AI in My Life: AI, Ethics & Privacy Workshops for 15-16-Year-Olds

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'AI in My Life' project will engage 500 Dublin teenagers from disadvantaged backgrounds in a 15-week (20-hour) co-created, interactive workshop series encouraging them to reflect on their experiences in a world shaped by Artificial Intelligence (AI), personal data processing and digital transformation. Students will be empowered to evaluate the ethical and privacy implications of AI in their lives, to protect their digital privacy and to activate STEM careers and university awareness. It extends the 'DCU TY' programme for innovative educational opportunities for Transition Year students from underrepresented communities in higher education.

Privacy and cybersecurity researchers and public engagement professionals from the SFI Centres ADAPT[1] and Lero[2] will join experts from the Future of Privacy Forum[3] and the INTEGRITY H2020[4] project to deliver the programme to the DCU Access[5] 22-school network. DCU Access has a mission of creating equality of access to third-level education for students from groups currently underrepresented in higher education. Each

[1] https://www.adaptcentre.ie/

[2] https://lero.ie/

[3] https://fpf.org/

[4] https://h2020integrity.eu/

[5] https://www.dcu.ie/access

partner brings proven training activities in AI, ethics and privacy. A novel blending of material into a youth-driven narrative will be the subject of initial co-creation workshops and supported by pilot material delivery by undergraduate DCU Student Ambassadors. Train-the-trainer workshops and a toolkit for teachers will enable delivery. The material will use a blended approach (in person and online) for delivery during COVID-19. It will also enable wider use of the material developed. An external study of programme effectiveness will report on participants': enhanced understanding of AI and its impact, improved data literacy skills in terms of their understanding of data privacy and security, empowerment to protect privacy, growth in confidence in participating in public discourse about STEM, increased propensity to consider STEM subjects at all levels, and greater capacity of teachers to facilitate STEM interventions. This paper introduces the project, presents more details about co-creation workshops that is a particular step in the proposed methodology and reports some preliminary results.

Keywords: Artificial Intelligence, Data, STEM, Co-creation, Privacy, Security, Ethics.

ACM Reference Format:

Malika Bendechache, Irina Tal, P. J. Wall, Laura Grehan, Emma Clarke, Aidan O'Driscoll, Laurence Van der Haegen, Brenda Leong, Anne Kearns, and Rob Brennan, 2021. AI in My Life: AI, Ethics & Privacy Workshops for 15–16-Year-Old, In Websci21 ACM Data Literacy Workshop, June 03–05, 2018, Woodstock, NY. ACM, New York, NY, USA, 10 pages. NOTE: This block will be automatically generated when manuscripts are processed after acceptance.

1. INTRODUCTION

From wearable devices to smart home technology, we generate data constantly across most aspects of our lives (Marr, 2018). As the amount of data collected grows exponentially over the next decade (Polonetsky & Renieris, 2020), new risks relating to ethics, privacy and security will emerge. Through its activities with teenagers and teachers, the project team has identified a significant need for a school workshop series that empowers participants to deliberate on the opportunities, issues and challenges presented by the ever-increasing role of AI (Artificial Intelligence) in our lives.

Research shows children are vulnerable due to low awareness of digital privacy. Even the oldest children struggle to comprehend the full complexity of internet data flows and data commercialisation (Livio et al., 2018). This project will combine existing resources from the project partners with best practice and materials from other international projects to address this deficit.

In early 2020, ADAPT partnered with the Department of Education's Junior Cycle for Teachers (JCT) unit to deliver workshops focused on AI and ethics that linked closely to learning outcomes of eight Junior Cycle subjects. These JCT STE(A)M[6] workshops were designed around topics in STEM (Science, Technology, Engineering and Math) and the Arts to provide Junior Cycle teachers with learning experiences that would allow for

[6] https://jct.ie/steAm/steAm

interdisciplinary responses to societal challenges in subject-specific and cross-curricular contexts. In the workshop evaluation, teachers called for a wider rollout of the workshops, saying "This needs to be compulsory for teachers. Offers great ideas and gets students thinking about their actions using AI" and "This is a vital whole-school topic as AI is in all parts of life".

