



S H E R P A

Shaping the ethical dimensions of smart information
systems– a European perspective (SHERPA)

Deliverable No. 5.3

Artistic Representation

27th April 2021

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Abstract	The SHERPA Consortium looked at the main ethical issues, tensions and possible social impacts of smart information systems. In this deliverable, we examine the artistic representation aspect of that study, detailing the wide ranging multi-media representations of the academic side of SHERPA. These included animated videos and quizzes along with physical and online interactive exhibits.
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Executive Summary

The SHERPA consortium looked at the main ethical issues, tensions and possible social impacts of smart information systems (SIS).

In this deliverable, we examine the artistic representation aspect of that study, detailing the wide ranging multi-media representations of the academic side of SHERPA. These included 10 animated videos based on the case studies and scenarios produced as part of SHERPA, the examination of human rights issues along with showcasing the recommendations from the project. There were also personality quizzes along with physical and online interactive exhibits including the examination of a privacy friendly smart home and the examination of algorithmic judgement and face recognition.

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List of acronyms/abbreviations

Abbreviation	Explanation
SIS	Smart Information Systems
AI	Artificial Intelligence

Table 1: List of acronyms/abbreviations



1. Introduction

SHERPA has produced a huge range of academic material including case studies and scenarios, reports covering interviews and studies on ethical tensions and social impacts, human rights frameworks, technical options and interventions, standardisation activities, regulatory options and finally guidelines for the development and use of SIS.

While these methods of research and the resulting data are critical to examining the ethical issues, tensions and possible social impacts of smart information systems (SIS), they may leave some people feeling initially overwhelmed and disconnected. The sheer volume of material may stop some people from looking at SHERPA's research in more detail.

The artistic representation aspect to SHERPA aimed to empower and invigorate people. Art does not show people what to do, yet engaging with a good work of art can connect people to their senses, body and mind. This feeling can spur further thinking and engagement.

Once people had engaged with the artistic representation, then they were more likely to engage with the academic side of the project.

Some people may also have felt that they did not have enough time to engage with the large volume of academic material that SHERPA produced. Once people had engaged with the videos and interactive exhibits, giving people a good foundation to the work of SHERPA, some would have made time to investigate further.

1.1 Strategy

While it was possible to produce some aspects of the representation at an early stage of the project – such as the introduction to SHERPA video, the remaining aspects were based in response to the academic work that SHERPA produced and so were created as the project progressed.

The COVID-19 pandemic also affected plans for the artistic representation. While the animated videos were always going to be hosted online, some of the interactive exhibits that were due to be presented at physical conferences had to be adapted to be presented online.



2. Animated Videos

Of the 10 videos to be produced for the SHERPA project and following on from the production of the 'Welcome to SHERPA' animated video during the first year of the SHERPA project, the case studies and scenarios developed as part of Work Package 1 were used to provide the basis for another 6 animated videos over the course of the second year of the project. Details from Work Package 3 fed into these videos and information from work package 4 also provided detail. Special emphasis was given to the topic of Human Rights to produce the final video during the second year of the project. The final animations were reserved for the advocacy and dissemination stages of the project. All the videos are showcased at www.project-sherpa.eu/category/videos

2.1 Welcome to SHERPA



Figure 1: Welcome to Sherpa

(Date Delivered: 4th September 2018 / Running Time: 1 minute 17 seconds)

Description: Welcome to SHERPA. Looking towards the future of technology, SHERPA is a project that will investigate, analyse and synthesise our understanding of the ways in which Smart Information Systems impact ethics and human rights issues.



2.2 Case Study and Scenario Animations

Smart Cities Case Study



Figure 2: Does AI Make Cities Smart?

Date Delivered: 10th June 2019

Running Time: 2 minutes 06 seconds

Description: The SHERPA project explores deeper insights into the use of SIS systems. This case study offers valuable insights into the development of smart cities in a European context, the use and implementation of SIS in urban environments, and what kind of ethical issues are evaluated in the literature and how they contrast and diverge from those faced by professionals in practice. It is hoped that this case study will offer practitioners, policymakers, smart city organisations, and private ICT companies, some interesting observations about ethically-responsible approaches towards SIS implantation in smart city projects. Read the full case studies to get an understanding of real world applications of SIS technologies and the potential ethical issues that are being dealt with. For further information visit our website: www.project-sherpa.eu/category/case-studies

Agriculture Case Study



Figure 3: Does Data Provide the Solution to Future Agriculture?

