

autism&uni

D3.2 Evaluation of Course Scenario Prototypes with Representative Students and Autism Professionals

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1 Background

The Autism&Uni project (www.autism-uni.org) aims to support students during the critical transition periods from leaving secondary education and applying to university through to arriving and settling in at university. It will do this through an online toolkit that provides students with strategies for overcoming the challenges they typically encounter. Work Package 3 aimed to create course scenarios and low-fidelity scenario prototypes for the toolkit, then evaluate these with representative students and autism professionals, iterating as necessary.

This report outlines the prototyping phase of the toolkit and its evaluation. The next project step is to pass on the toolkit prototype to project partner TU/e to incorporate into a software package (Work Package 4).

2 Executive Summaries

2.1 English – Executive Summary

Designing a set of course scenarios for the online toolkit is a multi-dimensional problem due to the many variables involved – the heterogeneous nature of the target group, differences between universities, differing HE landscape in the 5 partner countries. In our attempt to design the content of the toolkit, we adopted a Design Thinking approach which is specifically suited for such multi-dimensional problems. After analysing the Literature Review (see project report D2.1) and results from the multi-national Mapping Survey (see project report D2.3), we identified examples of good practice as well as recurring themes related to the challenges autistic students encounter.

Challenges relate to the social and physical environment, lack of appropriate support right from the start, unrealistic expectations by the student, challenges concerning assessment, and transitioning to adult life requiring more effort than it would for the average student. Teachers, support staff and academics told us about effective support programmes and practices. Students also told us about how they coped with problems encountered, and what strategies and support offers helped them as individuals. Students expressed a need for reliable information that went beyond universities' marketing material and which could be accessed in their own time, at their own pace. There was little mention of a need for academic support.

Using this knowledge about challenges, and possible ways to overcome these challenges, the project partners spent considerable time on generating content ideas for the online toolkit. The most promising ideas were shortlisted and a final list of topics was agreed on. Based on this shortlist, prototype content for the online toolkit was then created:

- Choosing the right subject and university
- Managing expectations about study and social life at university
- Typical study situations
- Managing difficult social interactions
- How to talk about one's autism – the strengths and the difficulties
- How to get support in place early (the Needs Assessment in the UK)
- Finding your way around campus

The content consisted of background information, activities, reflection prompts, image material and short video clips. We started planning a series of participatory design events with autistic students to test and further develop the prototype material. Wordpress was decided on as the technical platform, with a visually minimalist interface. We organised a "hack-day" with project partner TU/e to better understand and integrate the adaptive features TU/e were developing.

As part of engagement with autism professionals, we ran an academic seminar at the British HCI conference in Lincoln in July 2015. The event produced a list of practical tips for organising participatory events (*to be published in a journal article, link to follow*).

Also in July 2015 we ran a participatory design workshop with three autistic students, one of whom was accompanied by his mother. Participants went through a series of five planned activities which were designed to provide feedback on scenario content, information architecture of the prototype, visual design decisions, video format and video content. Participants were actively involved in the process as co-designers, building on their creativity and ability to spot inconsistencies.

All participants enjoyed the activities, praising their interactive nature, and they also all commented on how good it was to be listened to and to share strategies for coping in situations inside and outside of university. Participants told us that they tend to think logically, and that information needs to be presented in a clear and objective fashion for it to be both informative and persuading.

The general conception that autistic people think visually was challenged. Participants preferred well-structured text information to illustrations, infographics or videos. Visual information was welcome where it conveyed information that text alone could not achieve, e.g. showing buildings, rooms, people they would meet. The graphic design skin was well received, and comments revolved around how it was basic, muted and did not distract from the content.

Participants liked a flat navigation structure and ways to group and order content according to their needs. Animations and transitions were not rejected outright, but they needed to add a clear benefit to the interaction they supported (e.g. additional information sliding in when hovering over an image). Participants told us that they wanted to be able to choose how they looked at information – e.g. whether it was all in one long document or broken up into chunks or in a printable format. Participants' preferences differed, highlighting the need for personalised toolkit customisation.

Participants liked information to be presented in a clear and objective fashion for it to be both informative and believable. All participants declared a need to have as much information as possible provided – and accessible ways to get at that information and process it at their own speed. Negative depictions of autism and 'doom-and-gloom' scenarios were challenged as they increased anxiousness and discouraged engagement with the toolkit material. Participants liked prompts that encouraged reflection or taking action, e.g. how to get support, where to ask, who to ask and how. Anything that promoted self-advocacy was considered positive.

Overall, the prototype evaluation was a success, provided valuable insights, and the toolkit met with approval from the participants. The iterative and responsive approach we took was welcomed. Basing design decisions on evidence from research is important, but so is being willing to listen to participants and involve them in the design as well as the testing of prototypes.

2.2 Dutch – Uitgebreide Samenvatting

Het ontwerpen van een collectie cursus scenario's voor de online toolkit is een multi-dimensioneel probleem omwille van de vele variabelen – het heterogene karakter van de doelgroep, verschillen tussen universiteiten en verschillen in het hoger onderwijs landschap in de 5 landen van de deelnemers. Bij het ontwerp van de inhoud voor de toolkit hebben we een methode van Ontwerpgericht Denken toegepast die specifiek geschikt is voor zulke multi-dimensionale problemen. Na het analyseren van het Literatuur-Overzicht (zie project rapport D2.1) en resultaten van een multi-nationaal Survey om het probleemgebied in kaart te brengen (zie project rapport D2.3) hebben we voorbeelden van goed gebruik geïdentificeerd alsook terugkerende thema's die verband houden met de uitdagingen die autistische studenten tegenkomen.

De uitdagingen houden verband met de sociale en fysieke omgeving, het ontbreken van aangepaste ondersteuning vanaf het begin, onrealistische verwachtingen bij de student, uitdagingen met betrekking tot toetsing, en de overgang naar het leven als volwassene, wat (allemaal) meer moeite kost dan bij een "gemiddelde" student. Docenten, ondersteunende staf en academici vertelden ons over effectieve ondersteunende programma's en praktijken. Studenten vertelden ook hoe ze omgingen met de ondervonden problemen, en welke strategieën en aangeboden ondersteuning hen hielpen als individuen. Studenten drukten de behoefte uit aan betrouwbare informatie die verder ging dan wat universiteiten in hun marketing materiaal aanbieden en die ze in hun eigen tijd en in hun eigen snelheid konden bekijken. De behoefte aan academische ondersteuning werd zelden genoemd.

Door deze kennis te gebruiken over uitdagingen, en mogelijke manieren om de uitdagingen te overwinnen, hebben de projectpartners veel tijd besteed aan het genereren van ideeën voor inhoud voor de on-line toolkit. De meest veelbelovende ideeën werden op een shortlist geplaatst en een uiteindelijke lijst van onderwerpen werd overeen gekomen. Op basis van de shortlist werd prototype inhoud voor de on-line toolkit gecreëerd:

- Het kiezen van de juiste studie en universiteit
- Verwachtings-management over de studie en het sociale leven aan de universiteit
- Typische studie-situaties
- Omgaan met moeilijke sociale interacties
- Hoe te praten over je autisme – de sterktes en de moeilijkheden
- Hoe snel ondersteuning krijgen (behoefte-nastelling in het VK)
- De weg vinden op de campus

De inhoud bestond uit achtergrond-informatie, activiteiten, vragen om reflectie, beeldmateriaal en korte video clips. We startten met het plannen van een reeks participatory design events met autistische studenten om het prototype materiaal te testen en verder te ontwikkelen. Wordpress werd gekozen als technisch platform, met een visueel minimalistische interface. We organiseerden een "hack-day" met project partner TU/e om de adaptieve features die de TU/e ontwikkelde beter te begrijpen en integreren.

Als onderdeel van het inschakelen van professionele autisme behandelaars hielden we een academisch seminar tijdens de Britse HCI conferentie in Lincoln in juli 2015. Dit event produceerde een lijst van praktisch tips voor het organiseren van participatory events (wat nog gepubliceerd wordt in een jaurnal-artikel, waarvan de link nog volgt).

