Exten DT²

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Deliverable 9.1
Initial Ethics Board Report

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1 Abbreviations

Abbreviation	Definition
AI	Artificial Intelligence
ALAD	Authorable Learning Analytics Dashboard
DBR	Design Based Research
DMP	Data Management Plan
DPIA	Data Protection Impact Assessment
DPO	Data Protection Officer
DT	Design Thinking
EAB	Ethics Advisory Board
ESR	Ethics Summary Review
ET	Emerging Technologies
Exten(DT)^2	Extending Design Thinking with Emerging Digital Technologies
IRB	Institutional Review Board – with the power to grant ethical approval for research studies, typically operating at an institutional level
LA	Learning Analytics
LNU	Linnaeus University
OMT	Operational Management Team
OU	Open University
REC	Research Ethics Committee - with the power to grant ethical approval for research studies, typically operating at a department or school level within a university.
RRI	Responsible Research and Innovation
TCD	Trinity College Dublin
VSD	Value Sensitive Design
WP	Work Package

2 Summary

The Exten(DT)2 project aims to meaningfully enhance the pedagogic value of Design Thinking (DT) through the use of emerging technologies and in doing so, develop a concrete pedagogical approach which supports the digital transformation of education. In the context of Exten(DT)^2, these emerging technologies include Artificial Intelligence, Authorable Learning Analytics, Augmented Reality, Virtual Robotics and 3D printing. This necessarily entails the use of these technologies by students and teachers engaged in DT learning activities in authentic classroom settings. Within this context, the ethical implications and the perceptions of stakeholders are not yet fully understood. Thus, the Exten(DT)^2 project team is engaged in an ongoing proactive and reflective process to identify and consider the pertinent ethical issues.

This report presents the internal processes through which ethical issues have been engaged with, in the first seven months of the project. It presents the ethical issues discussed and resolved within the project, thus far, before going on to explore the more complex and emergent ethical issues. Both the resolved and ongoing ethical issues will both inform and be informed by the development of the project. These more complex issues sit at the intersection of technology, research and pedagogic practice and need to consider the different perspectives of stakeholders, including technologists, researchers, children/young people, their parents and teachers. Over the next two and a half years, the development of the Authorable Learning Analytics dashboard will be ongoing, allowing ethical issues to be mitigated through technical design as well as the design of the research. At the same time, the project will remain open and responsive to the developments within the scientific community, including precedents set and newly emergent issues. Overall, the Exten(DT)^2 project team is committed to addressing the ethical challenges of working with emerging technologies in education and is taking proactive steps to ensure that its practices not only align with the highest ethical standards but provide guidance for teachers, technologists and other researchers who need to address similarly complex ethical questions.

3 Introduction

The Exten(DT)2 project aims to use emerging technologies such as Artificial Intelligence (AI), Authorable Learning Analytics Dashboard (ALAD), Augmented Reality (AR), 3D printing, and Virtual Robotics to enhance pedagogical values, sustainable digitisation and the potential for wide deployment of DT. In Exten(DT)2, we argue that enhancing DT with Emerging Technologies (ET) could make DT a more feasible, accessible and inclusive approach for all students and teachers. The ultimate goal is for Exten(DT)2 to provide evidence about how ET together with DT can be used by teachers in classrooms to transform education in meaningful, pedagogically and research informed.

To achieve the objectives of the project, Exten(DT)2 utilises a 3-year Design Based Research (DBR) approach (Barab & Squire, 2004) to develop digital tools, pedagogic praxis, resources for teachers and teacher educators, and a unifying framework, for use in secondary school settings (ages 11-18). It engages stakeholders throughout, in co-design and co-production activities at different stages. As part of this, teachers design DT activities using ET which their students then participate in during the normal school day or in extra-curricular activities, in Belgium, Greece, Ireland, Norway, Sweden and the UK. Thus, this research involves vulnerable human participants, personal data and non-EU countries.

Particular issues to consider include the informed consent of adults and the informed assent of children, the right to withdraw, data protection including GDPR, data minimisation, user data for teaching purposes versus research data, child protection and confidentiality. The location of data collection, storage and processing all require attention. In addition, when it comes to AI and specifically within this project, the development of the LA platform and the authorable dashboard, there are existing challenges in terms of bias, data collection and potential for harm. The potential impact on future learning and stigmatisation of particular groups or individuals are known concerns, as well as the potential concerns that aggregating de-identified data from different sources carries an increased risk of re-identification of users (Flanagan & Ogata, 2017). Multimodal LA have been associated with a potentially higher risk of ethical concerns due to the high granularity and temporal nature of the data (Alwahaby et al., 2021). Ethical issues such as privacy, transparency, fairness and bias, and accountability have been studied in relation to AI but according to Alwahaby are sparsely investigated in Multimodal LA. Other ethical issues especially highlighted as a concern in Multimodal LA are related to moral principles such as surveillance, accountability and performance-orientation (Spikol et al. 2021). Finally, all of this needs to contextualised within formal school education settings, where teachers, parents, students, school boards and senior management may have conflicting views and moral arguments may require careful consideration alongside ethical issues. While at the same time restrictions on data gathering due to research ethics concerns may hamper teaching and learning in the classroom. While these issues may appear to most

pertinent to WP4, to adequately address these issues, all partners will need to actively engage with stakeholders in each country throughout the 3 years of the project and through each WP.

3.1 Purpose and scope of the deliverable

This is the first of three deliverables in work package (WP) 9 which report on the activities within Exten(DT)^2 from an ethical perspective, by the project's own Ethics Advisory Board (EAB). It is a key component of the project's approach to Responsible Research and Innovation (RRI), ensuring that research is transparent, reflexive, responsive and ethical.

The deliverable reports on the outcomes of Task 9.1 and Task 9.2 which include setting up the EAB, the review of the initial project proposal and developments of the project from M1-M7 with regard to ethics. In addition, it provides a report from an Independent Ethics Expert (Prof Adam Hedgecoe, Cardiff University) on progress thus far.

3.2 Interrelation of the deliverable with other WPs

Deliverable D9.1 reports on the EAB's review and input into initial project developments. This includes the Data Management Plan (DMP) in WP1, initial discussions about the design of the LA platform (WP4 – Shaping Technologies) and data collection for the evaluation of WPs 3 (Co-design of Educational Resources and Material), 5 (School Interventions) and 6 (Professional Development), in WP7 (Evaluation). It also provides some initial areas for consideration in WP2 (The Exten(DT)^2 Framework).

3.3 Structure of the deliverable

This deliverable begins by presenting an overview of the 'Processes' within the project for exploring ethical issues and the remit and composition of the EAB. This is followed by an overview of the 'Ethical Issues' identified within the project thus far and the ways in which these issues have been addressed. Within this, subsections explore the more 'Complex Issues Without a Solution'. It is the intersection of pedagogic, research and technological concerns, along with stakeholder concerns that have thus far resulted in the most complex ethical issues being identified. At this point, those issues do not yet have a clear-cut solution and require further engagement with the literature, consideration in the design of the LA platform and engagement with stakeholders. This is followed by a brief conclusion to the report which outlines recommendations and next steps. Finally, a 'Report by the Independent Ethics Expert' is provided on the progress of the project to-date and the engagement of the project team with the aforementioned ethical issues.