In addition, ADAPT are a leading partner in the INTEGRITY H2020 project[7] for teaching responsible research conduct to various cohorts of students across Europe through evidence-based, scaffolded learning. The main aim of the INTEGRITY project is to empower students, and also to give them the skills to deal with other important areas of research integrity including plagiarism, carrying out research as part of a larger group and reporting other unethical behaviour.

ADAPT also delivered a think-in and careers seminar for female Transition Year (TY) students in collaboration with iWish[8] in January 2020 at Trinity College Dublin (TCD). iWish is a volunteer-led community committed to showcasing the power of STEM to female secondary school students. The event ran over 4 days in Ireland and hosted 22,000 girls from 26 counties. More than 90% of participants in the event said that the workshop inspired them to consider studying STEM at Third Level.

A recent report by University College Dublin (Delaney & Devereux, 2019) found that subject choice in TY was the biggest indicator of future career choice in STEM subjects, especially amongst female students. Promoting STEM careers at this point in students' academic development will have a significant influence on future career choices for participating students and contribute to lessening the gap amongst disadvantaged students when it comes to participation in STEM courses and careers.

In addition, feedback from schools completing the DCU TY programme in 2019 highlighted significant interest in greater interaction with research centres.

The above evidence points to a substantial need, and unaddressed demand, for a workshop series for TY students that focuses on AI, ethics and data privacy.

2. TARGET AUDIENCE

'AI in My Life' is a novel workshop series on AI, ethics and privacy for Transition Year (TY) students (aged 14-15 years). The reason for targeting TY students is because intervention at this point (age) is so important in addressing gender gaps in STEM. An

[7] https://h2020integrity.eu

[8] https://www.iwish.ie/

article by (Delaney & Devereux, 2019) has found that subject choice for Leaving Certificate is the most important determinant and have a causal effect on STEM college choices. Therefore, policy interventions to reduce the STEM gender gap would need to be implemented when students are choosing Leaving Certificate subjects rather than later when they are considering what to study in college.

The project will engage 500 students from DEIS[9] schools that are economically and educationally disadvantaged backgrounds in reflection, dialogue and discussion around societal implications of emerging AI innovations. A report by (Gilleece et al., 2020) has found that the achievement gap between students in DEIS and non-DEIS schools is apparent in the domain of scientific literacy, just as it is in reading and mathematics literacies. Students attending DEIS schools have significantly lower mean performance in scientific literacy (41 points) compared to students in non-DEIS schools and compared to the country average. Another Report by (Weir & Kavanagh, 2018) looked at an evaluation and analysis of DEIS school and students' achievements and highlighted the need for a positive discrimination towards schools with concentrations of students from poor backgrounds, and that these schools should continue to be targeted for additional resources. The report analysis showed that the gap continues to narrow, however, a significant gap still exists, and more efforts are needed to support these underprivileged schools. AI in My Life workshop series is an initiative that aims to support these schools and narrow further the gap.

3. COURSE DEVELOPMENT

Co-creation and active learner involvement are demonstrated to improve the quality of education as it takes into consideration the learners needs and it also stimulates the teachers' growth (Könings et al., 2020). It has also the potential to improve the motivation as the learners feel engaged and empowered being actively involved in creating the content (Cook-Sather et al., 2014). While co-creation tends to be explored or used more in higher education, there are examples of using co-creation with the purpose of creating educational materials with younger learners as well. For example, a nuance of co-creation was employed by (Kumar et al., 2018) in co-designing with young pupils (8-11years) online privacy related games and stories. One of their major findings was that it is important when creating privacy-related educational material for children to include relatable elements. Based on all this

[9] Delivering Equality of Opportunity in Schools

evidence in the literature, we have decided to adopt a co-creation approach in creating the educational material for the module.

3.1. CO-CREATION WORKSHOPS

Our methodology involves co-creation workshops with a sample of students and teachers that will help ensure that content and learning methodologies resonate with and engage the intended audience effectively. Prior to the workshops, the researchers involved and DCU Student Ambassadors were trained on how to facilitate these co-creation workshops for an active engagement of the learners. DCU Student Ambassadors were recruited from students on DCU's Computing and Engineering degrees.