Eveneens in juli 2015 hielden we een participatory design workshop met drie autistische studenten, waarvan één vergezeld was door zijn moeder. De deelnemers doorliepen een reeks van vijf geplande activiteiten die ontworpen waren om feedback op te leveren over de inhoud van de scenario's, informatie architectuur van het prototype, visueel ontwerp beslissingen, videoformaat en video-inhoud. De deelnemers waren actief betrokken bij het proces als mede-ontwerpers, voortbouwend op hun creativiteit en hun talent om inconsistenties te vinden.

Alle deelnemers genoten van de activiteiten, prezen hun interactieve aanpak en ze merkten ook op hoe goed het was om aanhoord te worden en strategieën te delen voor het omgaan met situaties binnen en buiten de universiteit. Deelnemers vertelden ons dat ze de neiging hebben om logisch te denken en dat informatie op een duidelijke en objectieve manier moet worden gepresenteerd om zowel informatief als overtuigend over te komen.

De algemene indruk dat autistische mensen visueel denken werd in vraag gesteld. Deelnemers gaven de voorkeur aan goed-gestructureerde tekstuele informatie boven inillustraties, grafieken of

videos. Visuele informatie was welkom wanneer ze informatie overbracht die niet met tekst alleen kon, vb. gebouwen tonen, kamers en zalen en mensen die ze zouden ontmoeten. De grafische ontwerp-schil werd goed ontvangen en het commentaar ging over hoe het "basic" was, gedimd en dat het de aandacht niet aftrok van de inhoud.

De deelnemers hadden een voorkeur voor een ondiepe navigatie-structuur en manieren om inhoud te groeperen en sorteren volgens hun behoefte. Animaties en overgangen werden niet meteen verworpen maar ze moesten een duidelijke toevoeging zijn aan de interactie die ze ondersteunden (vb. bijkomende informatie die getoond wordt wanneer de cursor over een figuur wordt bewogen). De deelnemers vertelden ons dat ze wilden kunnen kiezen hoe ze informatie konden bekijken – vb. of het allemaal in een lang document stond of opgedeeld werd in delen of een af te drukken formaat. De voorkeuren van de deelnemers verschilden, wat de noodzaak benadrukt om personalisatie in de toolkit mogelijk te maken.

De deelnemers wilden dat de informatie op een duidelijke objectieve manier werd gepresenteerd zodat ze informatief en geloofwaardig zou zijn. Alle deelnemers drukten de behoefte uit om zoveel mogelijk informatie te krijgen – en toegankelijke manieren om die informatie te bereiken en aan hun eigen snelheid te verwerken. Negatieve indrukken van autisme en "donkere" scenario's werden uitgedaagd omdat die de angst verhoogden en het interageren met het toolkit materiaal ontmoedigden. De deelnemers hielden van "prompts" om te reflecteren of actie te ondernemen, vb. hoe ondersteuning te krijgen, waar dit te vragen, aan wie het te vragen en hoe. Alles wat zelfvoorzienendheid stimuleerde werd als positief beschouwd.

In het algemeen was de evaluatie van het prototype een succes, leverde waardevolle inzichten op, en de toolkit werd goedgekeurd door de deelnemers. De iteratieve en responsieve aanpak die we gebruiken werd verwelkomd. Het baseren van ontwerpbeslissingen op bewijzen uit de literatuur is belangrijk, maar zo ook de bereidheid om te luisteren naar de deelnemers en hen meenemen in het ontwerp en het testen van prototypes.

2.3 Spanish – Resumen

El diseño de diversos escenarios para desarrollar herramientas online es un problema multidimensional en el que se encuentran implicadas diversas variables, por una parte la naturaleza heterogénea del grupo al que va dirigida, las diferencias entre universidades, o las peculiaridades de cada uno de los cinco países participantes. En nuestro intento de diseñar el contenido de la herramienta, adoptamos el modelo de Design Thinking que se utiliza específicamente cuando nos encontramos a problemas multidimensionales. Después de analizar y realizar una revisión de la literatura (ver el resumen del proyecto D2.1) y los resultados del muestreo a través de cuestionarios multinacionales (resumen D2.3), identificamos ejemplos de buenas prácticas, así como problemas recurrentes a los que tienen que hacer frente los estudiantes con autismo.

Los retos relacionados con el entorno físico y social, a escasez de apoyo apropiado en el momento de iniciar los estudios, las expectativas poco realistas de los estudiantes, retos vinculados al conocimiento y la sensibilización y la transición hacia la vida adulta representan un mayor esfuerzo en este colectivo que en la media de los estudiantes. Profesores, profesionales de apoyo y especialistas nos han relatado buenas prácticas y apoyos eficaces para estos estudiantes. Los estudiantes también nos han relatado el modo en que se enfrentan a los problemas, así como sus estrategias o el apoyo que han recibido de especialistas y compañeros. Los estudiantes expresaron la necesidad de información fiable de que iba más allá de material de marketing de las universidades y de la que se podía acceder a su debido tiempo, a su propio ritmo. Hubo poca mención a la necesidad de apoyo académico.

Con el uso de este conocimiento acerca de los retos y las posibles formas de superar estos desafíos , los socios del proyecto dedicaron un tiempo considerable en la generación de ideas de contenido para el juego de herramientas en línea . Las ideas más prometedoras fueron seleccionadas y la lista final de temas se acordó de manera sucesiva. Sobre la base de esta lista, a continuación, se ha creado contenido de prototipo para el conjunto de herramientas en línea :

- Elija el tema derecha y Universidad
- Eligiendo la vocación y Universidad adecuada
- Manejando las expectativas sobre los estudios y la vida social en la universidad
- Situaciones típicas de estudi
- Manejando las dificultades en las interacciones sociales
- ¿Cómo hablar de tu propio autismo?- Tus puntos Fuertes y tus debilidades
- ¿Cómo conseguir apoyo de manera temprana?
- Encontrando tus intereses en el campus

El contenido consistía en información de antecedentes, actividades , indicaciones , material de imagen y video clips cortos . Empezamos a planear una serie de eventos de diseño participativo con los estudiantes con autismo para probar y desarrollar aún más el material prototipo. Se decidió que la plataforma técnica sería Wordpress, por contar con una interfaz visual minimalista. Se organizó un día de pilotaje con los socios para entender mejor e integrar la mejor la herramienta que estábamos desarrollando .

Como parte del compromiso con los profesionales especializados en autismo se realizaron formaciones en los países participantes y un seminario en el British HCF, es este evento se desarrollaron una lista de consejos prácticos para la organización de eventos participativos (que se publicarán en un artículo de revista)

También se llevo a cabo en Julio de 2015 un taller en el que se contó con tres estudiantes con autismo y la madre de uno de ellos. Los participantes a través de cinco actividades estructuradas diseñaron y dieron feedback sobre el contenido de los escenarios, la estructura y el aspecto visual del prototipo, así como el formato y contenido de los vídeos. Los participantes han estado activamente implicados como co-diseñadores, construyendo y aportando su habilidad para detectar errores o incoherencia en la herramienta.

Todos los participantes disfrutaron de las actividades, alabando su naturaleza interactiva, y también todos comentaron lo bien que estaba para ser escuchados y para compartir estrategias de afrontamiento en situaciones dentro y fuera de la universidad. Los participantes nos dijeron que tienden a pensar de manera lógica, y necesita que la información sea presentada de manera clara y objetiva para informar realmente.

La concepción general de que las personas con autismo son siempre pensadores visuales ha cambiado. Los participantes en el estudio preferían una buena estructuración a la presencia de imágenes, infografías o vídeos. La información visual era bienvenida en tanto en cuanto complementa al texto y llega a aspectos en los que la palabra es insuficiente, por ejemplo para mostrar los espacios o las personas con las que se van a encontrar. El diseño gráfico también es valorado como positivo, y el foco se puso en determinar qué información podía suponer un ruido o distractor que no aportase significado.