4 Processes

WP9 was created following a request from the Commission to have an Ethics Board to review and provide input into the project on an ongoing basis and report on the project's progress. Specifically, its purpose is to raise potential ethical issues across WPs, identify how ethical issues will be addressed and who will be responsible for addressing them. To achieve this, an Ethics Board was set up, referred to here as an Ethics Advisory Board (EAB) to distinguish it from institutional boards or committees which have the power to grant ethical approval for research or require amendments. The EAB's remit is primarily advisory. This section outlines the how the EAB was established, its remit and functioning to date. Supplementary material can be found in Appendix A.

4.1 Ethics Advisory Board (EAB)

The EAB is comprised of an internal expert on AI and children (Johanna Velander, LNU), an internal expert on emerging technologies and pedagogy who is also the WP7 evaluation lead (Dr Carina Girvan, TCD and EAB Chair), and an external independent ethics advisor Prof Adam Hedgecoe. Prof Hedgecoe's background is in Science and Technology Studies and empirical studies of research ethics which makes him ideally suited to provide independent advice on a range of potential issues within the project.

The EAB is open to additional members as the project develops and needs arise.

WP leads, members of the OMT and/or their nominees engage with the EAB in several ways:

- Attending meetings of the EAB
- Inviting the EAB to attend WP meetings

4.2 Remit of the EAB

In the first seven months of the project (reported here), the remit of the EAB was to review the initial project proposal and developments on the project to-date and meet to discuss potential ethical issues for WPs 3-8 including, but not limited to, data minimization, children's assent, power dynamics and the role of AI, as highlighted in the Commission's review. From this the EAB would identify potential issues for discussion with WP leads and provide guidance on how to address these issues. The EAB would also review the DMP to ensure alignment, acknowledging that this is a living document.

Following the initial review, the EAB will undertake a periodic review at 6 monthly intervals to: 1) review project developments and provide input into these, 2) review and respond to data collected by the researchers; 3) review and respond to data collected through automated tools; and 4) review approaches used to gain informed consent and assent.

The EAB will problematise the planned approaches within the project, both in the design of the research and design of the technological developments. It will work alongside other WPs to both identify and find solutions to potential issues. It will also make connections with Sister projects to enhance its capabilities.

It is not the role of the EAB to provide ethical approval, however the EAB does aim to ensure that ethical issues likely to be raised by IRBs/RECs are addressed in advance of applications being made. It also provides a route through which ethical concerns raised in one institution can be discussed and resolved at a project level to ensure consistency across the project, both in terms of ethical approaches to research and ensuring that project aims are met.

The EAB may draw on but is not limited to existing guidelines on educational research (e.g. BERA, 2018) or on the use of AI and data usage in education (e.g. European Commission, 2022). It will consider existing precedents in research which is both within and aligned to the current field of study. It will also remain open to emerging approaches.

4.3 Review and input process

To date the EAB has held four meetings, including one at the project Consortium meeting in M7 with all partners. Minutes of all meetings are included in Appendix A. Additionally, members of the board have attended WP7 meetings and the external independent ethics advisor, Prof Hedgecoe, has attended the OMT meeting in M6.

4.3.1 Initial review

The initial starting point was a review of the project proposal and Ethics Summary Report (ESR) by the Commission which noted the project appears “ethics ready” but is also complicated, so the EAB has an important role in providing oversight as the project progresses.

4.3.2 Progress review

The next step was a review of the project’s progress based on reports by WP leads to the EAB. Only issues related to WP4 and WP7 were raised. It was noted that at this stage only existing technologies are being used within the project and so issues related to the LA platform (which is in development) are unknown. Prof Hedgecoe raised questions about the new nQuire platform regarding safety but beyond that notes that decisions will need to be made regarding technologies before ethics review can take place.

4.3.3 Attending WP meetings

Following a review of the WP7 evaluation documents, it was noted nothing planned was out of the ordinary for social science research within education and that appropriate steps were being taken to ensure data minimisation, as well as appropriate assent and consent of

participants. The EAB subsequently attended meetings with project partners as part of WP7 development. This provided an opportunity for the EAB to uncover the practicalities of implementing the WP7 evaluation design, concerns of project partners and approaches to be used, for example in the selection of groups of students who would be the focus of data collection within a classroom.

4.3.4 Meetings of the EAB

Subsequent meetings of the EAB have focused on practical issues surrounding data collection for research purposes from the proposed LA dashboard during interventions in year 2 and onwards. While in the initial meeting Prof Hedgecoe stated that it would be difficult to identify potential issues ahead of design decisions being made, by problematising the evaluation of any interventions using such a technology, several issues subsequently emerged. Following two meetings where these issues remained un-resolved due to their complexity, a meeting was held with the Consortium in Athens in M7 to further flesh out the issues with all relevant partners, revealing in-turn additional unresolved issues which are discussed in the following section.

4.3.5 Periodic review

Following the Consortium meeting and the completion of this report, 6-monthly periodic reviews of the project are planned. This will involve many of the actions described above to review and input into project developments, specifically:

- Meetings of the EAB
    - Independent meetings
    - Part of future Consortium meetings
- Attendance at WP meetings
    - Particularly WP4 and WP7
- Progress reports from WP leads
- Review of ethical precedence for current and future issues that cannot be resolved with existing external guidance or from within the project team's expertise

4.4 Sister projects

Under this funding call there are several Sister projects that have been granted funding. Each of which will face their own ethical dilemmas, specific to their context and technology. However, there is some overlap between projects and for this reason the EAB Chair is in contact with the Sister projects with the aim of identifying shared issues and coordinating approaches.

4.5 National and institutional requirements

All partners within the Consortium are required to ensure that appropriate ethical approval is granted at national and/or institutional level. They are required to ensure that they follow national regulations and where these differ in a way which could undermine the success of

the project will communicate these to the relevant WP leads and Consortium lead at the earliest opportunity.

5 Ethical Issues

This section begins by providing detailed information in Table 1 on how the ethics concerns identified in the review by the Commission and EAB as well as those in the initial project proposal will be addressed, along with who will be responsible for addressing them. This is followed by a subsection which explores the more complex ethical issues which have emerged during EAB meeting discussions and have not yet been resolved.

