Experience Lab 10

Game Jam

Acknowledgements

GSºA INDI

DIGITAL HEALTH & CARE INSTITUTE

" *A thing we say again and again: we're not trying to stop you [young people] using the Internet, we're trying to help you use it safely."*

- Local Area Co-ordinator
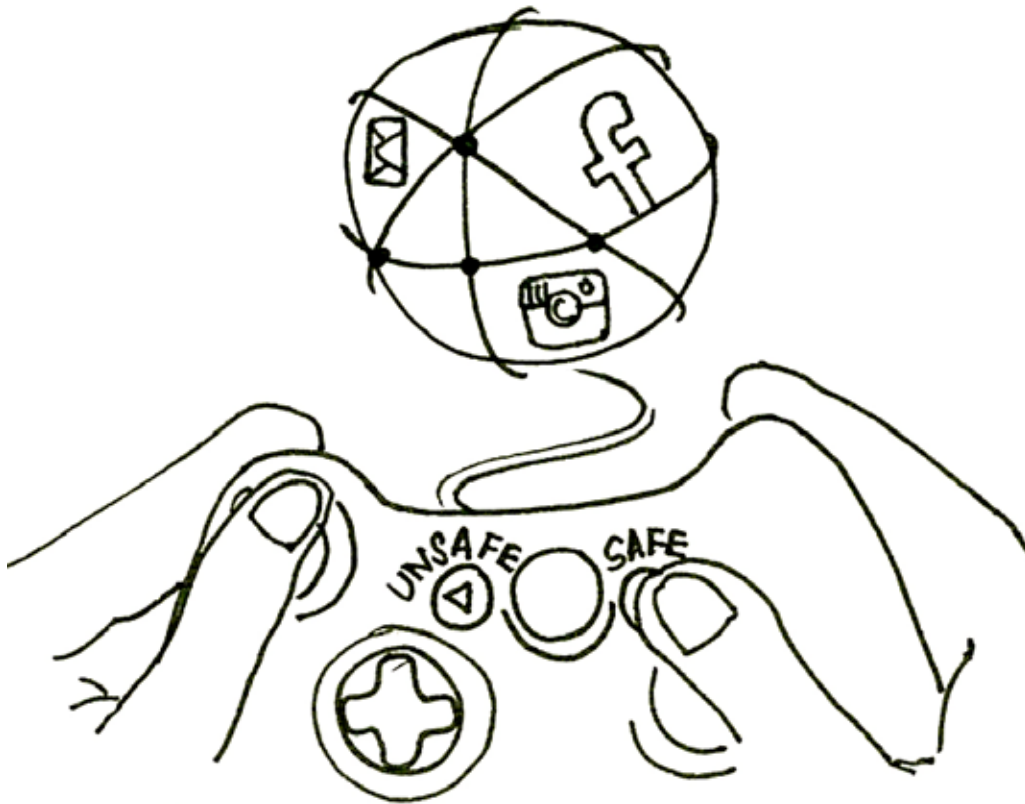
Game Jam Experience Lab

Game Jam employed a user-driven design approach to identify opportunities and develop an interactive game-based learning tool for educating young people with learning disabilities on internet and social media safety.

"
So this would be our meet-up game for all of us, we could all meet up and see ourselves, it's like a kind of gathering and then you can go and do the missions with your friends so obviously I could go in a group with all of them and we could do missions together.."

– Participant

Executive Summary

Game Jam employed a user-driven design approach to identify opportunities and develop an interactive game-based learning tool for educating young people with learning disabilities on internet and social media safety; and identify appropriate technologies for trainers to be able to upload tailored content to the training platform.

Experience Labs provided a platform to identify key user needs, validate content developed by Midlothian Council for training, and co-create and test ideas for a game-based learning tool with individuals with learning difficulties and trainers. The project involved a sequential series of Labs, which spanned over a period of five months.

Using an iterative design approach, four game concepts were co-created by participants and shared in the form of low fidelity prototypes. The final game concept was based on a consolidation of ideas from the four concepts to align with the participants' preferences and incorporated training themes.

Game developers at the University of West of Scotland developed a proof of concept, which was reviewed with the young people and trainers. This ensured that the game met the learning needs of young people with learning disabilities, and the requirements of the trainers.

Overall, based on findings from the Labs, a game-based learning tool has the potential to support young people in learning about internet and social media safety, and may have application in wider health and social care contexts.

The Digital Health & Care Institute

The Digital Health & Care Institute (DHI) is an Innovation Centre, which aims to enable Scotland to scale health and care services to meet current and future demographic challenges. Drawing on the expertise of core partners in medicine, design, business and informatics, the DHI will stimulate the creation of innovative and transformational solutions to health and social care delivery.

Experience Lab

A core aspect of the DHI is the concept of the Experience Lab, which is developed and led by The Glasgow School of Art. Experience Labs provide an environment where users, businesses and researchers can collaborate to respond to health and care challenges in an agile and iterative manner. Experience Labs use current and emerging design practice to build environments, which replicate real life practice. In doing this they provide a safe, creative and innovative environment where rapid cycles of experience can trial new technology, services, processes and behaviours.

Experience Lab Project Team

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Project background

In Scotland, 20 people in every 1,000 have a mild or moderate learning disability, and three or four in every 1,000 have profound or multiple disabilities. There are around 9,250 children with additional support needs due to a learning disability in Scottish schools (The same as you?, 2012). The rise of social media is impacting on the lives of young people with learning disabilities, as they find themselves in dangerous situations online without the right tools or understanding to keep themselves safe (Holmes & O'Loughlin, 2012). Practitioners and parents also require the resources to allow them to make informed choices that help to keep young people healthy and safe online.

There are developing examples of resources that promote online safety for people with learning disabilities in Scotland. Midlothian is hosting the current New MediaEducation Project, while in Fife the SafetyNet and Caught in the Net projects have provided training materials for vulnerable adults to learn Internet safety skills. Quarries/NHS Glasgow and Clyde/Inverclyde Council have also run Think Safe training to promote the development of self-protective skills when using the Internet.These sessions primarily use physical resources such as worksheets, slides and booklets with limited interactive content.