Date Delivered: 24th July 2019

Running Time: 2 minutes 8 seconds

Description: The SHERPA project explores deeper insights into the use of Smart information systems (SIS). SIS (Big Data and artificial intelligence) are used in the agricultural industry to help the planting, seeding, and harvesting of crops, as well as farm management, plant and livestock illness and disease detection. However, the use of agricultural SIS may create a number of ethical concerns. The aim of this case study is to identify ethical issues that may appear in practice in an agricultural organisation that are not covered in the literature; whether or not they face the same issues discussed in literature as in practice; and if there are policies and procedures set in place for addressing these concerns. Read the full case studies to get an understanding of real world applications of SIS technologies and the potential ethical issues that are being dealt with. For further information visit our website: www.project-sherpa.eu/category/case-studies



Cybersecurity Case Study

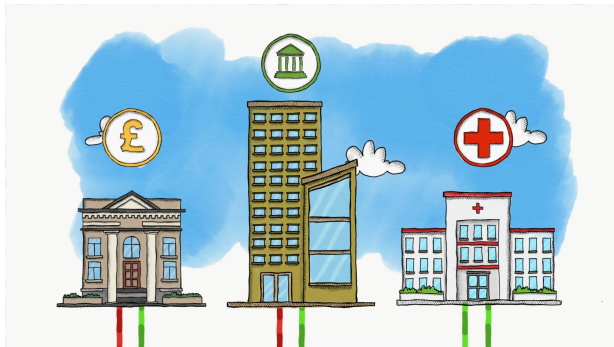


Figure 4: What Are The Impacts of AI on Cybersecurity

Date Delivered: 12th September 2019

Running Time: 2 minutes 19 seconds

Description: Cybersecurity has become an important concern both publicly and privately. In the public sector, governments have created and enlarged cybersecurity divisions to provide security to critical national security assets. In the private sphere, companies are struggling to keep up with the required need for security in the face of increasingly sophisticated attacks from a variety of sources. The SHERPA project analyses how can Smart Information Systems (SIS) can be introduced in cybersecurity and the benefits for society but also the ethical issues arising from the use of SIS in this domain. For further information visit our website: www.project-sherpa.eu/category/case-studies

Government Case Study



Figure 5: Should Governments Adopt Smart Information Systems Technologies to Meet Sustainability Goals?

Date Delivered: 15th October 2019

Running Time: 2 minutes 03 seconds

Description: The use of smart information systems (Artificial Intelligence and Big Data) are being pioneered to help governments meet these needs and to provide a sustainable future for their citizens. This case study analyses the ethical and social implications of using smart information systems (SIS) in the governmental domain, asking the primary research question: Which ethical issues arise in the use of SIS in governmental domains and how can they be addressed. For further information go to our website: www.project-sherpa.eu

Warfare Scenario

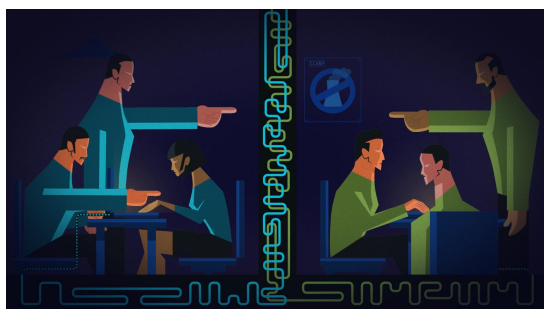


Figure 6: Misinformation and AI: The Face of Warfare in the 21st Century

Date Delivered: 10th November 2019

Running Time: 2 minutes 19 seconds

Description: This scenario considers the nature of warfare in 2025 and, in particular, cyber warfare or information warfare. It notes that the nature of warfare has changed and so have the instruments of warfare and even the soldiers. For further information go to our website: <https://www.project-sherpa.eu/scenarios/warfare/>

Education Scenario



Figure 7: Learning Buddies and AI in Education: What Will Our Schools Look Like in 2025?