Table 1 Ethical Question Table

Ethical question	How it will be addressed	Responsibility
What restrictions will there be on Open Access Data?	Only de-identified data will be shared. This will include questionnaire responses, written observations, images of objects created by children and so on. No video, audio or images of children will be shared. Further information can be found in **Deliverable 1.2** the **Initial Data Management Plan**.	WP1 & WP7 – All
Given that the inbuilt age and other safety barriers in nQuire are planned to be removed from the new version created for the project, how will the safety of children be ensured?	To protect the classroom work and details of participating students, the new version of nQuire ('nQuire for students') is password protected. This means that it is only accessible by teachers and students taking part in Exten(dt)2. Accounts to the new version are created by project partners at the Open University and allocated to participating teachers and students. The work of students - that is studies they create - are approved by their teachers (checking for content, language, structure etc) before they become visible on the platform and accessible by those with an nQuire account. The new version of nQuire is a tool for teaching and learning and hence only used by participating schools to achieve project objectives.	WP4 - OU
Who needs access to the backend database for the LA platform?	All access to data will be based on the 'least privilege' principle, meaning that users and processes are only able to access information that they need to complete their given tasks. For example, the teacher will have access to the ID generated by the platform and the real name of their students. Further details are available in **Deliverable 4.1**.	WP4 – Simple
How will LA data be stored?	Data will be stored in Amazon Web Services with embedded security employed from day 0. Full details about the security of data on the LA dashboard and all other project technologies are available in section 3.4.3 of **Deliverable 4.1**.	WP4 - Simple
How has the data collection been designed to ensure the principle of data minimisation is adhered to?	A mapping of data collection and research aims and questions has been undertaken to ensure that minimal data is collected and only for the purposes of this research. Where data could be collected from multiple sources the following principles were applied: ensure data collection activities are not onerous on participants; check whether the data could be	WP7 – TCD WP9 – Prof Hedgecoe

	collected using an existing instrument/approach; check whether the data is already available from an existing source. Year 1 has the most extensive data collection as it draws on exploratory case studies and has the broadest research aims. Subsequent years will involve more narrow research aims, as would be expected in design-based research studies. This will be reviewed as part of the EAB periodic review.	
How will children's assent be assured?	Following standard social science approaches, children will be provided with information about the research that they will be participating in through age-appropriate language. This may take the form of a presentation, explanations and discussions with researchers and teachers, and/or written information. It will be made clear to children which activities and data collection constitutes part of a lesson (which is not optional) and which is research (optional) as well as who will have access to what data. Periodic reminders will also be given.	WP7 – All
How will groups be chosen within the class, to participate in more in-depth research?	Researchers and/or teachers will ask for groups of students who are working together to volunteer for the more in-depth data collection. Two requirements for participation are parental consent (based on the age of the student) and the consent/assent of all students in the group. Full information about the additional data collection and activities these students will be involved in will be given and explained in addition to previous informed consent/assent activities.	WP7 - All
If more groups volunteer than are needed, how will the groups be selected?	There are both practical and ethical points that need to be addressed in selecting groups. Consideration of whether there may be any impediments or advantages to data collection, such as sat next to others who have not given consent/assent to be recorded and may inadvertently appear on camera or in a location that is particularly easy/difficult to set up recording equipment. For the research it is also important to gather data on a broad range of students. While the teacher may have a preference as to which groups are selected, it is	WP7 - All

	important for the research to ensure that students with a variety of backgrounds and characteristics are represented.	
How will power dynamics be addressed?	Power dynamics between adults and children, teachers and their students are relevant to both the WP5 and WP6 evaluations. In WP5 there are concerns both about the natural power imbalance between adults (teachers and researchers) and children and that created by the position of authority held by teachers over their students. There are several approaches to addressing the power imbalance: 1) children involved in the more in-depth research activities will be shown how to turn on and off all recording equipment so that they are given power over what is recorded – and this will be made explicit to them; 2) age-appropriate informed consent/assent information; 3) encouraging children to ask questions about the research which are linked to issues of power, such as 'does my teacher get to see what I write on the survey?'; and 4) making it clear that all students will participate in the learning activities regardless of whether they participate in the research, as they form part of their regular schooling. In the case of students participating in pre- and in-service teacher education (WP6), there is again a power imbalance between teachers (who are often researchers) and their students. Here it will be made clear to students that: 1) all students will participate in the professional development activities, regardless of whether they choose to participate in the research or not; 2) instruments such as surveys will be distributed to all students who can choose whether or not to complete any or all of the survey; 3) survey responses will be anonymous; and 4) making it clear that a choice to participate in the research or not will have no impact on their experience on the course or their final grades.	WP7 - All
How will evaluation data be stored and protected?	Each partner is responsible for the storage and maintenance of data that they collect, according to the DMP. Specific details will be dependent on the national and local requirements of partner organisations, as will the tools used which will also be dependent	WP7 - All

	on institutional licences. However, the following principles will be applied to all personal data: 1) storage and protection in accordance with national Data Protection Acts and GDPR; 2) Stored for a minimum of 5 years; 3) encrypted and stored on password-protected drives; 4) 'least privilege' principle regarding access; 5) regular backups and firewalls; and 6) access to authorised personnel who have undergone relevant training, background checks and agree to maintain confidentiality. For the purposes outlined in the research proposal and as described in the Joint Data Controller Agreement, some data will need to be transferred between partners.	
How will participants' identities be protected?	An established risk of social science research is the identification of participants, who may be able to identify themselves or be identified by others due to contextual information or turns of phrase (for example in a quote), despite all attempts to avoid the same through de-identifying the data etc. This is particularly acute where research involves a small sample as has been noted by several educational researchers. Established ways to address this include pseudo-anonymisation and minimal contextual information given about the school and its setting. However, schools and teachers may wish to have their involvement in research credited and publicised. This is a particular issue with regard to co-production. Information sheets to participants will make clear that this is a risk and full discussions will be had with teachers and schools who wish to be identified as part of the research, whether on project communications, as authors etc.	WP3, 7 & 8 - All
Are there any occasions when participants' identities will be disclosed?	In the case of a child protection concern or evidence of illegal activity, researchers will follow local and national guidelines on reporting.	WP7 - All
Can participants withdraw from the research at any time?	During data collection, participants can choose not to answer questions or withdraw from the study altogether at any time. However, anonymised data cannot be removed once it has been collected (as it will be impossible to determine whose data is whose) and no data can	WP7 - All

	be removed from the study after it has been analysed, or published in an Open Access repository. For this reason, participants will be informed of the dates by which they will need to inform researchers that they wish to withdraw from the study.	

In addition, a Data Protection Impact Assessment (DPIA) has been undertaken and approved by the Data Protection Officer (DPO) at TCD and will be monitored and updated throughout the project to accurately reflect the project developments.

In the case of AI and LA, there are established ethical concerns regarding bias, transparency and fairness, data collection, accountability, privacy and the potential for harm. These are under-researched in secondary education where a variety of stakeholders' views need to be accounted for alongside ethical decision making. At this early stage in the development of the project technologies it is not possible to identify specific concerns, however the EAB together with WP4 are already engaged in an open dialogue about ethical decision making and design. However, the EAB has begun to explore potential issues under the lens of data collection for evaluation purposes. These issues may be mitigated in the design of the LA platform or in the research design. However, in the course of discussions between the EAB and WP leads, it has become clear that some are multi-faceted and need to be viewed through the multiple lenses research, technology and pedagogy. These issues are classed as 'complex' and currently have no clear-cut solution, although multiple options are currently being considered. The following sub-section outlines the current set of 'complex' issues without a solution, which are a matter of ongoing discussion within the project and with the independent external ethics advisor.

5.1 Complex issues without a solution

The following issues are presented in increasing order of complexity and often require consideration of earlier issues. Within each section the issues being explored are outlined with potential solutions and unresolved questions presented.