Game Jam is differentiated by the nature of its presentation and scope. Multisensory techniques are often used with people with learning disabilities to stimulate understanding using the senses and visual learning techniques have evidenced increased achievement by young people (IARE, 2003). Learning through an interactive tool is also attractive to young people with a learning disability as it provides flexibility for those who are unable to depend on a single physical location for resources (Seale, 2013). There is a strong case from academic literature on the use of serious games to support the teaching and training of individuals with learning disabilities. An interactive game-based learning tool can provide unique opportunities for individuals, local groups, third sector parties, carers, families and professionals to engage in and share practice; in this case, about the safe and effective use of social media and the Internet. Existing tools in the health sector mostly focus on training the trainer or practitioner, however, Game Jam targets solutions for the user and is facilitated by the trainer, practitioner, or carer.

The Experience Labs provided a platform to identify opportunities for the development of this interactive game based learning platform by identifying key user needs and appropriate formats, as well as to test the tailored content developed by Midlothian Council and health practitioners on this new learning platform with the aim of increasing its effectiveness and engagement with young people.

Project aims

The aim of the research project was to employ a user-driven approach to identify opportunities and develop an interactive game based learning tool for educating young people with learning disabilities on Internet and social media safety; and identify appropriate technologies for trainers to be able to upload tailored content to the training platform.

Experience Labs provided a platform to identify key user needs, validate content developed by Midlothian Council for training, and co-create and test ideas for a game-based learning tool with individuals with learning disabilities and trainers. The Labs spanned five months and included two Mini Labs and one Pre-Lab session followed by five Labs and one Mini Lab in between.

Mini Labs 1 & 2

In preparation for the Labs, two Mini Lab sessions were organised in which researchers visited the existing pilot sites for training in two separate locations in Edinburgh and the Lothians. The key aims of these sessions were to discuss the Lab plan and strategies, and review existing trainings tools with the Local Area Coordinators (LACs) who offer training. The Mini Lab also allowed the research team to observe young people with learning disabilities in their training session.

Mini Lab Outcomes

Based on the LAC team's inputs, a local venue was chosen for the Labs, which was known to most participants as they access it regularly for learning and career guidance and support. It was also decided to organise Labs on a fortnightly basis for consistency and to maintain participant engagement and continuity in the design process. The participant information sheets and consent forms were reviewed with the LACs in a focus group (see Appendix A). The materials were redesigned to be more visual and the language was revised to ensure they were appropriate for participants. Discussion with the LACs and observation of current training sessions also validated the need to involve visual materials and artefacts throughout the Labs to engage participants and retain focus.

The sessions also helped in gathering preparatory material for the design of the Lab activities, tools and artefacts to suit the needs of participants, focusing on aspects such as accessibility, familiarity, comfort, personalisation, etc. This included the design of a diary to be maintained by all participants to log their online activities and gaming preferences prior to attending the first Lab (see Appendix B). The diary helped to capture information about devices used to access the Internet; online activities; websites visited and their user-experience; time spent online; concerns related to meeting people, safety, security and accessibility; favourite games, gaming platforms and motivations. This assisted with generating the context and current experience of participants' online activities and gaming preferences. Seven themes were also identified from the training material to explore alongside user stories – friendships; chat and communication; personal information; money and shopping; photos and videos; smartphone safety, and gaming.

Pre–Lab

The Lab team met the participants in two separate informal sessions, in Edinburgh and the Lothians, to introduce the project and distribute the information sheets and diaries to the participants. Venues were recommended by the LAC team based on participants' regular meeting places, (i.e. a library in Edinburgh and the 'Chips & Chat' night in Dalkeith) providing the researchers an opportunity to familiarise themselves with the participants' social context and also for participants to meet the researchers, ask questions and learn more about the project within a familiar and safe setting.
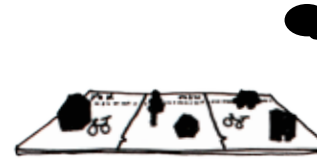
EXP LAB 1

Mapping a day in the life

The objective of Lab 1 was to understand participants' existing online and social media behaviours and concerns, their familiarity with different devices and technology, and to identify individual meaning and motivations towards learning.

The first session explored key themes related to online and social media use and learning needs. Participants were divided into two focus groups. Facilitated by the researchers, and with support from the LACs, the groups discussed about their thoughts on filling the diary and shared their experience and learning around the seven themes that were identified from the existing learning material. The seven themes were presented as coaster-sized mats to enable participants to engage and to focus on the themes, along with two blank mats to add any additional themes.

The next session focused on individual stories, concerns and learning needs, in order to gain better insight into the context of Internet and social media use and identify specific situations in which participants face risks. Participants worked with Lego blocks to portray and share their experiences and added red flags to mark the risks. The researchers and LACs helped them to capture these on scenario cards, which allowed information to be gathered on the context of their experience, such as when and where it happened, who was involved, and what the key issues were.

EXP LAB 1

Outcomes

The information captured in the diaries indicated that participants mainly use their mobile to access the internet, for activities related to social media, chat and gaming (see Appendix C). Participants indicated that most of them spent at least one to two hours or more online in a day. Regarding their experience of using the Internet, participants felt it was easy to access information and they felt safe, although some were worried about privacy. Making friends online was important to all participants, however some of them found it difficult.

From the seven themes discussed, participants felt that 'money and shopping' was the least relevant to them based on their existing Internet use. The majority of scenarios shared by participants involved instances when they were online and on their own at home. These scenarios showed varied use of computers, consoles and mobile phones, and activities mainly involved playing games, being on Facebook, and online chat. Participants shared their scenarios in the group and identified the most common forms of risk. Risks centered on privacy and security, communicating safely and responding appropriately to others online, and seeking consent when sharing information.

During the focus group discussion and throughout the course of building scenarios, it was evident that participants were aware of how to behave safely online due to the training they had previously received. This allowed them to be able to communicate the risks easily. However, the scenarios shared by participants highlighted that although they understand the risks, they do not always put their training into practice.
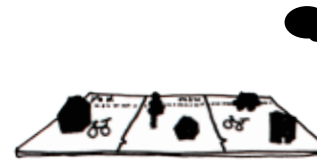
EXP LAB 2

Building the trust circle

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The aim of Lab 2 was to map the social support networks ('trust circle') of participants to depict who provides support to help them stay safe online. The Lab involved mapping the relationship of people who provide support to participants using a base map and wooden characters. The base map was crafted as a jigsaw piece that was large enough to allow participants to place the wooden characters in positions representing the closeness of the relationship.

Participants were split into four groups to map their networks. Discussion encouraged participants to describe who was in their support network; why they are trusted; what they provide help with, and to give an example of when they needed help in relation to an online experience. The wooden characters had space for participants to write the name of the person in their support network. These were accompanied by cards capturing information about people who they trusted and people who helped them to stay safe online. The LACs and research team helped participants to complete the 'Trust' and 'Safety' cards to capture discussion.