Los participantes prefieren una estructura de navegación plana y formas de contenido de grupo y el orden de acuerdo a sus necesidades. Animaciones y transiciones no fueron rechazadas de plano, pero para considerarlas útiles necesitaban añadir un beneficio claro para la interacción. Los participantes nos dijeron que querían ser capaces de elegir como se mostraba la información - por

ejemplo, si era todo en un documento largo o se segmentaba en trozos o en un formato imprimible. Las preferencias de los participantes diferían, destacando la necesidad de una personalización de las herramientas adaptadas a cada usuario.

A los participantes les gusta que la información sea presentada de manera clara y objetiva para que sea a la vez informativo y creíble. Todos los participantes declararon una necesidad de tener tanta información como sea posible siempre - y accesibles formas de llegar a esa información y procesarla a su propio ritmo. Las representaciones negativas de autismo y escenarios en los que se muestre melancólicamente la imagen del autismo¹ fueron rechazados. A los participantes les gusta contar con indicaciones que animen a la reflexión o la adopción de medidas, por ejemplo, cómo obtener asistencia técnica, dónde preguntar, a quién preguntar y cómo. Cualquier cosa que promueve la autogestión se consideró positive.

En general, la evaluación del prototipo fue un éxito, proporcionado información valiosa, y el kit de herramientas se realizó con la aprobación de los participantes. El enfoque iterativo y sensible que tomamos fue bien recibido. Basar las decisiones de diseño en la evidencia de la investigación es importante, pero también lo es estar dispuesto a escuchar a los participantes y hacer que participen en el diseño, así como en las pruebas de prototipos, esperamos que este enfoque de como resultado una herramienta verdaderamente útil.

2.4 Finnish – Tiivistelmä

Verkossa toimivan työkalupakin kurssiskenaarioiden suunnittelu on monitahoinen ongelma, koska siinä täytyy ottaa huomioon useita muuttujia, kuten kohderyhmän heterogeeninen luonne, korkeakoulujen väliset erot ja vaihteleva oppilaitoskulttuuri viidessä projektikumppanusmaassa. Valitsimme työkalupakin sisällön suunnitteluun Design Thinking -tyyppisen lähestymistavan, joka sopii erityisen hyvin moniulotteisten ongelmien käsittelyyn. Tutustuttuamme kirjallisuuskatsaukseen (ks. projektiraportti D2.1) ja usean maan kartoituksen tuloksiin (ks. projektiraportti D2.3), tunnistimme esimerkkejä hyvistä käytännöistä sekä toistuvia teemoja liittyen autismin kirjoon kuuluvien opiskelijoiden kohtaamiin haasteisiin.

Autismin kirjoon kuuluvien opiskelijoiden haasteet liittyivät sosiaalisen ja fyysisen opiskeluympäristön esteellisyyteen, asianmukaisen ja riittävän varhaisen tuen puutteeseen, opiskelijan epärealistisiin odotuksiin, tarpeenarvointiin liittyviin haasteisiin ja siihen, että siirtymävaihe aikuisuuteen vaatii heiltä usein tavallista enemmän ponnisteluja. Opettajat, tukihenkilöt ja korkeakoulujen henkilökunta esittelivät vaikuttavia tukiohjelmia ja käytäntöjä. Opiskelijat kertoivat keinoista, joilla he olivat yrittäneet selviytyä kohtaamistaan vaikeuksista ja siitä, minkälaiset strategiat ja tukitoimet olivat auttaneet heitä yksilöinä. Opiskelijat toivoivat saavansa luotettavaa tietoa, joka olisi syvällisempää ja kohdennetumpaa kuin korkeakoulujen omat esitteet ja johon voisi tutustua omalla ajalla ja omissa tahdissa. Harvat opiskelijat ilmaisivat tarvetta akateemiseen ohjaukseen.

Käyttäen tietoa opiskelijoiden kohtaamista haasteista ja mahdollisista keinoista niiden voittamiseen, projektikumppanit käyttivät huomattavan paljon aikaa kehittääkseen ideoita verkossa toimivan työkalupakin sisällöiksi. Lupaavimmat ideat valittiin jatkoon ja niiden pohjalta sovittiin lopullinen lista aiheista:

- Sopivan oppiaineen ja korkeakoulun valitseminen
- Opiskeluun ja oppilaitoksen sosiaaliseen elämään liittyvien odotusten hallinta
- Tyypilliset oppimistilanteet
- Hankalien sosiaaliseen vuorovaikutukseen liittyvien tilanteiden hallinta
- Kuinka kertoa autismista? Vaikeudet ja vahvuudet

- Kuinka saada riittävän varhaista tukea ("the Needs Assessment" Iso-Britanniassa)
- Kampusalueella liikkuminen

Työkalupakin sisältö koostui taustatiedoista, toimintaehdotuksista, pohdittavista kysymyksistä, kuvamateriaalista sekä lyhyistä videoklipeistä. Aloimme suunnitella autismin kirjoon kuuluvien opiskelijoiden kanssa yhdessä järjestettäviä suunnittelukokouksia, jossa he voisivat testata ja kehittää edelleen prototyypimateriaaleja. Wordpress valittiin julkaisualustaksi ja käyttöliittymästä haluttiin luoda visuaalisesti minimalistinen. Järjestimme ohjelmiston kehittämispäivän yhdessä Technische Universiteit Eindhovenin kanssa ymmärtääksemme paremmin heidän kehittämiään adaptiivisia ominaisuuksia ja pystyäksemme integroimaan ne kokonaisuuteen.

Osana sitoumustamme autismialan ammattilaisten kanssa järjestimme akateemisen seminaarin British HCI -konferenssissa Lincolnissa heinäkuussa 2015. Tapahtumassa syntyi lista hyvistä käytännöistä osallistavien tapahtumien järjestämiseksi (julkaistaan artikkelissa, ks. linkki).

Heinäkuussa 2015 järjestimme myös osallistavan työpajan kolmen autismin kirjoon kuuluvan opiskelijan kanssa, joista yhdellä oli mukana äiti tukihenkilönä. Opiskelijat osallistuivat viiteen ennalta suunniteltuun tehtävään, joiden avulla saatiin kerättyä palautetta työkalupakin prototyypin sisällöistä, rakenteesta, visuaalisesta ilmeestä ja videoista. Osallistajat olivat aktiivisia ja sitoutuneita tehtäväänsä ja osoittivat siinä luovuutta sekä kykyä havaita epäjohtonmukaisuuksia.

Kaikki osallistajat pitivät tehtävistä ja antoivat kiitettävää palautetta niiden interaktiivisesta luonteesta. He arvostivat myös sitä, että he tulivat kuulluiksi ja saivat jakaa strategioitaan, joilla he olivat selvinneet erilaista tilanteista niin korkeakoulussa kuin sen ulkopuolellakin. Osallistajat kertoivat, että heillä on tapana ajatella loogisesti ja että he tarvitsevat vakuuttavaa ja informatiivista tietoa, joka on esitetty selkeästi ja objektiivisesti.

Osallistajat haastoivat yleisen käsityksen siitä, että autismin kirjoon kuuluvat ihmiset olisivat visuaalisia ajattelijoita. He suosivat kuvallisten esitysten ja videoiden sijasta selkeästi jäsenneltyä tekstiä. Visuaalinen tieto koettiin tärkeäksi silloin, kun sen avulla voitiin ilmaista jotain sellaista, mikä pelkän tekstin avulla ei tullut selväksi, esimerkiksi valokuvia rakennuksista ja luokahuoneista. Työkalun graafista ulkoasua kiitettiin siitä, että se oli yksinkertainen, hillitty eikä ollut ristiriidassa sisällön kanssa.