Date Delivered: 2nd January 2020

Running Time: 2 minutes 26 seconds

Description: The scenario envisages a future with learning buddies, robots that mentor their young charges, and other educational technologies and analyses the potential impacts on ethics and human rights. For further information go to our website: <https://www.project-sherpa.eu/scenarios/education/>

2.3 Human Rights Animation

Smart Information Systems and Ethics: Protecting Human Rights



Figure 8: Smart Information Systems and Ethics: Protecting Human Rights

Date Delivered: 10th February 2020

Running Time: 2 minutes 31 seconds

Description: Human Rights are important for all of us and as technology changes and develops, so too do our views and insights into how these might affect our Human Rights. For further information go to: <https://www.project-sherpa.eu/understanding-ethics-and-human-rights-in-smart-information-systems/>



2.4 Advocacy & Dissemination Animation

Part One: The Foundation of SHERPA's Recommendations

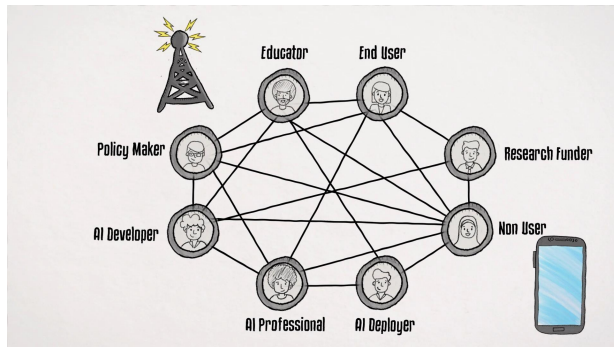


Figure 9: The Foundation of SHERPA's Recommendations

Date Delivered: 26th April 2021

Running Time: 2 minutes 17 seconds

Description: The benefits of artificial intelligence can be harnessed but its ethical issues and human rights concerns must be addressed. Using a variety of research methods, SHERPA has identified a number of these issues and concerns. In order to ensure that these ethical concerns are addressed and the benefits of AI can be harnessed, SHERPA has proposed three groups of recommendations: Concepts, knowledge and governance. But what are the foundations to these recommendations?

Part Two: The SHERPA Recommendations



Figure 10: The SHERPA Recommendations: Harnessing the Benefits of AI

Date Delivered: 26th April 2021

Running Time: 2 minutes 10 seconds

Description: In order to ensure that the benefits of AI can be harnessed and its ethical and human rights concerns can be addressed, SHERPA proposes three groups of recommendations aiming to delineate AI ecosystems and provide conceptual clarity, establish and maintain a knowledge base and institute appropriate governance mechanisms.



3. Personality Quiz

During the initial face-to-face sessions with the SHERPA participants and the stakeholders it became clear that there wasn't always the level of reflection on ideologies and biases that in the artist's opinion, is vital to have an outcome that is of a high enough quality to inform policy. The artist suggests that any policy document should take into account and reflect upon the creator's / teams position in the Technological determinism - Social Constructivism 'spectrum'.

A quiz was built and placed online that playfully helps citizens explore and learn about their own ideals.

The project is live at <https://www.sherpapièces.eu/quiz>. It does not collect any personal data. A fun side-note is that the quiz will be part of the course "Critical thinking about technology" by the SIOO foundation.

4. Sherpa Smart Guns

The stakeholder session on military application and risks surrounding AI, which took place on the 17th of September 2018 in Brussels, impressed the idea that this issue has very much arrived on our doorstep. Machine learning is here, and is already being integrated into weapons of war and (mass) surveillance.

Smart water guns is one of the larger projects, which reflects on the use of "AI" in military scenarios, and the increasing autonomy given to these systems. These water guns are a reaction to one of Samsung's lesser known products: the SGR-A1 autonomous gun (pictured). These guns use cameras to detect enemy combatants and then autonomously shoot. They are deployed on the border between north and south Korea.



Figure 11: The Samsung SGR-A1 Sentry Gun (left) versus the Sherpa Smart Gun (right)

In a similar fashion, the Sherpa Smart Guns are modified Nerf toy guns that use built-in face detection AI to detect who they are pointed at, and can only be fired at members of certain groups in society. For example, only baby boomers (age), only women (gender), or only people of a certain ethnicity. Face detection can either unlock the trigger, or even fire fully automatically if the targeted demographic is detected. Another mode is to fire at all faces *except* the target demographic.

The project was set to be launched at Dutch Design Week 2020, before the mayor of Eindhoven (rightfully) cancelled the event two weeks before it was supposed to start. There the guns would be integrated into a shooting gallery, which will challenge users to shoot the correct group without making mistakes / collateral damage (which is very hard). Because the project is too much fun to do as a virtual launch, a new opportunity to launch the project is being looked at.