5.1.1 Stakeholder values

While the issue of stakeholder values in relation to the design of the project technologies is largely addressed in WP4, it provides a starting point for thinking about the complexity of the issues which are discussed below. While the use of LA in education is not new, as a society we have a greater awareness of the data we generate through the various devices we use as well as the potential use and misuse of that data by corporations and governments, both now and in the future. Understandably this leads some to be reticent about any form of data collection in educational settings. Although data driven practices in education have been increasingly adopted, recent research has mainly focused on higher education settings (Slade & Tate, 2019). Ethical aspects related to LA has recently started to gain attention and ethical and privacy concerns as well as stakeholders data literacy and feedback literacy are some aspects that require attention (Gibson et al., 2020).

Classrooms can be contentious spaces with not only students, teachers, parents, unions and policy makers holding views on what should and should not happen within them, but also the media and through them the wider public. The introduction and embedding of emerging technologies in classrooms and as part of classroom practice is just one contentious issue, but one which re-emerges with each new wave of innovation - currently exemplified in the discussions surrounding the potential risks and value of Generative AI and tools such as

ChatGPT-4. Beyond the hype, emerging technologies can lead stakeholders to question the purpose and nature of education in light of new technologies, while others may dismiss the technology as a dangerous risk to teaching and learning.

This project seeks to involve stakeholders in the design of the Learning Analytics from an early stage of the process in order for stakeholders' values and ethical considerations to be reflected in the design. Value Sensitive Design (VSD) is a "theoretically grounded approach to the design of technology that accounts for human values in a principled and comprehensive manner throughout the design process" (Friedman at al., 2013). As such this project will elicit stakeholder values and ethical reflections following the VSD tripartite methodology approach including conceptual, empirical, and technical investigations through involving stakeholders in activities such as workshops, interviews and surveys. In the conceptual investigations both direct and indirect stakeholders will be identified and appropriate methods for eliciting these stakeholders' values will take place. Previously identified values such as transparency, data ownership and control, accessibility of data, validity and reliability of data, institutional responsibility and obligation to act, consent and trust will also be evaluated according to compliance with the global guidelines of ethics in LA (Slade & Tait., 2019). During workshops stakeholders will also be engaged in empirical investigations to examine and evaluate their experiences of the technology concerning the values they consider important, and the technical investigations allow stakeholders to reflect on how values they deem important are hindered or supported by the design. This process is iterative in nature and will as such engage stakeholders throughout the design and development of the LA platform.

While VSD provides a valuable approach to understanding stakeholder values, there are currently open questions within the project about how a representative sample of stakeholders can be obtained. One approach is to focus on RRI issues such as diversity and inclusion of a wide range of stakeholders early on and on an ongoing basis. However, it may be challenging to go beyond existing partnerships that researchers have with schools and engage with those who are not predisposed towards technological innovation in the classroom. Additionally, there are open questions about the extent to which is it both practical and valuable to have input from such a wide range of stakeholders in different countries. It may instead be more valuable to collaborate with a smaller group of stakeholders and focus on educating potential participants and the wider public about data and feedback literacy.

Action: WP4 with support from WP2, WP3, WP5, WP6, WP7 and WP8 - to engage with stakeholders to identify ethical concerns and solutions.

5.1.2 The boundaries of informed consent in educational settings

Within the social sciences, Bosk and de Vries (2004) note that it may not be possible to inform participants of all the risks and benefits of a study. Few educational researchers believe that the educational activities they invite participants to be involved in are risky. It is this Kantian focus on goodwill which allows educational researchers to introduce new learning experiences to learners and study the effects of such an intervention. In the case of edtech, it is a field that combines multiple disciplines and thus different assumptions about the purpose and design of research, as well as the ethical implications. Additionally, the field is often criticised for being overly positive about the potential benefits. While there is a growing critique about the potential of technology in education, including the use of robotics, intelligent tutoring and AI (e.g. Selwyn, 2019), rather than focus on research risks the critique has centred on pedagogical concerns.

Within the context of this research, teachers are co-designers and the primary instructors of the educational activities that students will participate in. They are gatekeepers who volunteer to participate in the research with their class, knowing the technologies that are available to them are in development and maintain their professional role as an educator throughout. However, the boundary between research and professional practice is not clear cut and becomes even more blurred when considered in light of culture, policies and practices at national and local levels. This leads to a series of questions which can easily be addressed based on existing standards in educational research which include:

- Can parents/students opt out of educational activities?
    - No - the activities are integrated into normal lessons and are part of the planned curriculum within the school as decided by the class teacher. To opt out would mean that the student would be deprived of an educational opportunity.
- Can parents/students opt out of research activities?
    - Yes – as is standard practice, participants have to opt in to research and can choose to opt out, or withdraw their consent, at a later point.

More complex questions which are harder to resolve are:

- Who decides which technologies can be used as part of a lesson? Do these need to be approved by senior leadership, school boards, local or national regulators?
- Is there a fundamental difference between a teacher choosing to use an ‘off-the-shelf’ digital tool and one which is designed for the purposes of research? If so, what are the implications for its use and for parental/student informed consent?
- To what extent can parents/students opt out of technology use, particularly the use of online tools which may harvest user data? Both within the context of research and non-research activities.

While the professional role of the teacher within a given context may be key to determining what parents and students can choose to opt into and what they cannot, it remains important

to consider that this research is introducing emerging technologies and that these technologies will be developed using data from their use by teachers and students in the classroom. Again, there are issues relating to stakeholder values - their views on education and the role of technology – however this research operates within the explicitly stated agenda of a digital transformation of education. So, perhaps the more important questions are:

- To what extent do potential research participants need to be informed or educated about the technologies used?
- To what extent can parents/students choose not to participate in data collection, specifically the automated collection of data by project technologies that students will have to use as part of their everyday educational activities as decided by their teacher?

As information sheets and informed consent documents become increasingly long , there are concerns that potential participants will either not read the information and consent anyway (hence the researcher has failed to obtain informed consent), or consider it too onerous or complex, not engage and not consent. Another challenge is how to convey complex information without knowing the background of the audience, their values or concerns. What level of depth is required to ensure informed consent and allay potential concerns?

One approach may be to consider the role of education in the informed consent process. Whether informed consent should be a considered to be a component of a broader educational process (such as the work by Brenner, Brenner and Horowitz, 2009) or education is seen as a tool to improve the informed consent process (Cornoiu et al, 2011), it is clear that education and informed consent go hand-in-hand, with David, Edwards and Alldred (2010) questioning whether 'educated consent' may be a better term. The use of multimedia presentations, information nights, etc are all established approaches to informing teachers, parents and students about research and while it is expected that researchers will be available to answer questions, often it is the teacher who is known to the parent or student who will answer. This may be a valuable opportunity to consider RRI in terms of both ethics and science education for stakeholders and the general public. Increasing an understanding of the work of researchers amongst the general public as well as the potential risks and benefits of emerging technologies away from the media hype can be valuable for all stakeholders. Therefore, multiple avenues for education should be considered to augment informed consent procedures.

From a technical point of view, the ability to opt in or out of data collection can be designed into the existing project technologies. According to the architectural design of the platform, instances of learning tools being used in activities operate with in-memory local databases that reside in the browser for the duration of the session. These local databases are used to store indicators of student interactions with the tools and this (local) data is used to enable adaptable intelligent (automated) support to the learners. At the same time this very same

data is synchronised with a central data repository in order to be used for the production of data analytics. Students could be given the ability to turn on and off the data synchronisation between the local databases and the central data repository. That, in practice, means that automated support will be available but data collection for analytics will be disabled. However, this leads to further ethical issues which are discussed in the final subsection, but before that, we consider the complexity of group work.