At the end of the session, the group's jigsaw pieces were fitted together to create a large jigsaw, with the support networks creating a circle. This allowed the four groups to see who was in each other's closest circle of trust and a discussion was focused on identifying the key network of support.

EXP LAB 2

Outcomes

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Participants' trust circles mainly consisted of family members such mother, father, brother, sister, and one or two best friends, along with tutors and LACs also included by some. The frequency of their interaction with the various people within the trust circle varied. While they talked everyday to some people, they met some others between one and three times a week or once a fortnight. Some participants identified the same individuals in their trust circle as people who also help them to stay safe online (e.g. mother, father, brother, sister, friend, LAC), while some others identified their mother as the key person who helps them with their online safety concerns. One participant pointed out that on facing any challenges related to safety they would seek help from the police.

It emerged during the discussion and completion of the 'Trust and Safety' cards that participants trusted and felt comfortable asking for advice from people who were in their close family and friend circles. Participants said they trusted them as they were available for them when in need, and also supported and encouraged them. Participants described that people who help them to stay safe give them advice, teach them things, and help to sort problems. They described them as people who 'look out' for them.

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EXP LAB 3

Gamification to identify risks and solutions

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The aim of Lab 3 was to understand perceived barriers or threats, coping mechanisms, and desirable support tools to overcome challenges experienced by participants when online and on social media. The Lab aimed to enable participants to explore solutions for minimising risks as well as tackling barriers and challenges related to the use of Internet and social media.

The activities in the Lab involved 'Build your superhero' to extract key themes related to participants' identity, confidence, safety and risk while being online. Participants were given a template for a badge and various colouring materials, stickers and props to create their own 'Superhero badge'. The identity badge asked them to name their superhero and describe the super tool that the hero would use to help them stay safe, to encourage them to identify specific support needs.

The second activity involved a comic strip that was designed to present scenarios to participants. These were informed by the experiences they shared in Labs 1 and 2. The comic strips asked participants to consider all the options available to the comic strip character based on the scenario presented. Participants were then asked to select a 'wild card', which revealed what the comic strip character actually did. Participants were then asked to come up with solutions based on how a 'superhero' could assist the character and help them overcome the problem they had.

Participants were then invited to present their solutions and superheroes to the other groups. Participants could choose how they wished to present back and were provided with props, dress up kit, Lego kit and puppets. All participants chose role-play to present to the other groups.

The third activity focused on gaming preferences and learning. Participants were asked to think about games that they played and what the game helped them to learn. LACs and the research team helped participants to complete

a 'Gaming and Learning' card, which captured the gaming preferences of participants, what they learned through the game and how the game helped them to learn.

The final activity of the Lab involved participants working in small groups and proposing ideas for designing the game prior to the fourth Lab. Participants were given themes of 'Story', 'Setting' and 'Characters' to discuss and come up with ideas about what the story, setting and characters of the game would be.

EXP LAB 3

Outcomes

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→ Risks and Solutions

The comic strip 'Click, share, like' focused on a scenario related to sharing photos of oneself and friends from a party on Facebook. When asked what are all the potential things that could happen if the character uploaded all the photos online, participants responded that people who did not like the character could leave nasty comments or be horrible to them; strangers can see the photos if privacy settings are not right; friends tagged in the photos could show them to other people and family; or could report to Facebook if the photos are silly or inappropriate; and that the character needs to seek permission from everyone in the photo before tagging them.

In response to the wild cards for the scenario, participants listed a number of solutions. These included apologising to friends and explaining that they did not mean to put up the photos without asking permission; untagging the friends from the photos; and removing the photos from Facebook. Participants also suggested that the character may feel hurt and upset and could speak to friends and try and explain in a way that friends would understand; or speak to someone who they are close to e.g. their parents, and ask for help; Finally, participants suggested that they could turn location settings off or change privacy settings to 'friends only', and that strangers could be blocked.

When asked to consider how the superhero could help to avoid or solve the problem, participants felt that the superhero could warn the character before the photos are uploaded and show the consequences of the actions in future. Participants proposed that the superhero could take the character back in time and show them what happened to them in a similar situation. It was also suggested that the superhero could help the character think about who to talk to about the problem; or could act as a medium to communicate to the people on behalf of the character.

The comic strip 'Watch what you're doing' focused on a scenario related to online gaming and getting angry after losing the game. On being asked what are all the potential things that could happen in this scenario, participants listed that the character could rage and scream at the person who beat them; turn off the game and do something else; try to get better at the game so they don't get beaten as much; try to beat their opponent by destroying their buildings; play something else; try to beat their opponent's high score; explain to people that they are trying to learn the game an ask to be left alone; carry on playing and try to win; take revenge on the person who beat them; or not get annoyed and remember that it's just a game.

In response to the wildcards, participants proposed solutions such as joining forces with their opponent and help to rebuild the game world; trying to help people and making up if they have arguments; stop destroying each others' game world; and being nice to the person who is being bad.

The comic strip 'You've got mail' focused on a scenario related to receiving a message from a stranger called Sam. When asked what are all the potential things that could happen if the character opened or responded to the message, participants responded that they could check Sam's profile; block Sam; reply to e-mail and ask questions to try and find out who Sam is; add Sam as a friend; ask friends questions about Sam; or delete the e-mail.

Based on the wild card options for the scenario, participants considered how a superhero could help to avoid or solve the problem. Participants suggested that the superhero could help the character by punching the computer (superhero Roman Reigns); make the computer invisible or sneak into Sam's house to find out who he/she is (superhero Invisible Man); fly through the window and get Sam's computer and throw it away (superhero Superman); or catch Sam in a web and take him to the police station (superhero Spiderman).

The comic strip 'Please enter your details' focused on a scenario related to sharing computers, visiting unsafe websites and being spammed. Participants listed a number of options for what the character could do to find out whether the website was authentic or fake, such as checking on the website for a phone number and contacting them on phone; waiting to go online until the character is on their own laptop that is secure; checking the name of the website to ensure that it is not fake (e.g. 'Shoptop' instead of 'Topshop'); using Paypal instead of credit or debit cards for payments; looking for signs that may indicate that the website is fake, e.g. pop ups or unsafe content; checking company details on the website, e.g. name of the company, insurance code, etc.

Based on the wild card options for the scenario, participants considered how a superhero could help to avoid or solve the problem. They suggested that

the character could download anti-virus software; inform friends or parents; seek professional help by going to a shop, e.g. Currys; inform the police; report the fake website; or phone the bank and cancel their credit/debit card to avoid losing money.

