Draft Project plan for the CEN Workshop on "eXtended Reality (XR) for Learning and Performance Augmentation"

Requests to participate in the Workshop and/or comments on the project plan are to be submitted by 2022-08-15 to futrilla@une.org[1]

Recipients of this project plan are kindly requested to name all patent rights known to them to be relevant to the Workshop and to make available all supporting documents.

2022-05-17 (Version 0.8)

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[1] Applications for participating in the Workshop and comments on the project plan that are not received by the deadline do not need to be taken into consideration. Once constituted, the Workshop will decide whether or not to consider the comments received in good time.

Contents

Summary

Virtual and Augmented Reality, often subsumed under the term 'eXtended Reality' are approaching a level of maturity, affordability, and public mindshare, where explosive growth can be expected, with high expectations for a new major wave in Personal Computing. These technologies offer an alternative sensory experience to reality like fully-immersed or augmented views of the real world. The role of these technologies for learning and as performance aids is evident, quite likely affecting the future of education and the future of work significantly. Current standardisation relevant to learning and performance augmentation with XR technologies is scarce, incomplete, with existing work scattered across standardization organizations and committees. For this reason, we seek to establish this workshop to perform as an observatory and as springboard for concertation, drawing together the work in a workshop agreement.

1 Status of the project plan

Draft project plan for commenting and approval (Version 0.8)

This draft project plan is intended to inform the public of a new Workshop. Any interested party can take part in this Workshop and/or comment on this draft project plan. Please send any requests to participate or comments by e-mail to **futrilla@une.org**.

All those who have applied for participation or have commented on the project plan by the deadline will be invited to the online kick-off meeting of the Workshop on **2022-09-09**.

2 Workshop proposer and Workshop participants

2.1 Workshop proposer

Person or organisation	Short description and interest in the subject
The Open University (UK)	The Workshop is an initiative of the ARETE project (Augmented reality interactive educational system), which has received funding from the European Union's Horizon 2020 research and innovation framework programme under grant agreement No 856533. University College Dublin is coordinating the project and The Open University is leading the standardization tasks.
University College Dublin (Ireland)	

2.2 Other potential participants

The following members of the ARETE project have stated their intention to take part in the Workshop:

- Cleverbooks Ltd (Ireland)
- Wordsworth Learning Ltd (Ireland)
- Stichting VU (Netherlands)
- University of Durham (UK)
- European Schoolnet - EUN Partnership AISBL (Belgium)
- Consiglio Nazionale delle Ricerche (Italy)
- Julius-Maximilians-Universitaet Wuerzburg (Germany)
- Fundacion Centro de Tecnologías de Interacción Visual y Comunicaciones VICOMTECH (Spain)

2.3 Participants at the kick-off meeting

Person	**Organisation**
Workshop proposer	Workshop proposer
Workshop secretariat	Workshop secretariat

2.4 Registered Workshop participants

Person	**Organisation**
Workshop Chair	Workshop Chair
Workshop Vice-Chair	Workshop Vice-Chair
Workshop secretariat	Workshop secretariat

3   Workshop objectives and scope

3.1 Background

eXtended Reality (XR) is the umbrella for Virtual, Mixed, and Augmented Reality (VR/MR/AR), relating in varying degree from the use of digital overlays to fully rendered immersive alternate views of a physical world, where objects are registered in 3D and user interaction is responsive to the user's surrounding in real-time. XR is increasingly used in education and training to support learning, practice, or even guide performance.

The number of active mobile AR users world-wide is predicted to hit 1.7bn by 2024[2]. The wider XR global market is valued at $30.7bn for 2021 already, with education being the second most disrupted sector (after healthcare)[3].

Standards, however, are scarce, incomplete, with existing work scattered across standardization organizations and committees. For example, existing relevant standards work is not necessarily conducted under the auspices of learning technology standards committees but can also be found in hardware-oriented, industry-focused, or human-computer interaction sponsorship. Moreover, several existing standards applicable to learning technologies at large focus on web and mobile apps and thus fall short of considering specificities of the new XR medium, delivery and interaction devices, and related management and usage protocols.