Osallistajat pitivät sivuston yksinkertaisesta navigaatorakenteesta ja mahdollisuudesta ryhmitellä ja järjestää sisältöä yksilöllisten toiveiden mukaisesti. Animaatioita ja siirtymiä ei suoraan tyrmätty, mutta osallistajat toivoivat, että ne antaisivat aina selkeää lisätukea kulloisellekin toiminnalle (esim. lisätietoa kun kohdistin siirretään kuvan päälle). Osallistajat toivoivat, että he voisivat vaikuttaa siihen, millä tavalla tieto on esitetty, esimerkiksi onko artikkeli luettavissa pitkänä pötkönä vai lyhyemmissä pätkissä tai onko se tulostettavissa. Osallistujien mieltymykset vaihtelivat, mikä korosti tarvetta siihen, että työkalupakkia tulisi voida kustomoida yksilöllisesti.

Osallistujien mielestä tieto on informatiivista ja uskottavaa silloin, kun se on esitetty selkeästi ja objektiivisesti. Kaikki osallistajat ilmaisivat toiveen, että heillä olisi käytettävissään mahdollisimman paljon tietoa ja mahdollisuus saavuttaa tieto esteettömästi ja käsitellä sitä omassa tahdissa. Osallistajat kritisoivat autismiin liittyviä negatiivisia ja synkkiä käsityksiä, koska ne lisäsivät ahdistusta ja tekivät työkalupakin käyttämisen epämiellyttävämmäksi. Osallistajat pitivät kehoitteista, jotka herättivät pohtimaan tai toimimaan, esim. opastivat miten saada tukea, keneltä ja millä tavalla pyytää sitä. Kaikki mikä edisti omien etujen ajamista koettiin positiiviseksi.

Kaiken kaikkiaan työkalupakin prototyypin arviointityöpaja oli menestys ja siinä saatiin kerättyä arvokkaita näkemyksiä. Työkalupakki sai osallistujien hyväksynnän. Iteratiivista ja responsiivista

lähestymistapaa kiitettiin. On tärkeää, että verkkosivuston suunnittelu pohjautuu tutkimuksista saatuun näyttöön, mutta tärkeää on myös se että loppukäyttäjät kuunnellaan ja osallistetaan heidät mukaan suunnitteluun ja testaukseen.

2.5 Polish – not provided by partner

3 Disclaimer

The Autism&Uni project has been funded with support from the European Commission (Funding Reference AUTHEW 539031-LLP-1-2013-1-UK-ERASMUS-ESIN). This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use, which may be made of the information contained therein. © Autism&Uni 2015



4 Positioning within the overall project methodology

In designing, prototyping and evaluating the scenarios we have followed a *Design Thinking* approach. Design Thinking is a human-centred methodology that uses co-design and intuitive problem-solving techniques to match people's needs with what is technologically feasible and logistically viable (Brown 2008). It is typically applied to deal with difficult, multi-dimensional problems that lack clear recognisable requirements and solutions – referred to as "wicked problems" (Rittel and Webber 1973). The methodology is based on the premise that by combining empathy, creativity and analytical processes, true innovation can emerge.

The challenge to design a set of course scenarios for the online toolkit is arguably a *wicked problem* because there are multiple variables involved, differing provisions in the 5 partner countries, and a number of highly individual personal accounts of students who have told us what worked for them, and what stopped them from fulfilling their full potential in higher education.

In the context of Autism&Uni, following a Design Thinking approach involved researching user needs, coming up with initial ideas for scenarios, shortlisting the best ones, and finally prototyping and testing them to arrive at a final set of scenarios that are both exemplary and fit for purpose.

A number of frameworks are available that help with the execution of a Design Thinking approach. For the Autism&Uni project, we chose the well-established five step model promoted by Stanford University (cf. d.school 2013). A description of each step and how it was applied in the context of Autism&Uni is outlined below.

Step	Aims and ethos of this step	What we did in the Autism&Uni context
1. Empathise	<p>Understand what people need and how it affects their lives. It is crucial to find out what they do, not just what they say they do. Let them tell stories about real events, rather than speculate on possibilities.</p>	<p>To better understand the challenges autistic students are facing, we undertook extensive research between March 2014 and January 2015:</p> <ol style="list-style-type: none"> 1. Nearly 300 individuals across the 5 partner countries took part in a survey designed to map current support provisions, identify good practice and gather feedback from future, current and past students on the autism spectrum. 2. 16 students told us their detailed personal stories of navigating higher education 3. A literature review covering characteristics of autistic learners at university level, pedagogical practice and technology interventions and preferences. 4. Accounts of the educational systems and provisions from primary to tertiary level in each partner country, as provided by the partners.
2. Define	<p>Look out for what is needed, in which context, and why. What stood out when you consulted with people. Identify recurring patterns. Refrain from identifying solutions just yet – it is about understanding people.</p>	<p>In January and February 2015, we analysed the research data and identified core themes. We summarised the literature reviews, looked for codes and patterns in survey responses, and extracted examples of good practice as well as poor practice. Recurring themes included:</p> <ol style="list-style-type: none"> 1. The social and physical environment, e.g. interactions with others, sensory issues, isolation; 2. Lack of appropriate support right from the start, e.g. due to non-disclosure, non-diagnosis or services focussing on deficits alone; 3. Unrealistic expectations by the student, e.g. regarding the course content, marks and the behaviour of peers; 4. Challenges concerning assessment (even when mastering the subject), e.g. ambiguity in instructions, knowing what to revise and when; 5. Transitioning to adult life requiring more effort than it would for the average student, e.g. time management, self-advocacy and living independently. <p>Students also told us about how they coped with challenges encountered, and what strategies worked for them. Teachers, support staff and academics told us about effective support programmes and practices. Students expressed a need for reliable information that went beyond universities' marketing material and which could be accessed in their own time, at their own pace. There was little mention of a need for academic support – students generally felt on top of their subjects and worried more about the non-academic aspects of student life and how they dealt with, and talked about, their autism</p>
3. Ideate	<p>Generate a large number of ideas about how to meet users' needs. Ensure all project members have an opportunity to contribute. Identify the best ideas to take forward into prototyping.</p>	<p>Between mid-February and mid-March, all partners were asked to propose course scenarios that would meet the user needs identified during the <i>Define</i> step. We asked for positive ideas that are based on the available evidence and meeting specific needs of autistic students. We provided a simple form template for making scenario suggestions.</p>

		<p>Overall 19 different scenarios were presented at the partner meeting in Amsterdam in mid-March 2015. (there were more, but some overlapped so much that they were merged). Partners discussed these and clarified any questions or concerns.</p> <p>Following the meeting, partners voted on the scenarios they felt were most important to take forward into prototyping – either because they had a high impact on the target audience, or because they were exemplary in demonstrating the capabilities of the adaptive software TU/e was in the process of developing. The following 6 scenarios were shortlisted:</p> <ol style="list-style-type: none"> 1. Choosing the right subject and university 2. Managing expectations about study and social life at university 3. Typical study situations 4. Managing difficult social interactions 5. How to talk about one's autism – the strengths and the difficulties 6. How to get support in place early (the Needs Assessment in the UK) 7. Finding your way around campus
<p>4. Prototype</p>	<p>Build several prototypes to try and answer a number of key design questions. Start with the smallest, quickest, simplest, cheapest thing that will help you understand what users want. You can always polish your prototypes as you go through test iterations.</p>	<p>Between April and June 2015, we produced content for several of these scenarios, to be used as prototype material. This consisted of background text, activities, reflection prompts and image material. We also commissioned a UK-based documentary film-maker to produce short clips about disclosing a disability, myths and facts about university and an introduction to the library at Leeds Beckett University. We organised a "hack-day" with TU/e to better understand and integrate the adaptive features of the software TU/e were developing.</p> <p>As part of engagement with autism professionals, we ran an academic workshop at the British HCI conference in Lincoln on 14 July 2015. We exchanged our ideas about running participatory design activities with autistic people and received valuable feedback. The event produced a list of practical tips that other autism researchers and designers can use in their practice.</p>
<p>5. Test</p>	<p>Test the prototypes with actual end users and identify improvements. Adapt your prototypes based on user feedback and show them the improved version.</p>	<p>On 28 July 2015 we ran a participatory design workshop with autistic students. Prior to the workshop we asked these students about their expectations, their worries and how they used technology and the internet. On the day, students went through a series of planned activities which were designed to provide feedback on:</p> <ol style="list-style-type: none"> 1. Scenario content 2. Information architecture of the prototype 3. Visual design decisions 4. Video format and content <p>Results and evaluation are written up below.</p>

5 Planning the evaluation workshop

When designing an online toolkit for young autistic adults, considerations of how people interact with the toolkit, how the toolkit presents itself, and what effect these interactions have on the user are critical for success and adoption.