These workshops are designed to feedback into the course, but also to foster the interest of the involved learners in AI, data and digital privacy and STEM in general. A total of 24 students and four teachers from three DCU Access linked schools are invited to these workshops in order to help refine application scenarios for discussion and select the informal learning tools (from a variety of existing interactive activities) that appeal to them most.

The workshops are designed to be highly interactive and involve quizzes, discussions, collaborative tasks and hands-on experience with AI empowered tools that make sense of the digital footprint.

Some of the main goals of the co-creation workshops are 1) to identify the apps mostly used by the learners, how often they use these apps, how they use these apps, privacy concerns about the apps, the features they like about them and 2) to identify their level of awareness about privacy and AI. In relation to the second goal, the workshops are designed to find out what the learners know about AI and privacy, what would they like to find out, is there anything that concerns them in relation to AI and privacy, do they use any privacy controls. The first goal will support us in developing scenarios that will resonate with them when exemplifying various concepts in the module developed. We envisage for instance that some of the features they love about the apps they are using would be empowered by AI (e.g., content recommendation features). The second goal will support us in an appropriate selection of content that needs to be presented to them in the context of the developed module.

The co-creation workshops were designed around the aforementioned goals as a series of 3

workshops. The workshops follow a blended delivery due to COVID-19 restrictions. They are organized over Zoom as the researchers involved and DCU ambassadors were unable to be in the classroom with the students. The students were all in the classroom with their teachers. Note that the word students and participants are used interchangeably throughout the paper.

Workshop 1 is the introductory workshop that focuses on discovering the apps most used by the students and getting a first glimpse at their privacy, security and AI awareness. This workshop aims to introduce the project and collect information from the participants about what apps they use the most, any privacy concerns around those apps, what is the usage frequency, features they love and use cases for various apps. In the first workshop, the participants will be also introduced to the Future of Privacy Forum (FPF) in a short talk entitled: "Who are the FPF?". The workshop starts with introductions, icebreakers to get everyone comfortable and engaged and contains a mix of quizzes implemented with Google Forms and Mentimeter.com and discussions in breakout rooms.

Workshop 2 digs deeper into the participant's understanding of privacy and security. The workshop intends to gather information about the participants' attitude when it comes to the tradeoff between sharing their data and the use of an app, their level of trust in various apps, the privacy settings they are using (if they are using any), the reasons for using these privacy settings and what they think the advantages/disadvantages of such privacy settings are from their perspective. The activities are a mix of quizzes and discussions around the topics above. Depending on the dynamic of the workshop, the plan is to also have a debate format when discussing advantages and disadvantages (with opposite teams: pro-team and cons-team). A variety of tools will be involved in the delivery of the workshop.

Workshop 3 is focused mainly on the AI topic, but it also brings all the elements (privacy and security) together and shows their interaction. Some of the topics that will be covered in the workshop are around: deep fake videos and their opinion on these (positive vs negative uses, what future will bring for these videos, can they distinguish them), recommendation features in various apps they are using (what is their opinion on these, do they like them, how do they think these features work) and their opinion on the use of AI in the future (do they find AI scary?). Various AI use cases (tracking apps, self-driving cars, recommender systems, robots, etc.) will be brought into discussion. Then the workshop will include a demo of a prediction tool from Cambridge (empowered by AI) that uses social media data to build

a psychological profile of the user: Apply Magic Sauce[10]. Students will see AI in action and an interaction use case with the privacy of the individuals. There will be a discussion around this tool, privacy and security implications, and the power of AI. The students will have the opportunity to have hands-on experience with the tool.
The workshop will be closed with a presentation and activity led by a representative of the National Anti-Bullying Centre[11].
The delivery of the workshop will again involve a mix of tools, quizzes, polls, discussions, and hands-on experience with Apply Magic Sauce tool.