Actions: WP4, Simple – explore the technical possibilities; WP7 & WP8, TCD & OU – to explore how education and informed consent could support each other.

5.1.3 Group activities – who's data is it anyway?

In light of the issues surrounding informed consent, it is important to consider whose data we are collecting during group activities. This is pertinent in classroom-based interventions and particularly where students are working in groups with a shared computer. Let's stake the scenario where a group of three students are using one computer. Students A and B have permission from their parents and have assented to participate in the research, while student C does not. Student A logs into the platform using their credentials and navigates to ChoiCo which the group will use to create a game. During the development of their game, students A and B begin to sketch out an idea on paper while student C takes control of the mouse and makes edits within the game. This brings us to a question more common in purely online research (Girvan & Savage, 2012) – how can we confirm the identity of research participants?

From the point-of-view of the system, the researchers and the teacher, there is no way to discern the actions of individual students. Should we therefore exclude any group that includes a student who has not consented to the research from systematic data collection by the platform? What happens when a student (who has been absent for some reason) joins a group part-way through the research and learning activity? Can data no longer be collected from that group?

In terms of the technological development of the platform, the previously proposed solution of a student controlled opt-in, out-out toggle may address the problem. However, this also links to pedagogical concerns which are discussed in the following sections.

Action: WP4, 5 & 9 – identify precedence in the fields of computer science and educational research.

5.1.4 Aggregate dashboard data – balancing pedagogic needs, participant rights and research

While a technological solution to the above issues may be for students to be given the ability to turn on and off the data synchronisation between the local databases and the central data repository, the consequence of this is that data will be excluded from authorable learning

analytics dashboards giving information about the cohort as a whole and individual learners. This data, we argue, is essential for teachers to be able to act in the best interests of all their students.

The dashboard will be designed as an authorable tool for teachers to use as part of their professional practice. However, if not all students are represented in the data, the teacher will be presented with a skewed view of the class and will have no information on individuals or groups who have chosen not to participate in the research. Furthermore, if we accept the decision presented in 5.1.2 that parents/students cannot opt out of educational activities which are part of the standard school day, then to exclude individuals or groups from the data that teachers are using in a professional capacity is to exclude those students from an educational opportunity. Several perspectives on this Catch-22 issue have been discussed by the EAB and with the project Consortium.

One approach is to consider that if teachers have made the decision to use the SMILE LA platform then that should be treated as a pedagogic decision, meaning that all data generated by the project technologies should be collected for use by the teacher. It would then not be optional for students to participate in. Technologically, it would be relatively simple to ensure that only data from students who have given informed consent for their data to be used is provided to researchers. However, the researchers also need to understand how the teacher uses the dashboard to inform their decision making in the classroom. We could rely on self-reported use through surveys or interviews. However, in the context of a busy classroom, teachers are unlikely to remember brief interactions with the technology in sufficient detail to provide meaningful insights to researchers. Currently the expectation is to use screen-capture and/or video recordings to see what elements of the dashboard the teacher engaged with, but this means that aggregate data which includes data from those who have not consented to participate in the research will be recorded.

In this circumstance, parents/students may be willing for their data to be included and could be given this as an option on the informed consent forms. However, as previously noted, as these documents increase in length additional tick-boxes may be ignored, particularly by those choosing not to participate in the research.

Alternatively, considering the decision to use the platform as a pedagogic one and given that the research is focused on the pedagogic decision making of the teacher, we may consider more ethnographic approaches to this question. In general, when conducting research on teachers' pedagogic practice, informed consent may or may not be requested from the students in the classroom. This was recently raised in a THE article by Martyn Hammersley (2023) who writes that "ethics committees' frequent demand that education researchers operating in secondary schools obtain informed consent not only from all participants who

could be observed or may be interviewed, but also from the parents of the children – requiring that they opt in. These requirements are not necessary in most cases to protect participants from harm, and they can stymie effective research" (2023). If informed consent is requested and some students choose not to participate, observations by the researcher would not explicitly mention those students. However, if describing the noise levels in the room, it would be impossible for the researcher to exclude the contribution of noise created by those who have not consented in their descriptions. So the question becomes "how do we balance the pedagogic needs of teachers, the rights of participants and requirements of research, when it comes to aggregated dashboard data that includes data points from those who are not participants in the research?".

At the other end of the solution spectrum is to include the implications of not participating in the research in the information given to parents and students. If a parent/student decides not to participate in the research, they then do so knowing that their data will not be collected by the platform and the teacher will not have that information to base their pedagogic decision making on. Assurances can be given that this will not disadvantage the student as the teacher will continue to employ traditional approaches to monitoring the progress of their students. However, it adds a layer of uncertainty and risk to non-participation which ethics committees and schools may not be comfortable with as gatekeepers to the research. It may also be problematic in the group scenario described in the previous section if parents/students believe that participating in the research (and by extension use of the dashboard) will provide additional pedagogic support to students which they unknowingly are barred from accessing.

At this time the EAB, assisted by the Consortium, is exploring whether there is precedence for this, and other issues described above, in educational research, computer science research and/or social science research in general. Partners have been asked to begin informal discussions with ethical committees within their institutions. It will also be a point discussed with Sister projects to identify universal approaches to this and the other issues.

Action: WP9, TCD with support from LNU, UCL, Simple and OU – identify precedence and potential technical solutions.

6 Conclusion

This report has presented the processes through which the EAB has engaged with the project overall. It outlines how ethical issues previously identified in the ESR and initial proposal are being addressed, as well as identifying and discussing emerging ethical issues which are more complex and lack established approaches to resolve them. For the more complex issues, it is the intersection and conflicting demands and expectations of pedagogy,

technology and research which cause the challenges in identifying solutions. Next steps for the EAB and wider project are:

- Review of the literature to establish precedence in the area
- Discussions with ethics committees to gauge their concerns
- Engagement with stakeholders around the issues, to establish their views and gain consensus regarding possible solutions
- Continuous review of the DMP
- Involvement of the EAB in reviewing the data generated by the LA platform
- Ongoing review of the technology developments and research elements of the project in relation to data collection aspects and ethics.
- Meetings with Sister projects around shared ethical issues

7 References

Alwahaby, H., Cukurova, M., Papamitsiou, Z., & Giannakos, M. (2022). The evidence of impact and ethical considerations of Multimodal Learning Analytics: A Systematic Literature Review. *The Multimodal Learning Analytics Handbook,* p289-325.

Barab, S., & Squire, K. (2004). Design-based research: Putting a stake in the ground*. The Journal of the Learning Sciences, 13*(1), 1-14

BERA (2018). *Ethical guidelines for educational research, fourth edition* (2018). BERA. https://www.bera.ac.uk/publication/ethical-guidelines-for-educational-research-2018

Brenner, L. H., Brenner, A. T., & Horowitz, D. (2009). Beyond informed consent: educating the patient. *Clinical Orthopaedics and Related Research, 467*, 348-351.

Bosk, C.L. and de Vries, R.G. (2004). Bureaucracies of mass deception: Institutional review boards and the ethics of ethnographic research. *The Annals of the American Academy of Political and Social Science, 595*(1): 249–263.