If we can design this toolkit in a way that makes it a) useful and relevant, b) easy to use, and c) makes students want to use it, then it is likely to be successful. These three key factors are sometimes elusive, and arguably the best way of creating a successful toolkit is to involve users early on in the design process.

We did this by running a human-centred, participatory design workshop, in line with the aims of Work Package 3 which are articulated in the project application. The purpose of the workshop was to evaluate the prototype course scenarios with autistic students. This workshop took place on Tuesday 28 July 2015 at Leeds Beckett University.

Location, structure, and content of the workshop needed to be planned carefully to avoid participants feeling anxious about what to expect, how to behave and perform on the day. This is a common challenge when working with people on the autism spectrum (cf. Benton et al 2014). To alleviate these potential challenges we carried out a review of the available literature and took advice from those sources.

5.1 Workshop aims

The overarching workshop aim was to gain feedback on:

1. The possible content of each scenario
2. How the information about the various scenarios is organised and presented
3. Visual design decisions
4. The potential for using image and video material

Specifically, we wanted the workshop to inform our design process by offering participants choices of layout and different versions of content, so that we could have discussions about which version might be better, and why.

In addition to these product feature-driven aims, we wanted to involve participants directly in the design process to tap into their expert knowledge about themselves and their condition, and give them ownership of the design process. There is a general conception that autistic people are not creative, or have limited imagination – DSM-5 for example speaks of "difficulties in sharing imaginative play" (American Psychiatric Association 2013) . While this may be true for some autistic people, recent research has challenged the general underlying assumption, acknowledging that in reality we see many extremely creative people (Best et al 2015).

5.2 Background research

Several researchers have considered how best to design creative workshops and design activities with participants on the autism spectrum. Benton et al (2014) provide a framework for working with neuro-diverse people, considering the preparation of the physical environment and the planning of activities. They also put a strong emphasis on tailoring activities to the individual, as do Barry and Pitt (2006). Along the same lines, Francis et al (2009) point out the importance of obtaining background information about workshop participants in order to understand their specific traits, preferences and abilities. Benton et al (2012), based their work with children, offer a set of guidelines which nonetheless are largely relevant to an older target group too. They report that

autistic people tend to have a strong preference for, and well-developed skills in, visual thinking, also supported by Benton et al's later work (2014).

Braz et al (2014) examine the use of paper prototyping of interactive systems, which can pose challenges due to the un-finished nature of the prototype material itself, and the "what-if" nature of questions surrounding the prototype. Davis et al (2010) offer yet another set of guidelines for designing software for autistic children. Martin (2015) points out that activities ought to be presented as optional open invitations, thereby reducing demand pressure on participants. This can then lead to less anxiety and more engagement. The language with which participants are addressed can also play an important role, e.g. considering them "experts" who are there to advise is preferable to "participants" who have come to test a new idea the researchers had.

Overall the literature provided us with a practical set of guidelines for designing a participatory design workshop. We collated these and grouped them into sections:

1. **Pre-event logistics** – how to prepare the environment and brief the participants
2. **Designing artefacts and activities** – what to consider when planning activities
3. **What to avoid** – common pitfalls and misconceptions
4. **After the event** – how to debrief participants and how to interpret results

5.3 Peer validation at British HCI conference

On 14 July 2015 we ran an academic workshop "*Designing with and for autistic users*" at Lincoln University as part of the annual British HCI conference, attracting researchers from the UK and beyond, interested in the field of Human-Computer Interaction and User Experience Design. The aims for this event were three-fold: Firstly to promote the Autism&Uni project amongst autism researchers, secondly to debate and learn from experts in the field, and finally to validate the guidelines we had formulated following the literature review.

The workshop lasted a whole day and was well attended with 14 academics and professionals from all over the UK and also from Poland and Australia, including three User Experience Designers from the British Broadcasting Corporation (BBC).

The focus of the day was on participatory design methods, where users are deeply embedded in research, design and development – and not just during the final evaluation stage. Many acknowledged the challenges when working with autistic end users, especially during the early stages of design when concepts and prototypes are not yet well developed, and co-design activities require imagination and abstract future thinking.

The guidelines we had originally proposed were largely validated, with some amendments. There was clear indication that different autistic user groups tend to prefer different stimuli and practical activities. The type of autistic people at the centre of the Autism&Uni project (of normal to high intelligence, verbal and with no learning impairments), prefer textual content with little or no visual distractions. On the other hand, non-verbal people with autism, or children on the autism spectrum, may benefit from material and activities that build on their visual processing skills.

An abridged version of the final list of "Practical Tips for running co-design activities with autistic users" is available on the project website at <http://www.autism-uni.org/british-hci-2015-conference-workshop-on-designing-with-and-for-autistic-users/>. The full version will be included in a forthcoming academic publication.

5.4 Prototype material design

The all-partner activity of drafting and shortlisting scenarios resulted in the following topics to be tested and evaluated during prototyping:

Course Scenario Title	Rationale / Comment
1 – Why declare a disability	Many autistic students do not declare their disability before starting university, which prevents access to support at the start of the study when it matters most.
3 – What is the needs assessment?	To reduce anxiety about being interviewed and discussing uncomfortable issues. (Needs Assessment is a UK term, similar process exists elsewhere)
6 – Manage expectations	Many autistic students (and their parents) have expectations that do not match the real situation at university. The surveys provided many accounts and quotes to support this.
9 – Study locations	To help students find their way around university. TU/e to lead on this scenario as it was identified to be ideal to show off software capabilities.
11 – Study Situations	Advice on what to do in certain unfamiliar situations, e.g. during a lecture, when working with other students in a team, in a tutorial, etc. TU/e identified this scenario as suitable to show off the software capabilities.
16 – Managing difficult situations	It is important for students to advocate for themselves. Parents and teachers were very vocal about this, and a number of typical situations were identified (e.g. talking about one's autism, complaining about something, when and how to arrange a meeting with a tutor)

Using these 6 scenarios as a starting point, the following workshop activities were designed. We also took direct guidance from the outcomes of the validation event with researchers at British HCI conference.

An autistic researcher was involved during all activities and discussions to contribute her own experiences of both dropping out and succeeding at university, and to provide context and explanations of the activities where required.

5.4.1 Activity 1: The benefits of disclosure

The purpose of this activity was to get feedback on the best way of presenting long text-based content with complementary information. The scenario was based on a narrative that explained the background, consequences and possible actions related to disclosure of autism. The content was written by a researcher with autism, and based on the analysis of survey and literature review.

The text had the following headings:

1. Background information
2. What do we mean by disclosure?
3. Disclosure and accessing support
4. Why don't some students disclose, and what happens then?
5. How does this affect me?
6. When I disclose, who will find out?
7. What to do now?
8. Questions to think about

In addition to this factual information, we also produced the edited transcript of an interview with the Head of Disability Assessment Services at Leeds Beckett University, and the first-person account of an autistic student who advocated for early disclosure, describing her own positive and negative experiences at university. There was some image material, e.g. a comic strip with genuine quotes from survey participants, and photographs of the interviewed people.

Overall, there were then 4 different pieces of content for the workshop participant to consider:

1. All scenario text on a single page
2. Scenario text broken up into several sections, navigable via previous/next buttons
3. Professional interview
4. Student account

During the activity, we ran through the following tasks:

1. Start by asking participants about their own disclosure:
 - When and why did they disclose?
 - Who else knows about their autism?
 - Does starting at university feel like a fresh start?
 - Have you been told who will know about your autism & who you need to tell yourself?
2. Specific design questions to ask in a discussion:
 - How they like the text to be laid out, how much do they want to see at a time, how much white space, how to break up sections?
 - Would they read it all?
3. Questions to ask at the end:
 - Would this kind of information have helped you during your application?
 - Can you think of other ways to present the information?

