes to technology' variables

Desire to engage

The 'Desire to engage' variable uses a standardized scale called Affinity for Technology Interaction (ATI). This scale assesses 'a person's tendency to actively engage in intensive technology interaction – or to avoid it'. It asks participants to rate their level of agreement to the following nine statements:

1. I like to occupy myself in greater detail with technical systems.
2. I like to try out the functions of new technical systems.
3. I predominately deal with technical systems because I have to.
4. When I have a new technical system in front of me, I try it out intensively.
5. I enjoy spending time becoming acquainted with a new technical system.
6. It is enough for me that a technical system works; I don't care how or why.
7. I try to understand how a technical system exactly works.
8. It is enough for me to know the basic functions of a technical system.
9. I try to make full use of the capabilities of a technical system.

Each statement was rated on a six point scale, from 'completely agree' to 'completely disagree'. Responses to negative items (such as the third statement above) were reversed. The mean of all nine responses is the ATI score or 'Desire to engage'.

Full details on this scale can be found at ati-scale.org.

Willingness to explore

In the survey, participants were asked to indicate their level of agreement with the following two statements:

1. When I'm not sure what to do next on a technical system, I try out different things until something works.
2. I am uneasy about tapping or clicking on things that I don't recognise in case something breaks.

Each statement was rated on a six point scale, from 'completely agree' to 'completely disagree'. The response to item 2 was reversed. The mean of the these responses is the 'Willingness to explore' score. It gives an indication of how willing a participant is to explore an unfamiliar technology interface.