5. Candle



Figure 12: Dutch Design Week

In October 2019, the Candle Project was presented at the Dutch Design Week. It was allowed to present in the main building, the Klokgebouw, which led to a large number of visitors. It was also taken up in the 'trend tour'.

Candle is a demonstrator project. It's a design fiction that shows what a privacy friendly smart home could look like. It offers a central controller which keeps all private data inside the home. Similarly, the other devices, such as a smart lock, thermostat and various sensors and devices, all connect to this central hub. But they don't connect to the internet. There is no cloud service.

The project aims to break down a common misconception: that consumers have to choose between convenience and privacy. This research project explored to what degree privacy and ease of use can be combined. As it turns out, it's possible to get almost all functionality this way. This even includes voice control, which is run locally.





Figure 13: Open expert Jesse Howard's Candle prototypes. Note the data transmission toggle switches.

The Candle smart home demonstrator incorporates and builds on SHERPA's research into smart information systems. It makes these issues tangible, and shows that ethical SIS is possible. Desk research and conversations with SHERPA members proved valuable, but also convinced the artist that making the issues tangible would be of great value. With artificial intelligence, there is a risk of talking in abstractions. The interactions with and presentation by F-secure put this distance between academia, politics and technologists into clear focus. Knowing how the technology actually works is one of the best ways to be inoculated against the hype that surrounds it.

The project adds all the features you'd expect, such as keeping the data locally, and adding switches that allow users to turn data transmission of their devices on and off easily.

But to take it further, the artist realised they had to more concretely address this "AI" issue. At the time, the scandal surrounding [voice recording by Amazon, Google and Apple](#) being shared with their contractors gained widespread attention. Many journalists accepted the narrative that the recordings were vital in order for these systems to learn. But that's a misrepresentation: after a while these systems have learnt enough. After 10,000 recordings of "please turn on the lights" the system won't get better at recognising that sentence.

So the artist decided to make this the message here: when do voice control systems "graduate"?

To engage this subject, the artist took their role in SHERPA and used it to contribute to the voice control aspect of the project. Thus, the Voco add-on for the [Mozilla WebThings Gateway](#) was born. The code is [available on Github](#), and refers to the EU contribution. The artist wrote an article ("[how 'good enough' AI can make voice assistants more ethical](#)") on the subject, and engaged with journalists to help them question these narratives.

In the meantime, Voco has now become the defacto voice control option for the WebThings Gateway, which means the software is now used by a growing community of users.

The project has received widespread attention, including posts on [Slashdot](#), [Hackaday](#) and [Reddit](#), as well as newspapers, videos and even a TV Show. It was showcased in TV program "Brilliant" on RTL4, and was highlighted in VPRO Tegenlicht documentary about reclaiming personal data. At its peak the website received over 4000 unique visitors per day. Emails and Github messages keep popping in the artist's inbox because a lot of people are building Candle themselves (something the project encourages and makes easy to do). For example, the project was presented at the Pi day event, organised by the [SenseMakers](#) community (just before COVID made further events impossible).



The ideas around ethics and AI that Candle explored have also reached places ‘upstream’. For example, Candle heavily builds on the WebThings Gateway software, which was originally developed by the Mozilla Foundation (makers of Firefox). They recognised the ideas around ethics and ‘psychological security’ that Candle places into the spotlight, and the potential solutions it proposes, could be “unique selling points”. Most smart home systems - even the ones that keep data locally - are still about collecting as much data as possible. Candle reverses that paradigm, and suggests “crazy” ideas like allowing users to generate fake data. For example, so that children can [hide activities from their parents](#). These ideas were also presented at the international [ThingsCon](#) conference in december (where Candle was also exhibited). It’s clear that a lot of IoT developers - even ones that care about ethics - could be more sensitive to the ‘impact’ that these systems have on people. From feeling watched all the time (children) to having ex-husbands using such systems to still spy on the family ([3500 cases reported in the USA in 2018](#)).

Both the Webthings Gateway and Candle's privacy-focussed features such as Voco are still being developed, as they are all open source. The community is working towards a version that could be commercialised. For Candle, a local Amsterdam design agency is helping in the practical/legal side of navigating this minefield. Designer [Jesse Howard](#), who helped develop Candle prototypes shown at Dutch Design Week, is also on board.

Candle challenges Google, Amazon and other parties to take ethics much more seriously, by showing a wider audience what is possible.