5.4.2 Activity 2: Managing expectations – Myths and Truths about university

For this activity we prepared a number of "Myths and Truths" pairs which were meant to clarify some of the common misconceptions about university, e.g.

Myth – The other students are really keen to get started on the course

Truth – Most university starters are away from home for the first time and have lots on their mind, including socialising and getting a chance to be themselves away from home and family. They may not turn up to lectures all the time and may not show much interest initially.

We commissioned a motion graphics artist to produce a video that introduced these Myth&Fact pairs. We also commissioned a film-maker to produce a video introducing the library services at Leeds Beckett University – this related directly to some of the Myth&Fact pairs. We also prepared paper design templates for workshop participants to create their own designs of the given information.

The rationale was to test different types of video representations, and to engage participants in a co-design task, thereby tapping into their creative potential and directly involving them in the advancement of the toolkit.

During the activity, we ran through the following tasks:

1. Video
 - Show Myths&Facts video as introduction
 - Ask about effectiveness of content and presentation
2. Paper prototypes
 - Show a prototype example we produced ourselves (from activity 1)
 - Participants build individual prototypes
 - Participants share and discuss their prototype ideas

5.4.3 Activity 3: Find out about the Needs Assessment

For this activity we produced a number of wireframes that illustrated how the scenario content could be displayed, and how users could interact with it. Wireframes display the functional elements of a web page, and they are typically used for planning a site's structure and functionality without applying graphic design elements.

There were two different versions of the wireframe: A text-centric one that showed extensive background text and practical tips related to the Needs Assessment, and a video-centric one that had a dominating video window, complemented by a text introduction only.

The purpose was two-fold: we wanted to explore opportunities for adaptive content (text vs video representation of content) as well as assess participants' capabilities with regards to imagining future toolkit functionality from paper-based wireframes.

During the activity, we ran through the following tasks:

- Ask participants to walk through the wireframes
- On request, play the video
- Keep this activity low-key and simply observe what participants do (after the previous one which was very active and hand-on)
- Establish through discussion how they got on with this exercise, e.g. did the task make sense, and was the scenario content appropriate?

5.4.4 Activity 4: Find your way around campus

For this activity we produced directions from the workshop venue to another location on the Headingley Campus of Leeds Beckett University (the target location was featured in one of the videos shown earlier in the day).

Directions were detailed and featured location shots. The purpose was to find out whether the level of detail for text and image material was sufficient, and whether there were any unforeseen challenges related to giving directions.

Participants were asked to attempt the journey on their own, using the instructions on their mobile phone. Under normal circumstances, the journey would take about 5 minutes. The workshop facilitators were on hand at all times to guide participants that got lost.

Following the activity, a de-brief was conducted based on the following questions:

- How good were the directions?
- What other information might have been useful?
- Did you recognise the location from the earlier "Needs Assessment" video?
- How familiar did you feel at the location once arrived?

5.4.5 Activity 5: Study situation "Group Work"

This activity aimed to get feedback on different ways of representing study situations, in particular group work scenarios. Participants read through a text article that introduced common issues related to group work and gave some pointers as to how one can overcome these issues.

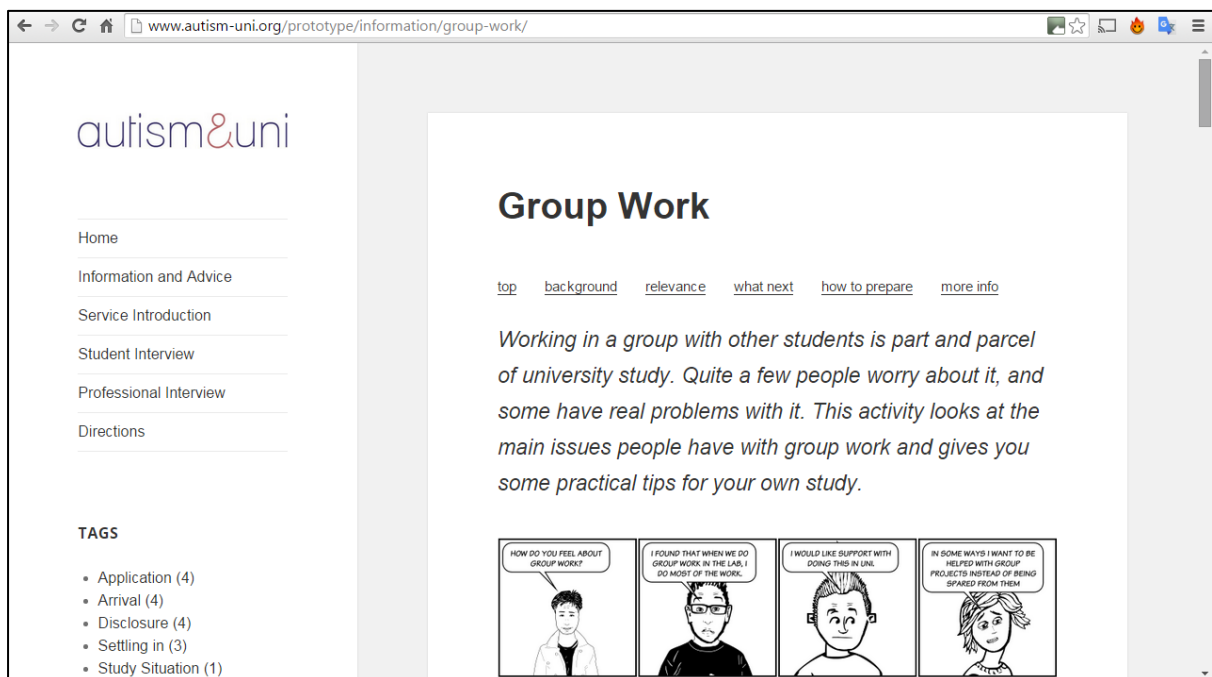
Participants were then presented with a script for a video clip on group work and the content of the script was then discussed. The discussion focused on self-awareness of strengths and weaknesses that may have an impact on the study situation, and how this awareness can be raised.

During the activity, we ran through the following tasks:

- Introduce the video concept and start a discussion - explain the "difficult situations" part of the toolkit and why it is relevant
- Talk about group work specifically, and individuals' strengths and weaknesses
- Relate this to the Needs Assessment – why it is important to discuss strengths
- Ask how they'd like the group work information to be presented
- Ask the tutor session (with an experienced university tutor present)
 - If you could ask a tutor anything about group work, what would it be?
 - Identify how the discussion can inform the next version of the toolkit

5.5 User Interface Design

WordPress was used as the interactive online platform to enter, edit and present prototype material. This had the advantage that the website was responsive (i.e. working seamlessly on devices with different form-factors including mobile phones). Navigation was functional and with a relatively flat hierarchy. The layout and visual design was chosen to be deliberately minimal, in line with our research findings from the survey regarding interface preferences of the target audience:



5.6 Workshop schedule

After successfully validating the workshop format and the design of prototype material, the following schedule was agreed:

Time	Activity	Comments
09.45	Meet in the Student Hub Building We will then walk together to the workshop venue which is in the library, James Graham Building, Room JG123	Pick a central point to meet and avoid participants getting lost
10.00-10.20	Welcome and introduction to the day Time to familiarise yourself with the surroundings and choose a place to sit. We will also ask you to complete a consent form so that we are allowed to use your input in our work.	Detailed information about the facilitators, the aims of the day, toilets and exits, and how the schedule is organised.
10.20-10.30	10 minute break	Frequent breaks we recommended