→ **Gaming preferences and learning**
During the third activity it emerged that participants' gaming preferences were varied and included popular games such as Grand Theft Auto, Fifa and Call of Duty. In relation to learning, participants described that playing games allows them to develop skills in numeracy and writing, life and interpersonal skills, gaming skills in terms of progressing levels and gaining lives, and also provides an outlet for emotions. When asked to think about how they learn through playing the game, participants suggested that instructions, tests, scores, and consequences of actions help them to learn. The list of games from this activity and perceived learning by participants is included in Appendix D.

→ **Initial game ideas**
In the final activity, participants came up with three ideas for the game.

The first game idea was based on the protagonist (a boy) attending a party and getting lost. The setting was primarily a haunted house in a maze form, with unknown rooms and scary sounds. The main character would be personalised by the player. Participants noted that it was quite important for them to be able to design their own character; but there could also be other characters, such as friends, in the game. The tasks and challenges help the player progress in the game and participants identified 'Question & Answer' and 'Hangman' as possible formats for setting the challenges. In terms of key user requirement, participants pointed out that they would like the game to be in colour, each room in the house differentiated using colour, and the option to save and play the game on their mobile phones.

The second game scenario involved a character playing an online game and getting angry when they lose the game. As a result they break their controller. The game is multiplayer and other gamers ask the character what is wrong. The outcome of the game would involve the character receiving support from his brother and learning not to get angry in games. Participants noted that the game would be similar to 'Grand Theft Auto' or 'Call of Duty' and be played on a console. The setting of the game would be two bedrooms (one noisy and untidy, and one calm and tidy) and the game itself would have scores on screen, ranks, and players would require a username. Characters of the game would involve a gamer with anger issues, a gamer who wins the game and is happy, and a realistic person related to the gamer with anger issues e.g. brother, who is helpful. As the game is multiplayer, there would also be other gamers in the background.

The third game idea was based on the concept of an 'Internet college' as a virtual

learning environment where players can go to make friends, do activities together and learn about safety. Participants proposed that the setting could be a college, with different screens to show different areas of a college and activities happening within them. There could be a variety of characters including students and teachers, and participants strongly felt that the characters should be realistic. In terms of tasks and challenges, participants proposed that the player would have to make friends when they enter the college and that different parts of the college would have different tasks.

During the various activities in the Lab, it was again highlighted that participants are aware of the right things to do and also the consequences of the actions that they may take online. However, during the comic strip scenarios, it emerged that their actions sometimes contradict what they think is the right thing to do. In relation to this, a numbers of solutions that they proposed were based on showing people the consequences of the actions that they take.

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EXP LAB 4

Game Jam – Co-designing the game

The aim of Lab 4 was to generate ideas for the game based learning tool and create a mock game. Participants worked in four groups and were given a storyboard template to capture their ideas for the game. The themes of 'Story', 'Setting' and 'Characters' were retained, and the ideas from Lab 3 were developed further. Researchers and the LAC team were given a Game Jam guide, which included key questions to help guide participants when designing the game. The guide also provided hints and tips when thinking about key aspects of the game. The storyboard also provided hints about how much detail was required for each frame.

A 'Stories and solutions' board was created using the material that emerged form the comic strips in the previous Lab. Participants were encouraged to select a story and solution that they wished to use it as a basis for the game. In addition, participants were asked to create a persona for the game, which depicted who they were creating the game for. This involved completing a persona card with details of the age, needs and challenges of the persona.

The groups were then invited to present their ideas to each other, and were given the option of how they wish to do this; e.g. using Lego, props and other craft materials, and capturing frames on the iPad using still or videos.

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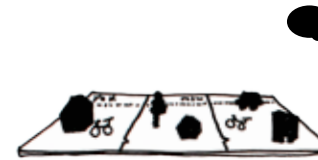
EXP LAB 4

Outcomes

Four concepts emerged and were captured in the form of low fidelity prototypes. These were further refined to incorporate the discussions in the groups as well as the feedback from the wider group when presenting back their concepts (Appendix E).

The first concept 'Mad Gamer Times Out' focused on Jimmy who is playing a game and getting frustrated by campers in 'Call of Duty'. An advice crew is ready to help Jimmy to avoid him from becoming The Rager by showing him the consequences of his actions.

Fig 1.

The second concept 'Haunted House Maze' focused on the player getting lost at a party and finding themselves in a haunted house, with the aim of finding their way back to the party. The game involved tasks and questions that help the player to reach the goal.

Fig 2.

The third concept 'Internet College' focused on a non-linear gaming platform where the college is metaphoric for the Internet. Players study, socialise and keep safe in the 'college' through individual and group tasks.

Fig 3.
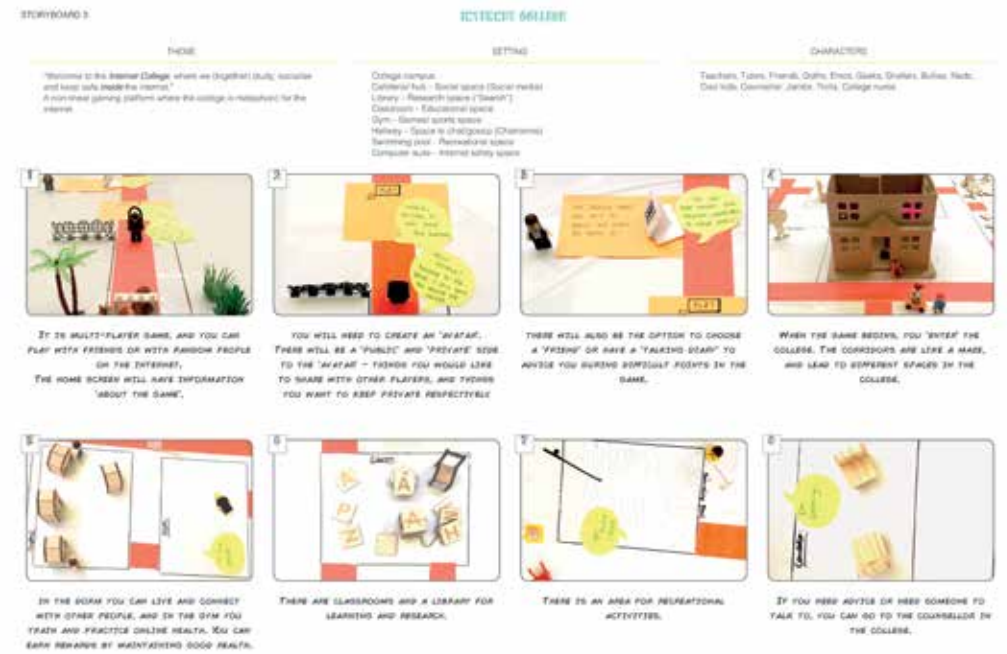
The fourth concept 'Online Phantom' focused on controlling emotional responses while gaming, through helping people to understand the consequences of their actions. This would be achieved through tasks and multiple-choice questions.