6. Survival of the Algorithmically Attractive at Unfreezing Freedom

In 2019 a Dutch student asked the artist if he could meet and get feedback on this graduation work. During their sessions, the artist pushed the student to explore not just how algorithms judge us, but that the tension in this judgement comes from being compared to others. The artist told him: try to turn it into a two-player ‘game’. In the end he didn’t, but the artist took his own advice.

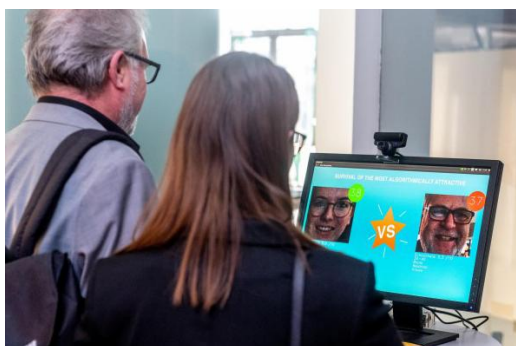


Figure 14: Visitors Interacting with Survival of the Algorithmically Attractive



Survival of the Algorithmically Attractive is technically simple: it's a screen with a camera. Whenever the camera sees two people, it starts to compare them using face recognition algorithms, and then points out a winner. Specifically, it tries to ascertain which one of the two would - all other things being equal - be more likely to succeed in a job application.

To make a judgement, it analyses age, gender, expression and even ethnicity. Then, it turns these analyses into a score. This translation is deceptively simple: give 6 points to a woman, and 10 points to a man. Give 10 points to white people, 7 points to Asian, and 3 points to people who look Arabic.

A black envelope in front of the installation contains the complete - and clearly dubious - mathematical formula. But which participants would actually look inside it? Would they simply accept the judgement, or get curious and ask me how it works?

The goal was to act as a conversation starter to talk about these increasingly common judging systems. Specifically, our need to avoid seeing "AI" and "algorithms" as monolithic, and instead dissect its components. In this case, the analysis of being a man or woman is only step one. Step 2 is to generate the judgement. This subjective, normative component of these systems should always be questioned, and we must avoid the "pars pro toto" mistake. We should at the very least regulate and force openness on the normative parts of the systems. The parts where a (in itself dodgy) analysis turns into an unquestioned judgement.

This project was part of a larger project called Unfreezing Freedom, which was initiated by the Hogeschool Rotterdam. They asked the artist to help them develop and pitch an idea to the Province of the South of Holland. The artist proposed they look at the ethics of AI, and specifically point out an aspect that most politicians don't have on their radar yet: [social cooling](#).



Figure 15: Keynote for 'Unfreezing Freedom' project

Although Sherpa was not an explicit partner, during these events the artist did point out the Sherpa concerns, as well as the artist's role in that project. When speaking to 200 politicians, it helps to talk about Sherpa's concerns and the EU's role in order for them to take the message more seriously.

The artist gave a keynote, exhibited Survival of the Algorithmically Attractive, and acted as an external teacher and "Sherpa" jury-member during the student design challenge. An early Dutch version of the next project was also developed.



7. How Normal Am I?

The interactive documentary “hownormalami.eu” makes tangible how machine learning algorithms can be used to judge our faces, often without us realising it. If you visit the website you can experience how algorithms judge your beauty, age, gender, body mass index (BMI), and more. From there it also extrapolates even further predictions, such as how long you're likely to live. All this technology is placed in a critical light.

Since its launch it has been experienced over 200,000 times. There has been a strong positive response, with many teachers emailing that this is very useful in education. Numerous talks have been given about the project, including the Next Generation Internet summit, Mozfest 2021, the University of Utrecht, as well as more commercial events such as the Tweakers AI meetup. This 'making of' story dives even deeper into the rather incredible story of what was discovered during the research phase. For example, Google Research's health department in India seemed to be grabbing data to train their own BMI prediction algorithm by scraping the `progresspics` community on Reddit.

The documentary was quite a technological challenge, since the goal was to run all this face detection on the user's own computer, and not in the cloud. The website requires the user to grant permission to use the webcam, but no personal data is collected.

Some anonymised data may optionally be shared. This data is then used to compare the user's results against all those that came before. This is the basis of a final judgement, which is about the user being 'normal' (average) or not.