3.2. CONTENT DEVELOPMENT AND DELIVERY

Following the co-creation workshops, the content of the module will be shaped from relevant existing materials and tools and tailored to the needs, expectations and level of the learners. The developed learning content will be then delivered in a series of workshops with the active involvement of the researchers and DCU student ambassadors as well. While the content and learning methodologies employed will be guided by insights gained during the co-creation workshops, a variety of key themes have been initially identified for delivery over 15 workshops. These key themes include an introductory workshop, a citizen think-in on AI, privacy and ethics, responsible research and innovation, various other data privacy workshops, and an AI careers and tech showcase. Especially in the latter theme, the researchers aim to continue to engage with the learners in the delivery of the content as well due to evidence in the literature that shows a highly positive impact on them when interacting with role models (Shin et al, 2016). Noteworthy is the fact that girls are particularly positively impacted by the interaction with female role models (that will be definitely involved in the project). The literature shows that the girls are more attracted to a career in STEM following this type of interaction (Hermann et al., 2016). This is of particular importance considering that there are ongoing efforts to reduce the gender gap in STEM that is acknowledged to be a global problem (García-Holgado et al., 2019).

The learning material developed will use a blended approach (in person and online) for delivery during COVID-19. It will also enable wider use of the material developed. Teachers will attend train-the-trainer workshops to enable delivery, and they will have access to

[10] https://applymagicsauce.com/demo
[11] http://antibullyingcentre.ie/

ongoing remote support for the programme's duration. We estimated that the module will be delivered to approximately 572 students from the DCU Access network of schools, however, the blended approach will also enable subsequent wider use of the material beyond DCU Access schools.

4. EVALUATION

This section looks at the evaluation of this engagement project. We split the evaluation into two: the evaluation of co-creation workshops and the overall evaluation of the project that is mostly focused on evaluating the course content developed and its delivery.

4.1. Co-creation workshops evaluation

- ***Pre-workshops questionnaire***

Prior to engaging in workshop 1 activities, the students were invited to respond to a questionnaire aimed at collecting some demographic information about themselves, their interest, level of knowledge and awareness in the topics, we focus on namely ethics, privacy, security and AI, but also their engagement with STEM and their interest in pursuing a career in STEM.

- ***Post-workshops questionnaires***

The workshops will end with a questionnaire designed in a way to measure the impact of the workshops on the interest in digital privacy, security and AI, the motivation to learn about digital privacy, security and AI, the knowledge level about these concepts, the motivation of following a STEM career. Moreover, the questionnaires will also look at their experience with the co-creation workshops.

Towards the end of workshop 1 activities, the students were invited to respond to another questionnaire aimed at collecting their feedback about workshop 1. They were asked to rate the workshop and the workshop instructors, what did they like and dislike about the workshop, and whether the workshop had an immediate effect on their motivation to learn more about digital privacy, security and AI. The main idea behind conducting this extra questionnaire was to allow for interventions in the delivery style of the next workshops if the students' feedback would indicate such a need.

- ***Results of Workshop 1***

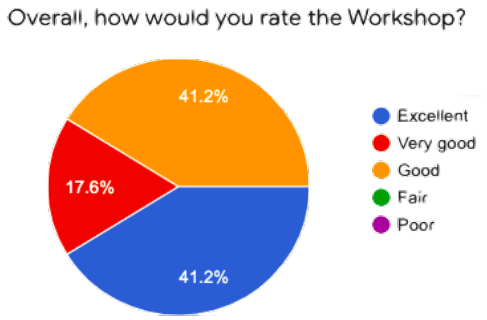

Fig1: Feedback about the workshop

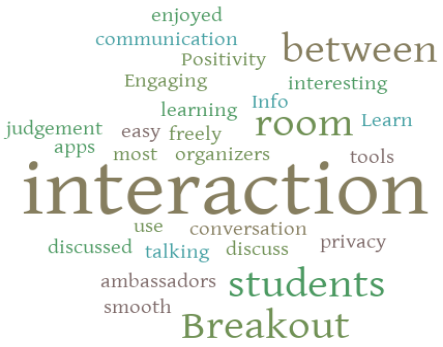

Fig2: What did participants like about the workshop?

Figs 1 and 2 show the results of the feedback collected from the post-workshop questionnaire about the learners' experience in the workshop. As it can be seen, all the participants seemed to have enjoyed the workshop and they liked most the level of interaction across all the different activities of the workshop. Hence, the evaluation of workshop 1 in terms of student experience with the workshop had very positive results. Students indicated it to be a fun learning experience with a high degree of interaction. Very few comments were made that indicated the preference for direct contact with the researchers and student ambassadors, but unfortunately, this is not possible due to COVID19 restrictions. The instructors were very positively rated as well (56.3% excellent, 25% very good, 18.8% good). Following this feedback, it was concluded that no interventions were necessary for the next 2 workshops.