The proposed Workshop seeks to remedy this situation and take charge, from a European perspective, by stock taking of existing relevant work scattered across agencies and committees, elaborating a recommendation for a

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[2] https://www.statista.com/statistics/1098630/global-mobile-augmented-reality-ar-users/

[3] https://www.statista.com/topics/6072/extended-reality-xr/#dossierKeyfigures

holistic portfolio (including application profiles of existing standards where appropriate), linking, licensing, and extending existing work also from other standards bodies for the blind spot areas in the canon.

The motivation for the creation of the Workshop is foremost the transfer of knowledge from the research and innovation activities within the ARETE project (Augmented reality interactive educational system), which has received funding from the European Union's Horizon 2020 research and innovation framework program under grant agreement No 856533.

Standardization is one of the most powerful tools within technology and educational infrastructures, influencing the competitive dynamics and strategies of companies within the sector. Standardization is of special importance now more than ever to support the digital disruptive transformation in education globally. But there are areas, identified as being critical for the success of a disruptive educational platform economy, not covered by the work program of existing standardization technical bodies. Therefore, for ARETE it is important to recognize the benefits of the standardization process and to address findings within the outcomes of the project that could improve the European and the global map of standards in education.

A CEN Workshop is the proposed approach due to the required agility to include the standardization work into the limited timeframe of a European research and innovation project. Other available standardization options do not match this requirement. Upon this, the WS offers other advantages, which have made the CWA the most usual standardization tool used by research and innovation projects:

- Open participation: The Workshop Agreement allows the involvement of the industry and other players (laboratories, AR component manufacturers, integrators, application developers, etc.) as the workshop is open to anyone, including non-European participants, and the opportunity to participate is widely advertised in advance by CEN/CENELEC and the promoters. This guarantees that the different views of the stakeholders interested in the document are considered.
- Transparency: Public commenting periods at the starting point and prior to the publication of the CWA are available through the CEN/CENELEC webpage, together with updated information on the WS.
- Free availability of the resulting CWA: It is expected that the CWA is open for free download from the CEN/CENELEC webpage, being the relevant cost covered by ARETE. This will facilitate its dissemination and use by the target stakeholders.
- Expected use for further standardization works: As a first standard approach, the CWA can be upgraded to, or used as a first input for the development of new standards by the relevant technical committees (e.g. CEN/TC 353).

3.2 Scope

The objective of the Workshop is to elaborate a CEN Workshop Agreement (CWA) "**eXtended Reality (XR) for Learning and Performance Augmentation - Methodology, techniques, and data formats**". It will aim at drawing up a comprehensive set of specifications relevant for the creation, delivery, and deployment of XR learning experience, including proposals related to sharing of XR-enriched learning activities and 3D Augmented Reality learning objects. Where appropriate, the workshop agreement will link with existing work in CEN/CENELEC and other standards bodies. The CEN Workshop Agreement will define common methodology, and detail techniques, technologies, interoperability specifications, and practice agreements or policies that should be employed (e.g., authoring toolkit, educational analysis technique, device management) to advance knowledge exchange and facilitate competence development in heterogeneous application contexts.

The CWA will not define requirements related to educational aspects.

The following key areas will be screened for inclusion, some of which linking with existing standards:

- **Quality:** Quality of digital 3D educational objects.
- **Content Models: Learning Experience**: AR Learning Experience Model (linking with IEEE P1589).
- **Retrieval:** Metadata for AR based Learning Experiences, possibly including a Learning Object Metadata (LOM) application profile.
- **Analytics:** Learner experience logging, possibly including an Experience Application Programming Interface (xAPI) application profile and other advances in educational data analytics of 3D experiences.
- **Usability:** Usability and effectiveness of AR based education.
- **Sharing:** Multi-user communications in AR educational settings.
- **Ethics:** Ethics and policy deliberations for XR in education.
- **Human Factors:** standards relevant to safety, cleaning, security, accessibility
- **Mapping and positioning:** AR education cloud

The planned CEN Workshop Agreement is intended to be used by:

- Educational providers to establish targets for XR learning content services provided and boost resilience of the XR learning and performance augmentation infrastructure, ensuring that there is a complete and systematic way of setting up a service for teaching and learning anytime anywhere with 3D experiences.
- Educational managers, intermediaries, and regulators (like departments of education on member state level, educational infrastructure providers, school systems) to systematically identify appropriate enhancing actions and ensure effective allocation of digital learning resources for the provision of education anytime anywhere.
- Investors to properly allocate resources to 3D content infrastructure.