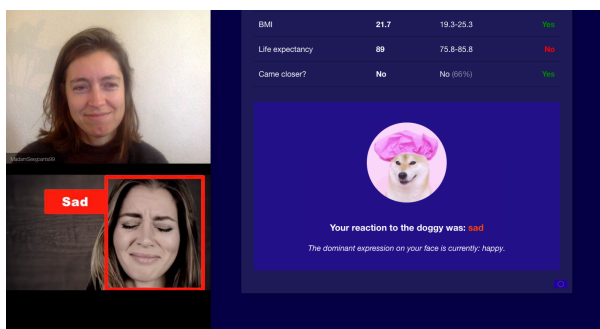


Figure 16: A user's facial expressions being judged at www.hownormalami.eu



8. Slot Machine

This is another installation that the artist is developing for Sherpa. They don't know where it will be exhibited yet, but are sure it will at some point after COVID19.

It consists of a small jackpot/slot machine, continuing in the theme of playing with algorithmic judgement and face recognition. Where HowNormalAml was more cerebral and educational, this project is more metaphorical, referring to the gambles and educated guesses that are made using AI.

Users stand in front of the device, insert a euro coin, and then pull the lever. A number of factors on which their face will be analysed is randomly selected, and shown on the slot machine's dials, complete with casino sound effects. Users can select 'what they are', e.g. a man/woman/other. Aged between 0-30, 30-50 or 50+. Attractive, mediocre, or ugly. White, black or other.



Figure 17: Image of slot machine without the coin slot (insert in the space in the bottom)

Once the three randomly selected factors are set, the dials begin to spin again. Meanwhile, face recognition algorithms analyse the user, and come to their own conclusions. If the algorithms reach a different verdict from what the user inputted, then they lose their money. If the AI's analysis matches what the user claimed to be, then they win all the money collected by the device at that time.

The jackpot metaphor points to the truth: in many cases these algorithms make faulty analyses. This contrasts with the increasing number of organisations who rely on them and treat them as being more reliable than is warranted. For example, services like Hirevue are increasingly scrutinised for giving a false sense of security to the companies who employ (through) their services.

The slot machine was purposefully designed to be easy to travel and exhibit, but its literal "hands on" nature has made it incompatible with the pandemic safety precautions.



9. Conclusion

The work produced as part of the artistic representation of SHERPA's activities explores several different areas of life. These include translating SHERPA's research into the use of SIS in the physical educational, urban and agricultural environments along with the use of SIS in the digital environments of cybersecurity and information warfare. These different environments were also examined from a personal, commercial and governmental perspective, while exploring how to promote a just and equitable society.

The work conducted as part of the artistic representation covers a significant portion of the SHERPA research and illustrates that wherever one turns, SIS is ever present in people's lives as are the ethical issues of its use.

The artistic representation encourages people to play with technology that might at first have seemed intimidating. It breaks down barriers for people who might have thought that anything to do with artificial intelligence or smart information systems was too confusing for them. The Candle smart home demonstrator was a great success at tangibly explaining how the technology works without talking in abstractions.

This part of the SHERPA project also approaches sensitive or taboo topics in a novel and disarming way. With regards to the Smart Guns, it would no doubt be a surprise for conference attendees to be encouraged to shoot certain groups in society with modified Nerf products, but once that strong barrier had been broken, the conversation about how SIS could be used to target certain groups would be made a lot easier.

The Survival of the Algorithmically Attractive, How Normal Am I? and Slot Machine outputs all explored how algorithms judge people and the effect that could have on people's lives. They enticed people to explore a topic that they might not have been familiar with, while also leaving people with an urge to explore the topic further.

The animations can be used as an introduction to more in depth discussions about SHERPA's research. They complement and support the material in the SHERPA workbook and can be delivered as demand dictates. As the animations are hosted online, they can be used to advocate SHERPA's research to people anywhere in the world. The animations can also be used in the physical environment at conferences to attract people to SHERPA's lectures and workshops. They are subtitled to assist people who may have accessibility issues.

The artistic representation concluded with showcasing the foundations to SHERPA's recommendations along with details of the recommendations themselves in the format of animations.

The artistic representation can be delivered as a mixture of online and physical activities. Not all research projects have translated their work into different media formats, especially with such a broad range as seen here. Not all research projects encourage people to learn through play either. Learning through play is accessible to anyone, regardless of their age as also illustrated here.

This artistic representation will live on in both online and physical formats for many years to come. It is something quite unique to SHERPA and enables engagement with a much wider audience - essential to the successful advocacy of the project.