Fig 4.
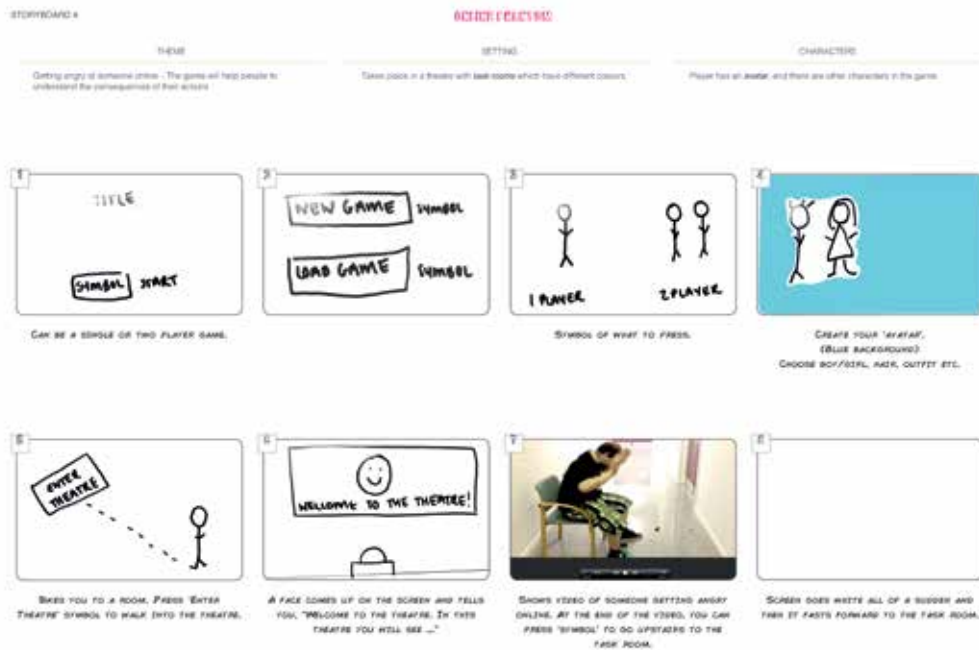
Overall, the idea of learning through consequences was evident across all four concepts. Two of the concepts focused on creating a realistic setting for the game, while the other two concepts incorporated a game-based setting. Different ideas emerged from the concepts in relation to gaming elements, and showed potential to be integrated into one final concept.

Mini-Lab 3: Synthesising and refining the game concept

The aim of the Mini-Lab was to analyse and synthesise key insights towards generating user requirements and finalising the game concept to be developed for Lab 5. The Mini-Lab involved two half-day sessions with all the project partners and the game developers.

The first session involved reviewing the game concepts from Lab 4 in order to integrate them into a single concept for developing the prototype. The next session focused on generating a list of user requirements, from the perspective of the young people and the perspective of the trainers. These were categorised into 'must-have' and 'desirable' requirements.

Mini-Lab 3 Outcomes

Based on the four concepts and outcomes from the previous Labs, a list of user requirements for young people and trainers was generated (Appendix F). For young people, the 'must-have' requirements were centered on themes of progression, interactions and learning.

→ **User requirements**
To allow players to experience a sense of progression the game needs to have rewards (points, 'lives', trophies, certificates etc.); randomisation i.e. players have the option to skip certain tasks and return to them at a later stage in the game allowing them to progress in the game and explore different aspects; different levels of difficulty; and clear symbols and step-by-step audio instructions.

To enable interaction in the game there needs to be a sense of a 'fake' interaction; a sense of multi-player game where they feel they are interacting with other players or characters e.g. fake Facebook; authentic scenarios so young people can take responsibility for themselves in a simulated world; realistic aesthetics; and mini-games.

To enable learning through the game players should have the ability to make mistakes; hints and tips to help them through the game; and reinforcement of learning by exploring a single theme using multiple formats, e.g. tasks and questions.

The desirable requirements for young people included multiplayer capability; end of game feedback e.g. links to more information on topics; connecting to an LAC or parent; and tips on how to improve. It was decided that the levels of difficulty would be incorporated in the game at a later stage and therefore became a 'desirable' than a 'must-have' requirement.

For the trainers, the 'must-have' requirements were identified as progress tracking through data collection; customisation of content based on the individual's needs, to vary access to the different areas or levels in the game; chapter-based content to ensure alignment with the training module; ability to update content; and a controlled environment to ensure safety of the players.

The 'desirable' requirements for trainers include assessment capabilities; administrative feature to control content accessed by each individual; compatibility with third party learning content; and a resources space for further reference materials.

User requirements for young people were supported by the outcomes of the activities in the Labs. However, for the trainers, further validation was required and this was included in the plan for Lab 5.

→ **Final game concept**
The final game concept consolidated ideas from the four concepts to align with the participants' preferences and to incorporate the training themes. The narrative, environment and characters for the game were identified and further refined to meet the user requirements. Learning formats included a number of tasks and activities such as dialogue and multiple choices, puzzles, task-based tests and experiential learning through reinforcement of key messages. Scenarios were matched with the appropriate environment in the game and learning format to ensure that they were engaging and realistic. Finally, training themes were grouped into three prioritised areas for development: friendships and taking and sharing photos and videos; online gaming and cyberbullying; and chat and communication.

Developing proof of concept

Game developers at the University of West of Scotland developed a proof of concept to be reviewed with the young people and trainers. The proof of concept included the town environment in 3D with one scenario, the Phone Shop. Once in the phone shop, the player could engage with themes and activities such as an instructional video and multiple-choice questions around phone safety. The interaction is audio-based and command driven. The player is also tasked to find jigsaw pieces around the town; collecting and completing it shows the player an interesting fact or message related to online safety. A web view of a mock-up portal for the trainer was also created with a dashboard on player activity and progress.