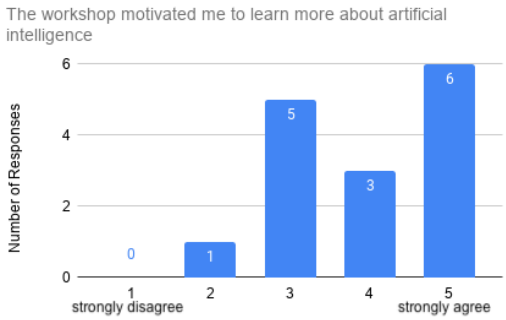

Fig3: Impact on learning about AI

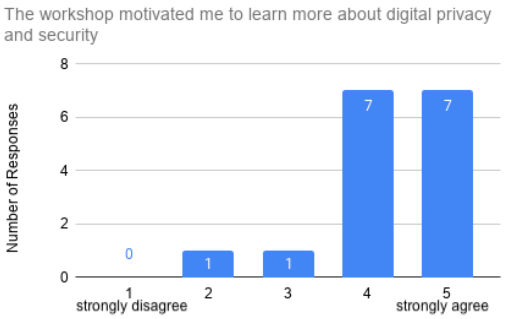

Fig4: Impact on learning about digital privacy and security

Figs 3 and 4 show the impact of the workshop on the participants' motivation on learning new concepts. As can be seen in the two figures, most participants agreed on the importance of the workshop and on motivating them to learn more about privacy, security and AI. We

envisage that the impact on their motivation will be even higher at the end of the 3 workshops.

4.2. Overall Evaluation

The project will employ the services of an external evaluation consultant to effectively evaluate this project before, during and after delivery. In line with international best practice, a mixed-methods evaluation approach will be adopted. The specifics of the evaluation plan will be determined in conjunction with the evaluation consultant and the co-creation workshop participants. The evaluation methodology will be discussed and agreed upon between the evaluation consultant and the researchers involved in the project.

The following are the proposed metrics to evaluate the success of the project:

- No. of students completing workshop series and no. of teachers trained to facilitate workshops in their schools.
- Percentage (%) of students reporting enhanced confidence in their ability to engage in informed debate on STEM issues and/or having a better understanding of the role of STEM in their lives.
- Percentage (%) of students reporting increased awareness of how to safeguard their digital privacy, security, and AI.
- Increase in students' propensity to consider STEM subjects at Senior Cycle/Third Level
- No. of student ambassadors and researchers who report enhanced skills in public engagement.

5. CONCLUSION

This paper introduced 'AI in My Life', an ongoing project that aims to create a novel course for TY students that will consist of workshop series on AI, ethics and privacy. More than 500 students from DEIS schools that are economically, and educationally disadvantaged backgrounds will have direct access to the workshops in its first phase. The paper presents the methodology followed in the project in terms of the development of the novel course and its evaluation. The project adopts an innovative approach in the development of the content that actively involves the stakeholders: students and teachers. Co-creation workshops were designed for this purpose that are described in detail in this paper. Moreover, the paper also reports the feedback following the first such co-creation workshop. Students positively rated the workshop and the instructors and enjoyed the interactive nature of the event and the

activities designed for them. The workshop also had a very positive impact on their motivation on learning more about privacy, security and AI.

We envisage that both co-creation workshops and especially the novel course will improve students' data literacy skills in terms of their understanding of how they generate the data, how this may be used by the AI-empowered solutions, the security and privacy of their data. Moreover, as mentioned in the evaluation section, we expect to see an impact on the students' knowledge about privacy, security, AI, engagement and motivation to learn more about these topics, and an increased interest in STEM careers.

ACKNOWLEDGMENTS

This work was supported by Science Foundation Ireland through Discover programme grant number 20/DP/8175 and through the ADAPT Centre for Digital Content Technology (www.adaptcentre.ie) [grant number 13/RC/2106_P2] and through Lero- the Irish Software Research Centre (www.lero.ie). [grant number 13/RC/2094_2].

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