The planned CEN Workshop Agreement is not intended to be used for certification purposes.

3.3 Related activities

The intended CEN Workshop Agreement (CWA) is within the scope of CEN/TC 353 'Technologies supporting education and learning processes'. Following Guide 29, CEN/TC 353 has confirmed that the CWA will not conflict with any CEN/TC 353 published or under development standard, and agrees with the establishment of the Workshop. It is invited to take part in the Workshop. Once published, the CWA can be considered by this CEN/TC for future inclusion in their work plan.

Other technical bodies and organizations developing related to activities on AR but not only focused on learning applications are listed below. Information on the creation and the outcomes of the Workshop will be sent to them:

- ISO/IEC JTC 1/SC 24 'Computer graphics, image processing and environmental data representation'
- ISO/IEC JTC 1/SC 29 'Coding of audio, picture, multimedia and hypermedia information'
- ISO/IEC JTC 1/SC 36 'Information technology for learning, education and training'
- ETSI ISG 'Augmented Reality Framework'
- IEEE LTSC
- IEEE P2048 Working Group on 'VR/AR Standards'
- IEEE P1589 Working Group on 'Augmented Reality Learning Experience Models'
- IEEE Global Initiative on 'Ethics of Extended reality'

4   Workshop programme

4.1 General

The estimated duration of this Workshop is 11 months from the kick-off meeting. Due to travel restrictions related to the COVID-19 pandemic, the delivery of the Workshop in blended format or online and the virtual participation will be possible.

The CWA will be drawn up in English (language of meetings, minutes, etc.). The CWA will be written in English.
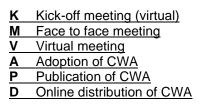
The Kick-off meeting will take place online on 2022-09-09.

4.2 Workshop schedule

Workshop schedule is initially planned as shown in table 1. Since a significative participation of external experts is foreseen, the optional stage of public commenting will be held or not, depending on the time needed for the development and agreement on the CWA.

Table 1: Workshop schedule (preliminary)

CEN Workshop	Mar 22	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	Apr 23
Initiation														
1. Proposal form submission and														
2. Project plan development														
3. Open commenting period on draft project plan (mandatory)														
Operation														
4. Kick-off meeting														
5. CWA development														
6. Open commenting period on draft CWA (optional)														
7. CWA finalised and approved by Workshop participants														
Publication														
8. CWA publication														
Dissemination (see 7)														
Milestones							K	V	V/M	V	V/M		V	P D

K   Kick-off meeting (virtual)
M   Face to face meeting
V   Virtual meeting
A   Adoption of CWA
P   Publication of CWA
D   Online distribution of CWA

5   Resource planning

Both registration and participation at the Workshop here are free of charge. The management costs of the Workshop will be covered by resources from the ARETE project.

The use of electronic meetings will be preferred. Nevertheless, in the case of physical meetings, they will be held in Europe and each participant must bear his/her own costs for travel, accommodation and subsistence.

The CWA will be published by CEN/CENELEC and made publicly available through CEN/CENELEC and the different standardization Institutes in the member states at normal costs in line with the guidelines in CEN/CENELEC Guide 10. It is foreseen that the CWA can be also freely downloaded from the CWA Download Area on the CEN/CENELEC webpage.

The copyright of the final CWA will be at CEN/CENELEC. The final document will include the following paragraph: "Results incorporated in this CEN Workshop Agreement received funding from the European Union's HORIZON 2020 research and innovation program under grant agreement number 856533".

6   Workshop structure and rules of cooperation

6.1 Participation in the Workshop

The Workshop will be constituted during the kick-off meeting. By approving this project plan, the interested parties declare their willingness to participate in the Workshop and will be formally named as Workshop participants, with the associated rights and duties. Participants at the kick-off meeting who do not approve the project plan are not given the status of a Workshop participant and are thus excluded from further decisions made during the kick-off meeting and from any other decisions regarding the Workshop. All Workshop participants shall sign the registration form stating their contact information and accepting the participation rules from CEN/CENELEC.

As a rule, the request to participate in the Workshop is closed once it is constituted. The current Workshop participants shall decide whether any additional members will be accepted or not.