→ **Design and animation**
In order to create the environment, numerous source images were acquired for inspiration of each of the individual buildings within the town. These pictures were refined and used to develop concept sketches of how the final town will look. Using these refined concepts the 3D models were then built and textured. The models were UV mapped and textured within Photoshop to provide a realistic output.

→ **Characters**
Characters were similarly rendered in a realistic manner, and were edited from pre-existing character models to save time. The texture was edited for the character of 'Phone Shop Jeff' to give him a new face and allow his clothing to mirror that of the phone shop. Animations, such as the walk cycle and the character idles, were then applied to the skeleton to give each character movement. Each character was also given facial animation to make the interactions look more realistic.

→ **Software development and technology**
The game was implemented using the Unity 5.1.1 game engine as it provides a flexible platform upon which to rapidly build a 3D first person game environment that can be ported to multiple platform formats, such as, Mac and Windows. A back-end server was developed to record, store and present the responses to interaction and player activity, for access by an administrator who could be the trainer. The potential to port the game for use with Virtual Reality (VR) headset systems, such as, the Occulus Rift, was identified to add more immersion to the game and the players.

→ **Limitations and challenges**
Only one building (the phone shop) has been developed within the environment. As per the final concept, other buildings will need to be created such as the library, college, bank, Internet café / gaming store, restaurant, park as well as surrounding areas and buildings. A production ready game

will require fully developed scripts, scenarios and dialog along with further coding and design for all the buildings and environment. Development complexity is dependent on the desired realism of the characters, town and environment to resulting in deeper immersion for players. The build of the system is recommended to be developed for network for local installation within a machine.

For a browser accessible version, WebGL technology could be used, however at present, it is still in its infancy and requires further development before being able to display 3D graphics within a browser. The VR headset industry is still under development yet to be realised. The Oculus Rift is no different, so this would require further maturity before being considered as viable target platform for use in this context. This situation can change over the next few months and in the meantime:

Further information on the technical development is included in Appendix G.
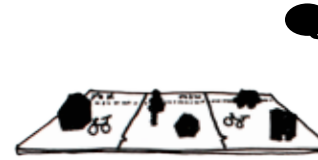
EXP LAB 5

Testing the game

The aim of the final Lab was to review and refine the prototype of the game developed by UWS. The Lab allowed participants to play the game prototype and provided them with a sense of the learning experience. In addition, the Lab aimed to ensure that the game meets learning needs and user requirements, and test the suitability of the platforms and technology for participants and trainers.

Participants were split into two rooms with four machines in each room and were invited to explore the game in pairs or small groups. There were a mix of keyboard with mouse controls and game controllers and participants were given the option to play the game using both. The LACs were also invited to experience and review the game from a trainer perspective. Participants experienced the phone shop scenario and town environment in the game prototype. The rest of the game idea proposed during the Mini Lab was presented as an interactive wireframe on a tablet, as well as printed visual storyboards.

Feedback was gathered using an activity booklet (Appendix H) and the session ended with a focus group on the game experience with both young people and the LAC team. Young people were then invited to try out Occulus Rift as a fun end to the day, while a focus group discussion was conducted with the LACs focusing on trainer requirements.

EXP LAB 5

Outcomes

Gaming experience

Overall, participants enjoyed playing the game and felt that it met all their needs. Some of the participants played the game again, and one of them said that they found it easier when they played it a second time. The majority of participants felt they would play the game for anywhere between half an hour to two hours. One of the participants noted that it was good that they could take any amount of time to play the game, and said they wished all games would allow that.

Most participants indicated that they would prefer to play the game with a controller rather than the mouse and keyboard. One of the participants explained that playing with the controller was easier, as controllers have two buttons which can be pressed using the thumb to go up or down, unlike using a mouse and arrow keys. Two of the participants also pointed out that the computer was slow and it affected their overall experience of the game.

→ **Starting and progressing in the game**
The majority of participants understood how to start and move forward in the game and thought that the instructions were clear. Some participants would like an 'avatar' or some form of online ID for the players. They felt this would make them feel as being part of the game and would also allow them to recognise friends who may also be in the game. Audio was important to the participants to know what to do in the game, e.g. to enter the phone shop and to know what to do when you were there.

→ **Game environment**
The majority of participants responded positively to the town environment and the phone shop. Some of them proposed that details such as cars, shopping, music and changing weather would make the town better. One of the participants proposed that the player could have the option to build their own car, potentially using Lego.

All participants liked the design of the phone shop. One participant suggested that there could be different types of phones, so that participants can choose one that is closer to the model they own in real life. They thought there could be more activities added to other spaces in the phone shop if the player wanted to explore and spend more time there. Another participant mentioned that the phones could be interactive, explaining that when they entered the phone shop they tried clicking on the phones and expected it to respond.

The majority of participants found it easy to move between different areas in the game. However, navigation must be fluid, as some participants found it difficult to turn around in the game. Some participants also noted that during the introduction the background spun and they found this confusing, and they ran into walls frequently. They had to be helped a few times by other players or the trainer to find their position in the game.

➜ **Characters and interaction**
The majority of participants thought the characters were good. Participants said they liked the character Jeff and found him helpful. They also liked the character with the Italian accent near the jigsaw as they found the accent funny and enjoyed talking to him. Some participants proposed having the option of creating and customising their own 'avatar', as well as including more characters in the game that they could talk to. Referring to the training video featuring Stuart, participants felt that they would like the characters in the game to be familiar.

The element of interactivity and ability to play with people that they know seemed very important to some participants. One of the participants noted that they do not meet their friends from the training programme very often, and the game could act as platform for them to meet and interact with each other.

➜ **Activities and learning formats**
All participants responded positively towards the video in the phone shop and found it very helpful. They thought that it was good to have a familiar face (Stuart) as it made it realistic. Some participants said it was their favourite part in the game.

Participants found the multiple-choice questions useful. One of the participants related it to the TV show 'The Chase' and said that they liked it. Another participant proposed that they could meet more characters like Jeff in different places around town who could ask questions; the more characters the player meets and answers questions, the more popular they could become in the game. They felt this would motivate them to play and answer more.

All participants felt that the audio helped them to understand the question. One of the participants found reading the questions to be difficult as there were too many words and the text was small. Most participants did not notice that the audio was different from the written text, and felt it did not impact their experience. Some participants felt it will be useful for people who need more time to understand the question to have the option to repeat the audio, e.g. a 'repeat question' button.

Participants had mixed reactions to the response received in the game when they answer a question. Some participants liked that when they got an answer wrong they were told the correct answer immediately, while others felt it would be good to wait and be told this at the end of the session. Some participants thought it would be better to keep trying until they get the correct answer, saying the more they try the more they would learn. In contrast, other participants said they would like to move on with the game rather than go back and try again.