Cornoiu, A., Beischer, A. D., Donnan, L., Graves, S., & de Steiger, R. (2011). Multimedia patient education to assist the informed consent process for knee arthroscopy. *ANZ Journal of Surgery, 81*(3), 176-180.

David, M., Edwards, R., & Alldred, P. (2001). Children and School-based Research: 'informed consent' or 'educated consent'? *British Educational Research Journal, 27*(3), 347-365.

European Commission, Directorate-General for Education, Youth, Sport and Culture (2022) *Ethical guidelines on the use of artificial intelligence (AI) and data in teaching and learning*

for educators, Publications Office of the European Union https://data.europa.eu/doi/10.2766/153756

Flanagan, B., & Ogata, H. (2017, November). Integration of learning analytics research and production systems while protecting privacy. In *The 25th International Conference on Computers in Education*, Christchurch, New Zealand (pp. 333- 338).

Gibson, D., Ifenthaler, D., Baron, M., Downie, J., Elliott, S., Parent, S., Prasse, D., Shimada, A. & Yamada, M. (2020). Putting Learning Back into Learning Analytics: Optimizing Learning Through Analyzing the Data. In Petra Fisser and Michael Phillips (Eds.). *Learners and learning contexts: New alignments for the digital age*, pp.45- 53 https://hal.science/hal-03410063

Girvan, C., & Savage, T. (2012). Ethical considerations for educational research in a virtual world. *Interactive Learning Environments, 20*(3), 239-251.

Hammersley, M. (2023) Social research is being stymied by excessive ethical oversight. *Times Higher Education* 13th April, 2023 https://www.timeshighereducation.com/opinion/social-research-being-stymied-excessive-ethical-oversight

Selwyn, N. (2019). *Should robots replace teachers?: AI and the future of education.* Cambridge, UK: Policy Press

Slade, S., & Tait, A. (2019). Global guidelines: Ethics in learning analytics*. International Council for Open and Distance Education (ICDE)* Retrieved April 19, 2023 from https://www.learntechlib.org/p/208251/

Spikol, D., Ochoa, X., Worsley, M., Di Mitri, D., Cukurova, M., Martinez-Maldonado, R., & Schneider, J. (2021, April).

Appendix A: Minutes of the Ethics Advisory Board

ExtenDT² Ethics Advisory Board

Meeting Minutes 14/02/23

10:30-11:30 (CET) via Teams

Attending

Dr Carina Girvan (TCD) Chair & WP7 lead
Prof. Adam Hedgecoe (Cardiff University) External Ethics Advisor
Johanna Velander (LNU)

Agenda Minutes

#1 Purpose of the Board and Introductions	• CG provides an overview of the WPs and their inter-relation with WP9 • CG reviews primary purpose of EAB • CG, AH & JV introduce themselves
#2 Ethical issues raised by the Commission	General discussion of ethics table from Commission • JV notes that with LA, ethical issues emerge and change. Need a value sensitive design approach to ethics for the LA dashboard development. • AH notes project appears “ethics ready” but its complicated so EAB provides oversight as it progresses. Issues are likely practical. • AH raises practical issues around contracts CG to raise with Shamim @ LNU
#3 Review of project progress	• CG updates EAB on WP progress and emerging issues • WP4 – AH asks who needs access to backend database – helping a student login in, all the way through to data analysis • JV notes teachers can make annotations on data so will need access • CG raises issue of linking ‘click data’ to real-world actions • CG notes at this stage the LA platform will not be used in year 1 except in a small pilot in a single classroom in Greece around M9 • WP4 – AH raises questions about what safety will be inbuilt to nQuire given age and other safety barriers are planned to be removed. • WP4 – AH notes that decisions will need to be made regarding technologies before ethics review • WP7 – AH asks is any particular ethical concerns – CG notes not based on past experience but will share evaluation plans with EAB. CG to send summaries of data collection for WP3, 5 and 6 for EAB review • AH raises that as the technology is in development and the research is evolving over 3 years, ethical review is needed in a timely manner

	(internally) AND applications to institutional ethical review committees should acknowledge this from the start – providing advance warning that the technology and research design will change resulting in further applications
#4 Tasks, priorities and next meeting	Actions to carry forward: • What does 'respond to data mean'? How will EAB achieve this? Dial into team meetings? At what level and stage? To discuss at future meeting • Meeting with all partners running interventions in WP5 to discuss "assent". CG to arrange • AH to review informed consent documents and ethical application material • AH to attend OMT meetings relating specifically to ethics and to meet WP leads CG to make request • Meeting with WP leads and institution leads ahead of deliverable deadline CG to arrange early-mid April • Next meeting: 28th February 10:30-11:30 CET

Minutes circulated to those attending and Shamim Patel (Project Manager)

ExtenDT² Ethics Advisory Board

Meeting Minutes 28/02/23

10:30-11:30 (CET) via Teams

Attending

Dr Carina Girvan (TCD) Chair & WP7 lead
Prof. Adam Hedgecoe (Cardiff University) External Ethics Advisor
Johanna Velander (LNU)

Agenda Minutes

#1 Agenda for meeting	• WP4 and ethical issues • Research design • What does 'respond to data' mean?

#2 WP4 & ethics	• Reminder of points raised at previous meeting – primarily that ethical issues could not be discussed prior to knowing what functionality of the technology • CG raised question about how design might be informed by ethical or RRI concerns • JV explained Value Sensitive Design (VSD) and plans for its use in WP4 • JV identified teachers as the primary users involved • JV noted that WP4 team needs and will be aware that teachers' values may change between initial design and reviewing the data collected from the system • AH raised question of what direct and indirect stakeholders value. • JV explained process of developing prototypes based on initial set of teacher values and then gaining feedback from a wider range of stakeholders • Questions raised: ○ How can the LA platform help teachers make good decisions? To what extent do we assume that the user knows what data to select? – JV to follow-up with WP4 team ○ What happens if parents disagree with teachers, for example collecting less data may make someone less identifiable versus the need for quantity and depth for granularity of decision making. – JV to follow-up with WP4 team ○ How will various stakeholders be involved? – JV to follow-up with WP4 team ○ What happens if parents don't give consent to use the technology? ○ As part of the research, can parents/students opt in/out of the dashboard? ○ How easy is it to not collect data from individuals from whom consent has not been given? ▪ JV and CG discuss technical solutions to collecting data from all students so that teacher has access but that only data from consenting students goes to researchers. – JV to follow-up with WP4 team – how easy is it to exclude students from the datasets and who is going to remove those students (teachers, via the technology?) ▪ AH notes that it is crucial that data is stripped out before researchers receive it ▪ CG notes that this data will be valuable when linked to observational data ○ Linked to this line of questioning, CG asks about how we should treat aggregate data displayed on the teacher's computer that researchers see (through screen recordings or observations as part of WP7) ▪ AH gives examples from NHS research – aggregate data is a part of "everyday practice" which patients cannot