10.30-11.00	Activity 1: The benefits of disclosure We ask for your feedback on a set of information sheets we have put together	Participants used two different versions of an online scenario
11.00-11.10	10 minute break	
11.10-11.40	Activity 2: Myths and Facts about university Find out about grades and tutor expectations. You can then build your own Myths & Facts toolkit.	We presented a video and some textual content. Participants then created their own paper prototypes of an interactive scenario
11.40-11.50	10 minute break	
11.50-12.20	Activity 3: Find out about the Needs Assessment The DSA Needs Assessment is an important step to receiving the right support for your study. In this activity you will find out how to prepare for the assessment.	Participants used paper wireframe versions of the scenario, and a video was presented
12.20-13.00	A light lunch of sandwiches, crisps, fruit and drinks Please let us know of any dietary requirements via the pre-workshop questionnaire	Provided suggestions what people could do during the lunch break, once they had finished their food
13.00-13.20	Activity 4: Find a location on campus We will give you a smartphone with directions and ask you to find a location on campus. Afterwards we'll ask you how suitable the directions were. Don't worry, we will be there to help in case you get lost	To test the suitability of a set of directions we put together
13.20-13.30	10 minute break	
13.30-14.00	Activity 5: How to study in groups Students often work in small groups and negotiating this can be a challenge. We have prepared some resources to help with this and would like your feedback.	We discussed the script for a "group work" video we had planned, with focus on how to articulate strengths and weaknesses
14.00	End of activities	
14.00-14.20	Debrief Time for you to feed back on the workshop and for us to tell you about our next steps.	Information about how the data will be used, signing of consent forms, hand out of travel expense forms, demonstration of changes made to the online toolkit during the day, final feedback on how the workshop was run

6 Running the workshop

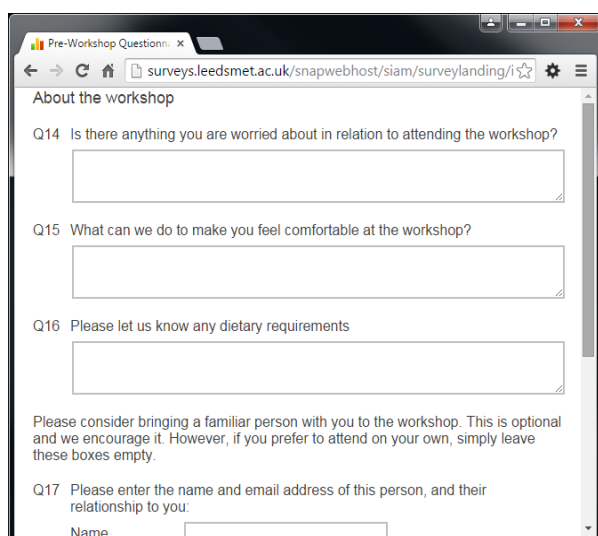
6.1 Ethics

Due to the nature of the research activities and the potential vulnerability of participants, the ethics application for running the workshop was considered at the highest approval level within Leeds Beckett University. Ethical approval was granted on 13 July 2015.

6.2 Demographic

Five students had confirmed attendance at the workshop. One the day, three participants turned up: two male and one female. Even though participants were encouraged to bring a family member or friend to have a familiar person in the room, none did. There were informal introductions by everyone.

6.3 Pre-workshop briefing



The screenshot shows a web browser window titled "Pre-Workshop Questionnaire" with the URL "surveys.leedsmet.ac.uk/snapwebhost/siam/surveylanding/i". The form is titled "About the workshop" and contains three questions:

- Q14 Is there anything you are worried about in relation to attending the workshop?
- Q15 What can we do to make you feel comfortable at the workshop?
- Q16 Please let us know any dietary requirements

Below the questions is a note: "Please consider bringing a familiar person with you to the workshop. This is optional and we encourage it. However, if you prefer to attend on your own, simply leave these boxes empty."

Q17 Please enter the name and email address of this person, and their relationship to you:

Name

About 3 weeks before the event, we sent out questionnaires to participants asking if they had any worries or anxieties about the day and how we could make them feel more comfortable. This felt more personal and relevant than the usual accessibility questions.

Informed by participants' responses, we added information about what participants could do in breaks in the workshop programme, as while some autistic people need a lot of comfort breaks, others feel lost and forced into social interaction during such breaks.

6.4 Lessons learnt

All participants enjoyed the activities, praising their interactive nature, and they also all commented on how good it was to actually be listened to.

The most valuable parts of the day involved discussion of issues faced and strategies for coping in various situations, inside and outside of university, and it showed what a shame it is that autistic people are so rarely part of the design process – only being 'users' presented with products and services to test and use to help with their presumed deficits.

Some stereotypes were challenged, like the assumption that all autistic people think visually and prefer visual information. The test comic strip we used to show comments from real students in our surveys was popular. It used illustrations rather than photographs to protect anonymity.



Other than that, our participants strongly preferred well-structured text information to infographics or video. They told us that perhaps more visual information worked better for autistic people who also had a learning disability and struggled with reading.

Participants only wanted visual information when it specifically added something that text alone could not achieve, such as

- showing landmarks and turnings in directions to reduce ambiguity
- images of the people they would be meeting
- rooms they would be using, and so on.

Participants had clear preferences for how headings, quotations and other non-paragraph text should be presented and which fonts and colours did not work well for them.



Participants told us that they also wanted to be able to choose how they looked at information, whether it was all in one long document or broken up into chunks or in a printable format. They did not want to have this decision made for them, although when queried they welcomed that idea that a system could learn from and predict their viewing preferences. Having said that, their choice might be different depending on the content and the context in which they were using the toolkit, so any predicted preference needs to be easy to override.

The narrative structure of the scenarios was well received. Participants liked the prompts to reflect and take action, e.g. how to get support, where to ask, who and how. Anything that encouraged self-advocacy was considered positive.

Participants challenged wording that made assumptions that they would find things difficult, preferring a more neutral tone that provided information without judgement. Thankfully there was only a small amount of content that did not meet with their approval, showing we had chosen an appropriate tone and style for writing.

There were very few minor typos in the scenario text, and also in one of the videos. This was immediately identified as something an autistic person is likely to focus on, to the detriment of reading and understanding the rest of the information. It is important to produce high quality information that is complete and correct.

One thing everyone had in common was the need for as much information as possible to be provided – and accessible ways to get at that information and process it at their own speed. Anything else, like graphics, videos, interactive activities or ‘exciting’ layouts and features would just distract them from being able to make their own route through the information in their own time, as often as they wanted. We were warned – “Stop overthinking it!”

Every single participant got lost (at different points) when following campus directions on their mobile phone. Directions need to be very detailed and completely unambiguous. Using landmarks is effective, but they need to be unique (in our directions we pointed out a zebra crossing in a photograph; but because there was another zebra crossing nearby – even though it looked completely different – confusion was created).

During the de-brief, participants acknowledged the potential of combining directions with a student timetable so that they could be directed to a certain building or room at the right time of the day.

In our Autism&Uni surveys, Wikipedia was the most popular website autistic students liked to use. Comprehensive text-based information really is vital for autistic people who have the capacity to study at university and the structure of that information is important. Shiny presentation and attempts to 'engage' the user generally seem to just get in the way.

Key observations from the workshop, particularly from the discussions with students, are summarised in the box below.

Guidelines for producing scenarios

- Provide as much detailed written description as possible, in a clear, logical way
- Use positive language when describing autism and potential challenges
- Avoid generalisations – every autistic student is an individual
- Make use of genuine quotes from autistic people who are/were in a similar situation
- Avoid overly stimulating interfaces
- Provide an uncluttered information architecture
- Keep graphic design basic and understated
- Use simple animations and transitions
- Only include images or video when the visual material shows relevant places or people

7 Recommendations for the next project phase

7.1 Scenario structure and narrative

From an analysis of the shortlisted scenarios, their proposed content and the survey responses that inspired these scenarios, a common narrative structure emerged: It appeared that in order to help autistic students navigate university effectively, students need to:

1. be informed about the challenges they may encounter;
2. understand how, why and when those challenges may affect them;
3. realise what the possible consequences of doing nothing could be;
4. and equip them with the tools for overcoming or avoiding those challenges.