Participants also liked the jigsaw puzzle and thought that having to look for the pieces was motivating. However, one of the participants felt that if they could skip one thing in the game it would be the jigsaw, as they found that doing it over and over was frustrating. Some participants found it hard to find all the pieces and felt that some hints will be helpful, e.g. Jeff or another character helping to find the pieces. Some participants also mentioned that they tried to click on the jigsaw first, before realising that they had to walk over it instead.

With regard to future ideas presented using the interactive wireframe on a tablet and visual storyboards, participants responded positively to the photo sorter puzzle, and thought that it would be a good way to learn. The proposal for hangman as a mini-game received a mixed response amongst the group. Some participants have had experience of playing it and responded positively, while one of the participants said they did not like it. Some participants suggested having a 'word association' game or 'Candy Crush' in its place. Participants also liked the idea of a 'fake Facebook' in the game.

In terms of learning, participants strongly agreed that they would like to have the option to make mistakes in the game, as they felt it would teach them what not to do in real life.

➜ **Rewards**
Participants thought that a high score would motivate people to keep playing the game. Participants agreed that it would be good to see scores at the end of each session. One of the participants added that they would like to get a

trophy at the end of a session. In addition to scores and trophies, one of the participants suggested that there should also be coins that would allow them to buy things within the game.

→ **Support and playing with others**

Participants suggested including the option of choosing a friend at the start of the game, someone who they can trust and who will be there throughout the game ready to offer advice and help. Most participants thought that playing the game with a friend would be easier. They also thought that if they get bored or get stuck a friend could help them to keep playing. However, one participant said they would prefer to play on their own, and suggested that players could have the option to invite each other into their towns and perform tasks together. Participants also felt that the option to text friends for help or meet Stuart in the game could be other ways of getting support.

→ **Alignment with training module**

All participants felt that the game was relevant to the topics covered in their training. Some participants felt that when they go for the training they would like to talk to the LACs and then play the game online when they were on their own.

Trainer requirements

→ **Clear instructions and messages**

The LACs agreed that having both text and audio-based instructions is important; but also pointed out that some participants may still find both the formats difficult to follow. They stressed again on the point that the text needs to be simplified for participants to understand the instructions clearly. They also pointed out that if the audio instructions were too long some participants would lose attention and forget what has been said.

The LACs proposed that at the end of an activity or session, it is important to have a clear message, e.g. 'Well done. You have completed the jigsaw'. They noted that it is not just for praise or encouragement, but it is important for participants to have obvious indicators when they finish something to allow them to move on to the next task.

→ **Emphasising real consequences**

The LACs remarked that while some participants would be thrilled at the prospect of an 'avatar' or online identity, some others would struggle to understand the concept. They felt that at least for the early stages of using the game, it would be important for participants to play as themselves in order to retain a sense of reality.

One of the LACs pointed out that although the game looks realistic, players still know it is a game and there is a sense of safety. The LACs felt that this would allow people to try out different things, without having to face real consequences of their choices. They proposed that there could be a place in the game, e.g. police station, to demonstrate that wrong choices in real life could lead them to the criminal justice system. The LACs explained that a big part of their role is to lead people away from legal consequences, and hence in the game it would be useful if individuals can see these consequences. One of the LACs suggested that there could also be different levels for the legal consequences – e.g. losing some of the freedom within the game by losing points or being grounded as the first level of consequence, followed by going to the police station, further escalated to the courts, and ultimately being sent to prison. They thought that consequences could also vary based on the nature of activity. The LACs recalled that many participants said they would like to have a companion in the game, adding that the legal consequences do not have to happen to the player directly, but could be shown to them by the companion as a preventative measure.

→ **Engaging individuals with different capabilities and pace of learning**

The LACs felt that the game was engaging for all participants. Based on their observations of participants playing the game prototype, the LACs noted that some of the participants were not just gamers but also at an intellectually higher level than others, and they got through the game quickly. For the others, although it took them longer, they were still very engaged and were able to get through the game at their own pace, which was positive.

→ **Adapting, updating and customising content**

The LACs proposed compiling the information provided within the game in the form of question and answers, videos, etc, into a document with simple easy-to-read bullet points, which could either be saved to the participants' computer or printed out for future reference. They noted that currently individuals are given posters at the end of each session to take away and this is quite important, as individuals tend to forget or lose information. The game developers added that in order to do this, they would need to put in a standard block of text that would be easy to print, but would limit the degree to which the content in the game could then be updated.

Given the option between being able to update the content on their own or having predetermined themes, scenarios and learning outcomes in the game that can be separate from the handouts and other material that LACs create themselves, the LACs chose the latter option. One of the LACs pointed out that the library area proposed in the game could be used for LAC-generated content such as links to other training material. However, the other LACs felt they did not want to update any content directly in the game. The game

developers also added that there could be some limitations in updating content directly in the game, as all elements such as text, audio, animation, etc, need to be aligned, and suggested that delivery of additional reference materials offline would be more feasible.

With respect to customising content for individual participants, the LACs felt that instead of sign-posting different people to look at different content within the game, they would prefer to do it offline. They noted that their approach varies between one-to-one sessions vs group sessions. For one-to-one sessions, they get individuals to write down their understanding, and based on that the LACs can assess the individual's capability and identify topics that they might be struggling with to take up for training in the following sessions. In a group context, accommodating different learning styles and patterns can be challenging, but the LACs try to explain the same concept in different ways so everybody reaches the same level of understanding of the unit at the end of a session. They added that this depends on their knowledge of the various individuals and the group dynamics, and individual needs will be easier to address offline rather than within the game.

→ **Evaluation and progress tracking**
The LACs suggested that the game could be chapter-based or level-based, and aligned with the training module. The chapters could be organised based on themes and learning outcomes – e.g. 10 themes with one or two outcomes each. They proposed that participants could be evaluated and their progress tracked based on the outcomes defined per theme.