	opt out of and is given to the researchers (in aggregate) This issue is around identifiability and consent in advance. In the NHS case it is not possible to gain consent in advance nor is it possible to identify an individual if pseudo anonymised in advance ▪ CG notes that in ExtenDT2 the data will be pseudo-anonymised but consent CAN be obtained in advance. ▪ Suggestion that consent includes two parts 1) access to child's individual data and 2) access to aggregate data which child will be a part of ▪ Query whether it would be acceptable to simply tell parents that researchers will be doing option 2 ▪ AH raises limits of GDPR – in public interest if the data cannot be collected in any other way and ONLY looking at the aggregate data. ▪ AH queries what will a research ethics committee (REC accept) and suggests that practice may be dictated by this, noting that there will be variability between countries and institutions ▪ CG questions whether we reframe the aggregate data issue as a teacher/school issue. For example, in the UK schools annually publish aggregate data on the exam results obtained by their students. ▪ Query whether it would be acceptable to request permission from the school (as data controller) for access to this data with a guarantee not to publish screenshots etc and for such data only to be reviewed by researchers • Raises linked question about who the data controller is in this situation as the technology is in development ▪ AH suggests we examine what precedent there is regarding aggregate data – CG to contact Manolis Mavrikis from UCL to support the EAB in this ▪ Noted that researchers from different disciplines will have different research practices ▪ Noted that dashboard data is not necessarily collected from an individual but from a group which potentially further problematises consent
#3 Research design – WP7	AH notes that from attending the WP7 meetings and reviewing the documents circulated that there are no obvious concerns regarding ethics beyond standard social science ethical practices, which he feels assured are being followed
#4 Responding to data – WP7	No time to discuss as WP4 discussion ran much longer than expected

	Agree to return to this issue once data collection commences after Easter
#5 Tasks, priorities and next meeting	Actions to carry forward: • What does 'respond to data mean'? How will EAB achieve this? Dial into team meetings? At what level and stage? To discuss after Easter • Return to WP4 issues at meeting with WP and institutional leads at project meeting in Athens • Next meeting: 21st March 10:30-11:30 CET

Minutes circulated to those attending and Shamim Patel (Project Manager)

ExtenDT² Ethics Advisory Board

Meeting Minutes 21/03/23

10:30-11:30 (CET) via Teams

Attending

Dr Carina Girvan (TCD) Chair & WP7 lead
Prof. Adam Hedgecoe (Cardiff University) External Ethics Advisor
Johanna Velander (LNU)

Agenda Minutes

#1 Agenda for meeting	• Data analysis overview • Slot for WP and institutional lead meeting during Athens project meeting • Deliverable 9.1 and AH's report
#2 Data analysis	AH notes from attending WP7 meetings and reviewing documents circulated that there are no obvious concerns regarding the WP7 data analysis approaches With regards to data processing he notes: ▪ No issues with shifting data over borders currently but to maintain a watchful eye on the impact of Brexit over the 3 years of the project ▪ Questions how data will be transferred and notes to avoid email and use FTP/secure file transfer and institutional tools such as OneDrive CG raises potential issues with early draft of DMP regarding LA platform data: ▪ How is data presented to research team? Who needs access to what? ▪ AH suggests that school and teacher names are okay

	▪ Students' names or IDs are needed to link data sets ▪ When data is made open access – all data needs to be anonymised. ▪ What potential is there to identify an individual student based only on a school's name? ▪ To what extent could a 3rd party infer actions and ability of a teacher or student based on data collected by the platform? ▪ AH questions to what extent this data needs to be made open access – if a principal in a school would not have access to it, why should anyone else? ▪ Storing of emails and passwords flagged as a potential issue ▪ AH suggests a mapping of what data can be accessed by whom and for what purpose ▪ Johanna to review DMP and pass on suggestions from EAB
#3 Athens meeting	Issues to raise at Athens meeting discussed: ▪ DMP ▪ Role of EAB in responding to data ▪ Unresolved issue from the previous meeting on aggregate data ▪ What are the standard practices in the research community with regards to the issues raised by the EAB? ▪ What are the potential technological solutions? ▪ What research alternatives are there – recording teachers and their decision making, is it then legitimate to say that we include aggregate data without the informed consent of students and their parents, as the individual student is not the focus? Equivalent classroom research precedent discussed
#4 Report	AH to provide expert opinion on the project overall, issues raised and discussions had CG to provide an overview of ethical issues, how they have been addressed and the more complex issues yet to be resolved
#5 Tasks, priorities and next meeting	• Johanna to review DMP • AH to write independent report • CG to draft Deliverable 9.1 • Next meeting: 31st March, time tbc

Minutes circulated to those attending and Shamim Patel (Project Manager)

Meeting Minutes 31/03/23

10:30-11:30 (CET) face to face in Athens at NKUA and via Teams

Attending

Dr Carina Girvan (TCD) Chair & WP7 lead
Prof. Adam Hedgecoe (Cardiff University)
Independent External Ethics Advisor - online
Johanna Velander (LNU) EAB member - online
Marcelo Mlirad (LNU) PI, WP1 & 4 lead
Alisa Lincke (LNU)
Anthony Scully (LNU) – note taking
Sofia Papavalaopoulou (NTNU) WP2 lead
Isabella Possaghi (NTNU)
Feiran Zhang (NTNU)
Boban Vesin (NTNU)
Christothea Heredotou (OU) WP3 & 8 lead
Sagun Shrestha (OU) - online
Chronis Kynigos (NKUA) WP5 lead
Marianthi Grizioti (NKUA) - online
Christina Gkreka (NKUA)
Maria-Stella Nikolaou (NKUA)
Katia Schiza (NKUA)
Joanna Arampatzi (NKUA)
Jake Byrne (TCD)
Filothei Chalvatza (Simple)
Sokratis Karkalas (Simple)
Manolis Mavrikis (UCL)

Agenda Minutes

#1 Agenda for meeting	• Overview of EAB meetings thus far • Complex issues currently unresolved • DMP • Role of EAB in responding to data • Deliverable 9.1 and AH report
#2 Overview of EAB meetings	▪ CG provided a brief overview of the functioning of the EAB to date ▪ AH provided brief input as external advisor – the main issues are around AI and LA ▪ Reminder from CG for partners to register issues raised by their own ethics committees in the Google Drive and to upload approvals
#3 Complex issues	In describing the issue of aggregate data, several layers of ethical issues had to first be unpacked. Therefore the following minutes note the concerns raised by partners and the EAB: ▪ CH – excluding someone from the LA platform with no consent – we/the teacher have a duty to help all students. If we don't have their information we can't help them ○ CG/MM – this may be how the consent form is used. The difference is the split between data used to help the student (no consent needed) and data used for analytics/research (consent needed)