Any new participant in the Workshop at a later date is decided on by the participants making up the Workshop at that time. It is particularly important to consider these aspects:

a.   expansion would be conducive to shortening the duration of the Workshop or to avoiding or averting an impending delay in the planned duration of the Workshop;
b.   the expansion would not result in the Workshop taking longer to complete;
c.   the new Workshop participant would not address any new or complementary issues beyond the scope defined and approved in the project plan;
d.   the new Workshop participant would bring complementary expertise into the Workshop in order to incorporate the latest scientific findings and state-of-the-art knowledge;
e.   the new Workshop participant would actively participate in the drafting of the manuscript by submitting concrete, not abstract, proposals and contributions;
f.   the new Workshop participant would ensure wider application of the CWA.

All Workshop participants who voted for the publication of the CWA or its draft will be named as authors in the European Foreword, including the organisations which they represent. All Workshop participants who voted against the publication of the CWA, or who have abstained, will not be named in the European Foreword.

6.2 Workshop responsibilities

The Workshop Chair is responsible for content management and any decision-making and voting procedures. The Workshop Chair is supported by the Workshop Vice-Chair and the responsible Workshop secretariat, whereby the Workshop secretariat will always remain neutral regarding the content of the CWA(s). Furthermore, the Workshop secretariat shall ensure that CEN-CENELEC's rules of procedure, rules of presentation, and the principles governing the publication of CWA(s) have been observed. Should a Workshop Chair no longer be able to carry out her/his duties, the Workshop secretariat shall initiate the election of a new Workshop Chair. The list below covers the main tasks of the Workshop Chair. It is not intended to be exhaustive.

– Content related contact point for the Workshop
– Presides at Workshop meetings
– Ensures that the development of the CWA respects the principles and content of the adopted project plan

  – Manages the consensus building process, decides when the Workshop participants have reached agreement on the final CWA, on the basis of the comments received
  – Ensures due information exchange with the Workshop secretariat
  – Represents the Workshop and its results to exterior

The Workshop secretariat, provided by a CEN national member, is responsible for organising and leading the kick-off meeting, in consultation with the Workshop proposer. Further Workshop meetings and/or web conferences shall be organised by the Workshop secretariat in consultation with the Workshop Chair. The list below covers the main tasks of the Workshop secretariat. It is not intended to be exhaustive.

  – Administrative and organisational contact point for the Workshop
  – Ensures that the development of the CWA respects the principles and content of the adopted project plan and of the requirements of the CEN-CENELEC Guide 29
  – Formally registers Workshop participants and maintains record of participating organisations and individuals
  – Offers infrastructure and manage documents and their distribution through an electronic platform
  – Prepares agenda and distribute information on meetings and meeting minutes as well as follow-up actions of the Workshop
  – Initiates and manage CWA approval process upon decision by the Workshop Chair
  – Interface with CEN-CENELEC Management Centre (CCMC) and Workshop Chair regarding strategic directions, problems arising, and external relationships
  – Advises on CEN-CENELEC rules and bring any major problems encountered (if any) in the development of the CWA to the attention of CEN-CENELEC Management Centre (CCMC)
  – Administrates the connection with relevant CEN or CENELEC/TCs

6.3 Decision making process

Each Workshop participant is entitled to vote and has one vote. If an organisation sends several experts to the Workshop, that organisation has only one vote, regardless of how many Workshop participants it sends. Transferring voting rights to other Workshop participants is not permitted. During voting procedures, decisions are passed by simple majority; abstentions do not count.

If Workshop participants cannot be present in the meetings when the CWA or its draft is adopted, an alternative means of including them in the voting procedure shall be used.

7   Dissemination and participation strategy

CEN/TC 353 and other interested technical bodies and organizations will be informed about the WS and invited to take part. Additionally, selected stakeholders will be also invited. In particular, the participation of representatives from National educational providers and/or educational content developers is considered very valuable, and contacts will be made to promote it.

Other communication channels will be used to disseminate the CWA and promote its use, like the ARETE project own web and social media, UNE and CEN/CENELEC official channels.

It will be also promoted during iLRN 2022, the 8th International Conference of the Immersive Learning Research Network (Vienna, June 2022).

8   Contacts

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