Participants told us that they tend to think logically, and that information needs to be presented in a clear and objective fashion for it to be both informative and persuading. Based on the scenario content presented and the feedback received, we can articulate the following guidelines for writing scenarios:

1. Lay out the information clearly and objectively
2. Explain how the scenario/challenge is relevant to the student
3. Provide a direct call to action, i.e. say what to do next
4. List practical tips for how that call to action can be implemented

5. Give prompts for further reflection and discussion (e.g. with parents or tutor)

Following these guidelines, we propose a template structure for future scenarios. This is outlined below, annotated with instructions for data input (for university disability support teams):

Data field	Type	Instructions for data input
Introduction	Text	<p>Write a sentence or two that gives an overview of the the topic area, then describe briefly what this activity aims to achieve.</p> <p>The introduction field will be shown at the top of the toolkit item, in a slightly larger font than the rest of the text. It will also be used as a summary for the activity when displayed in a list.</p>
Student voice	Cartoon or other graphic showing quotes	<p>Upload a comic strip or another type of image that shows genuine quotes from students about the topic, setting an authentic context for this article. A good free online tool for creating comics is Chogger.</p> <p>If creating a comic, spend some time getting the characters looking right, and avoid too long sentences in each dialogue box. Once you have saved the image of the comic, you can edit and crop it with image editing software (or a free online tool like Pixlr).</p> <p>Do not just use images taken from Google Image Search as this will often contravene copyright law.</p>
Video	Video clip	<p>Videos can be used to provide an alternative to purely textual content. Upload the video to the media library first, then select it here. The recommended file type for videos is MP4 as this is widely supported.</p> <p>Avoid videos that are over-stimulating or those that include a lot of quick edits. Be aware that the students we talked to only liked videos and images if they added something to the information that couldn't be provided via text alone, such as showing a real life location, experience or person.</p>
Background	Text	<p>Provide background information about the topic area. What is the general situation and why do we need this toolkit item?</p> <p>Frame the description positively. Be careful not to present autistic students as "the problem". Also, don't assume that every autistic student has the same problem - some may, some may not, and some non-autistic students may struggle too.</p> <p>This section should explain WHAT the problem is, WHY we're talking about it and HOW autistic students are affected. Include a range of examples for HOW, based on evidence from surveys or other sources of genuine student voices such as blogs and interviews.</p>
How could this affect me?	Text	<p>Talk about the impact on autistic students, without assuming that everyone is automatically affected. Use phrases like "some students" and where non-autistic students are also likely to be affected, try to mention that too.</p> <p>Always talk about the consequences of both the positive action (e.g. disclosing early) and the negative action (not disclosing at all).</p> <p>Be careful not to repeat the background information - make it</p>

		personal and refer to research results and quotes. Linking to a student interview can provide context and help the student to positively identify with the content.
What to do next	Single line of text	This is the clear and concise call to action: describe in a single sentence what the student can do to move things forward, e.g. book an appointment with the needs assessment team. This call to action will be displayed prominently on the website.
Practical tips	Text	List practical tips that will help with achieving the call to action above. It is good to use research outcomes and quotes here. Keep things brief. Think about actions and what students may get out of doing those actions. Format each individual action prompt as Heading 3
Questions to think about	Text	This should be a list of questions for the student to consider when preparing to take the next step. Use What/When/Where/How/Who questions. Try to strike a balance between describing problems and suggesting solutions. Make students think about their strengths and weaknesses. Give prompts for discussions that can be used at home or university with trusted individuals such as family members, friends, mentors and counsellors. Phrase questions in a way that allows the student to discover answers themselves, and to make them realise that they may already have the tools to find their own solutions.
Additional information and links	Text	Use this field to add anything that does not fit into the boxes above. Make sure to use a H2 level heading of your choice, as there is no automatic heading inserted. Where appropriate, list contact details, links to further reading, online videos or tutorials, etc.

This structure contains both reflective and reflexive elements, the latter potentially engendering a change in the reader's perception of self, promoting direct and positive action.

7.2 Adaptive features

Project partner Technical University Eindhoven advocated the creation of a toolkit that is able to adapt to the user's preferences and behaviour. The workshop pointed towards a number of opportunities for integrating adaptive features into the system software. Four dimensions were identified by TU/e and supported by workshop findings:

1. **Visual vs Verbal** means that depending on the user's preference the toolkit presents information either in a visual or a textual way. An example is the information about the needs assessment, which can be viewed as a video or read as a text article.
2. **Active vs Reflective** means that content may be structured differently depending on the preference, e.g. active readers start with an activity, continue with an example, then explanation and theory. For reflective readers it starts with an example, continues with explanation, then theory and activity. This structure can be mapped against the scenario template outlined above, where
 1. Theory = Background
 2. Explanation = How could this affect me?

3. Exercise = Questions to think about
 4. Activity = What to do next + Practical tips
- 3. Global vs Analytical** means that users are guided through content in a certain order - global sees the global picture first then goes into detail, analytical dives straight into the details and builds up a full picture from those details. This may eventually influence how the navigation is structured, and what menu choices toolkit users have at any one point.
- 4. Time** dependent adaptation, e.g. the display of timetable information at the right moment to let the student know a) where they need to be in the next hour, and b) what type of session it is and how they can prepare for it.

8 Final conclusions

Overall, the workshop was a success and the scenario prototypes met with approval from the participants. The iterative and responsive approach we took to design and the adaptive features of the toolkit helped to ameliorate some of the issues around stereotyping or generalisations about autistic students regarding creativity and imagination. Basing design decisions on evidence from research and well-established methodologies is important, but so is willingness to listen to participants and involving them in design as well as testing of prototypes.

9 References

- American Psychiatric Association. 2013. Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Publishing
- Barry, M., Pitt, I., 2006. Interaction design: a multidimensional approach for learners with autism, in: Proceedings of the 2006 Conference on Interaction Design and Children. ACM, pp. 33–36.
- Benton, L., Johnson, H., Ashwin, E., Brosnan, M., Grawemeyer, B., 2012. Developing IDEAS: supporting children with autism within a participatory design team. ACM Press, p. 2599. doi:10.1145/2207676.2208650
- Benton, L., Vasalou, A., Khaled, R., Johnson, H., Gooch, D., 2014. Diversity for design: a framework for involving neurodiverse children in the technology design process. ACM Press, pp. 3747–3756. doi:10.1145/2556288.2557244
- Best, C., Arora, S., Porter, F., Doherty, M. 2015. The Relationship Between Subthreshold Autistic Traits, Ambiguous Figure Perception and Divergent Thinking, in: Journal of Autism and Development Disorders, DOI 10.1007/s10803-015-2518-2, pp1-10
- Braz, P., David, V.F., Raposo, A., Barbosa, S.D.J., de Souza, C.S., 2014. An Alternative Design Perspective for Technology Supporting Youngsters with Autism, in: Foundations of Augmented Cognition. Advancing Human Performance and Decision-Making through Adaptive Systems. Springer, pp. 279–287.
- Brown, T., 2008. Design Thinking, in Harvard Business Review, June edition, pp84-95
- Davis, M., Dautenhahn, K., Powell, S., Nehaniv, C., 2010. Guidelines for researchers and practitioners designing software and software trials for children with autism. J. Assist. Technol. 4, 38–48. doi:10.5042/jat.2010.0043
- d.school, 2013. Design Thinking Bootcamp Bootleg, Available from <http://dschool.stanford.edu/wp-content/uploads/2013/10/METHODCARDS-v3-slim.pdf>

Francis, P., Mellor, D., Firth, L., 2009. Techniques and Recommendations for the Inclusion of Users with Autism in the Design of Assistive Technologies. *Assist. Technol.* 21, 57–68. doi:10.1080/10400430902945561

Martin, J.A., 2015. Research with adults with Asperger's syndrome--participatory or emancipatory research? *Qual. Soc. Work* 14, 209–223. doi:10.1177/1473325014535964

Rittel, H., Webber, M., 1973. Dilemmas in a General Theory of Planning, in *Policy Sciences* 4, 155-179