	○ AH – parents and students don't get to opt out of collecting behavioural data as it is integral to teaching. The question is when data is sent to the research team. The parents don't need to consent to the dashboard being used by the teacher, only when the dashboard is used to transfer data to researchers ○ CH – this is not data collected across the school that the school owns. These are not normal data the school collected ○ JB – we may need the school to classify the data as part of the pedagogical process and this may vary between countries and jurisdictions ○ CG - from a research perspective, we need the aggregate data to understand teacher decision making, which includes students who don't have consent ▪ CH gives a scenario where a parent is fine for their child's data to be used for the school but not for the data to go out of the school. Current preparation for the dashboard assumes permission from parents ○ CK suggests a toggle button to allow data to be visible to the teacher or visible to the project ○ MM another option is to exclude students altogether but that's another ethical question. Could they do an equivalent activity? ○ CG – could some students log into the system and those who have not consented still engage with the technology but not by logging in ○ MM – need to carefully word information sheets to explain how we mitigate the risks and highlight benefits ○ CH – we are trialling something for the first time – we can't show evidence that it improves anything ○ CK/CG – teachers make the pedagogic decision to do the DT activity and students and parents can not opt out of that ○ CH – if students already log into something such as Google Classroom, then it may be normal for parents and students ▪ CG raises issue of individual log on but actions are by multiple students or directed by students who may not have consented to participate in the research ▪ SP/SK – Deliverable 4.1 refers to sensitive data, which should be replaced with personal data ▪ MMavrikis clarifies that IP addresses are not collected ▪ JB questions whether we can use the models for machine learning for people who have not consented ○ SK – we cannot commit ourselves to specific uses as we are experimenting. It is impossible to have consent for things we do not yet know ▪ CG – could one solution be that the teachers gets those with consent to login to the LA platform and non-consenting use the tools via the NKUA website which does not collect data? Would we have something pedagogically viable if the teacher only gets half the data?

	○ CH – the advantage of being in the physical room is that the teacher knows the students ○ CG – what about online only? As a social science researcher, I want o know what the prompts are that make a teacher take certain actions. We can't disentangle the non-consenting child from what is on the teacher's screen as aggregate data ○ SK – technical solution - the system has a local memory database and synchronises this to another database which provides an overview of what is going on. I can give you a button so that the local data can still be gathered, and the student can have a level of support through Authelo, but the data does not end up populating the central database ▪ AH notes that the project team have focused on key things that the EAB have raised and have trouble knowing the answers to. Notes that as a group of researchers the project team is passionately and deeply engaged with not just the scientific but also the ethical issues. Not clear if any of the issues have a clear answer and talking about the issues has revealed more complexity about how data is managed
#4 Report	• AH asks what partners expect from his report ○ CG/CK/MMilrad – reiterate what AH has already said about project progress; ask the Commission to consider putting more specific requirements about EABs within projects in future calls
#5 Tasks, priorities and next meeting	• DMP and responding to the data undiscussed due to time limits. • All partners – list ethics committee issues and upload ethics approval to Drive folder • CG to write Deliverable 9.1 • AH to write independent report • All partners – look for precedence to issues discussed • Next meeting: tbc

Minutes circulated to those attending and Shamim Patel (Project Manager)

Appendix B: Report by the Independent Ethics Expert

Method: In drafting this report I had access to both the original Exten.D.T.2 technical application (including the Ethics Self-Assessment) and the REA ethics summary report (dated 26/01/2022). I attended 3 EAB meetings (14th February, 7th March, 21st March), one WP7 (evaluation) team meeting (17th February), an OMT meeting (10th March) and the team meeting on 31st March.

The original **technical application** acknowledges that the developing nature of Learning Analytics as a field means that there remain significant uncertainties, including ethical aspects of the technology around, for example, biases, transparency and trust.
The **Ethics self-assessment**, included as part of the technical application highlights issues around Human Participants (such as consent, data protection and the involvement of children in research), Personal Data and Artificial Intelligence, flagging that Multimodal Learning Analytics (LA) such as those included in this research have been associated with ethical issues around the granularity of data (and hence participants identifiability) and surveillance.

When discussing the issues around informed consent, the self-assessment notes the need, in the case of children, for consent from both the child in question and their parents and the collection of personal data is described as "minimum", with shared data (between consortium partners) being anonymous and encrypted.

The **Ethics Summary report** (ESR) produced as part of the formal review of the application notes that while the formal application addresses many of the ethics issues raised by this research the "the list is not exhaustive" and that ethics guidance (from the EAB) is required "to ensure that the data minimization principle is respected and to assure that no pressure is put on the children, whose assent is important yet difficult to obtain."

Ethical issues in Exten.D.T.2
Many of the ethical issues raised by this research project are standard for social science research involving human participants and have been addressed by the research team in a thoughtful and comprehensive way. For example, **WP3** involves co-design of teaching materials involving both researchers but also participants, such as teacher trainers and teachers; while the focus of this activity is the production of teaching and training materials, the research team acknowledge that there are issues around collection of **personal data** from the meetings/focus groups where this co-design will take place. The solution offered is to transcribe the meeting recording into a de-personalised transcript and then delete the original recording. This complies with good practice around data minimization.

As is often the case with classroom research in education, issues around **consent to participation in research** require deft handling. At a basic level, consent to a child's participation requires written consent from parents and the assent of the child – with the child's opt out of research paramount. Further consideration of consent issues can best be seen in **WP7**, which will involve the collection of qualitative and quantitative data on steadily increasing numbers of students participating in **WP5** activities (from c.100 students in the pilot to c. 1300 in the third cycle). The challenge here is that it is unlikely that all students in a classroom will have consented to being involved in research. Researchers therefore need to limit the data collected in the classroom to only those students with both student and parental consent. In the case of observations and field notes, such focused data gathering is relatively straight forward. In the case of video recording, the Exten(DT)2 team have decided either to focus recording on one section of the classroom (i.e. containing only consented students) or to not record at all and rely on observation and fieldnotes. Such solutions are common practice in classroom research, allowing the gathering of data while at the same time respecting participants' consent. The classroom focus groups will be selected according to consent, self-selection, teacher preferences and practical issues (such as where in the room the group are meeting). Further consent is enabled in the small group work where control over recording will be given to students, allowing them to pause recordings when they want.

Discussions around consenting to researchers' access to data have highlighted potential issues around the representation and analysis of aggregate data in the classroom. When children are engaged in a classroom activity, data from their performance will be presented to the teacher in the form of a 'dashboard'. While the subsequent transfer of individual student's data to researchers can be filtered to remove non-consenting children, it is possible that the researchers will record the aggregate data on a teacher's screen when videoing. While this data cannot be used to identify individual students it will include data from students who have not consented for their data to be provided to the research team. This issue was a key point of the ethics portion of the team meeting on the 31st of March, a discussion characterized by an intense focus on both the technical possibilities for the control of access to non-consented data and serious minded – and sometimes passionate – engagement with the ethical issues. As an independent ethics advisor I was impressed by the seriousness with which these issues were debated; a tentative solution proposed is that non-consenting kids should not log into SMILE, but use it via another platform. Students do the activity but the teacher only gets dashboard information from consenting children. However, because the research is being conducted in normal teaching classes, there remains the question of whether this way of collecting data limits how much information the teacher will get and makes it harder for them to support students who are struggling.

In terms of the next steps the **Progress review** will focus on:

- **A review of the Data Management Plan, paying particular attention to issues around the transfer of data and the storage (or not) of personal data (such as student names).**
- **Detailed review of the multimodal LA proposed for this project, paying specific attention to the kind of data being gathered (especially those data that might be seen in personal terms – gestures and movement) and the ways in which the EAB might engage with data analysis.**

As independent ethics advisor, I believe that the current ethical status of this project is strong, not just in terms of the pre-agreed approaches but also in terms of the research team's willingness to discuss potential ethical challenges of the programme of work in an open and mature manner.