The LACs explained that they currently get the participants to note down key messages from their training on a flipchart at the end of a chapter or unit as a way of testing their understanding. They added that with one-to-one sessions it is easier to gauge how a person is coping, and make note of topics that need revisiting in a few weeks or months. However, they noted that these were post-training evaluation methods, while the live tracking feature proposed in the game is exciting as it can give them information while the training is happening. This would allow them to make quick decisions on adapting or reinforcing the message within that session or to follow-up in the next one.
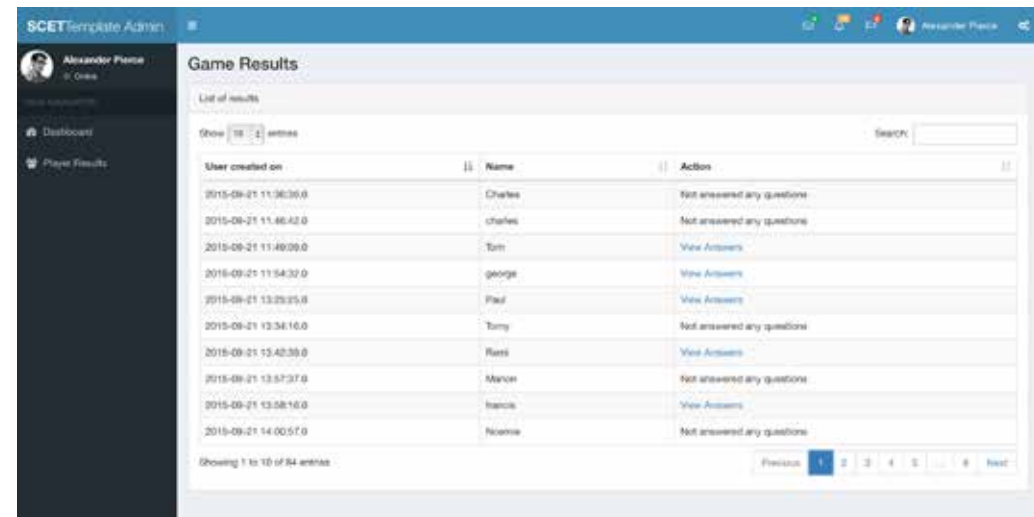
One of the LACs suggested that it would be good to have tangible rewards outside the game as well, such as certificates at the end of each chapter for individuals to take away with them.

→ **Feedback screen for trainers**
Fig. 5
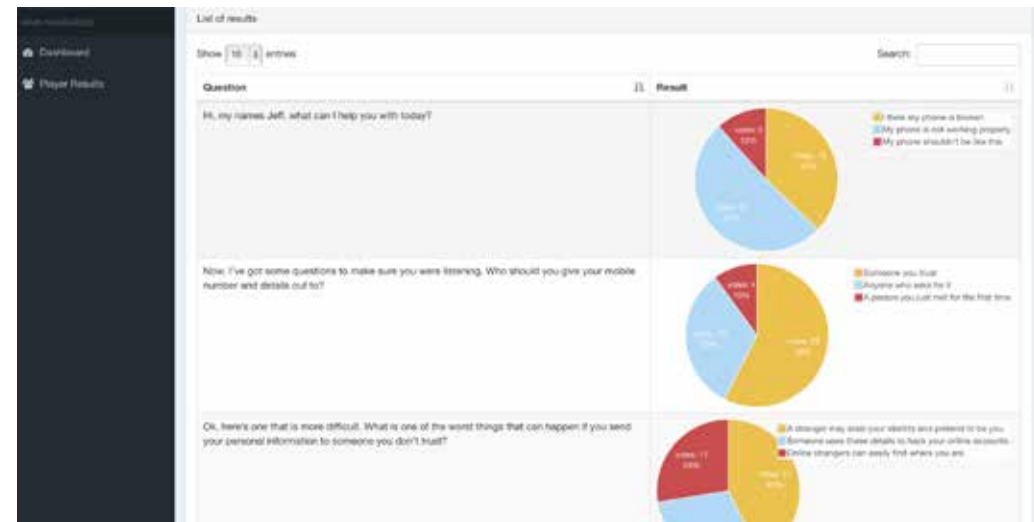
Fig. 6

The LACs thought that the pie chart was good for a statistical overview. Between the options for an overview for the group or player-based feedback, the LACs felt that player-based feedback would be more useful to them to track progress. They proposed that if individuals respond differently to the same questions and tasks at various points in time the dashboard could highlight this change, which would allow them to track an individual's progress over a period of time.

→ **Compatibility with third party learning content**
The LACs felt it would be useful to link the training module to other resources both online and offline, and it was important that the game is not a closed system. However, the linked content would need to address what the individuals would like to investigate further, how they would like to do that, and whether they want to do so with the LACs or on their own. They also discussed challenges of dealing with sensitive topics, adding that the message they are trying to convey is that they are not trying to stop people from using the internet, but are there to help them use it safely.

Future recommendations

→ **Development of the game**
There is a clear opportunity to progress the project into the Factory stage and to partner with an SME to develop the remaining scenarios and activities in the game, incorporating the feedback from Lab 5, towards a production-ready format. There is a need to also refine the feedback screen based on the inputs from the LAC team. There is scope to return to the Experience Lab to test the finished proof of concept with the existing participant group before finalising the production-ready format and entering a full evaluation.

→ **Wider application of the game**
It has emerged from discussion with Midlothian Council and the LAC team that the game may be beneficial to other user groups. This would require an Exploratory phase of horizon scanning to identify wider areas of application as well as to scope parallel projects for those particular areas. In addition to this, there is an opportunity to explore how the game could assist parents, carers and other support providers to enable them to support the young people better; for example, what information would be relevant to them to view on the feedback screen.

→ **Person-centered training**
The positive feedback from the participants suggest that the Lab approach, in particular the activities, tools and artefacts, sustained participation and enabled those involved to share their ideas and take ownership of the game. It is suggested that the participatory approach and use of visual materials is maintained in all future development and delivery of training.

Conclusion

The proof of concept for the game meets the learning needs of young people with learning disabilities, and the requirements of the trainers. It integrates the scenarios gathered from participants to set a realistic context for learning, whilst ensuring that the game remains fun and engaging. The iterative design approach enabled the development of concepts that were appropriately tailored to the needs and skills of the young people. Therefore, the proof of concept is challenging to the degree that it attracts interest and ensures continued engagement in the game. By involving young people and trainers from the beginning of the design process, the Lab allowed everyone involved to feel a level of ownership over the final game.

Overall, based on findings from the Labs, a game-based learning tool has the potential to support young people in learning about Internet and social media safety, and may have application in wider health and social care contexts.

Digital Appendix

Appendix A. Information booklet
Appendix B. Participant diary
Appendix C. Participant diary raw data
Appendix D. Gaming & learning preferences
Appendix E. Game concepts by participants
Appendix F. User requirements (young people and trainers)
Appendix G. Technical development
Appendix H. Proof of concept feedback