

01 Teaching Emerging Media in collaboration with Industries Research



EMERGING MEDIA EXPLORATION



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O1 Teaching Emerging Media in collaboration with industries Research

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O1 Teaching Emerging Media in collaboration with industries

Introduction

The Erasmus+ Strategic Partnership Emerging Media Exploration (EMEX) was conceived to develop collaborative teaching approaches to explore the impact of new and emerging media technologies on the future of storytelling and the society. For both creators and users, emerging media transforms the way we perceive and think about the world. We want to educate skilled and reflective media professionals and prepare them for a successful career in the ever-changing media business.

In the context of EMEX, we understand the term Emerging Media to mean new forms of media that know neither established formats nor well-defined workflows and mature tools.

Primary target groups were students and teachers in design, arts and media technology. Students need access to emerging media technology in order to improve their employability in the competitive labour market of the media industry. Teachers also need first-hand access to new developments in the field to update their curricula and courses to match the developments of the market. Secondary target group are industry partners from media technology research institutes and start-ups, who often cannot test their products in an authentic production environment for reasons of resources.

The main objective of EMEX was the creation of a “blended mobility” project-based learning curriculum on the theme of Emerging Media, integrating international online courses, intensive on-site workshops, industry partnerships and shared minor curricula for Erasmus students.

The project followed these sub-objectives:

- creation of a framework for a blended mobility curriculum on Emerging Media
- establishment of an international minor programme for bachelor students in media and design study programmes with mutual recognition of modules in the domain of Emerging Media
- development of online course formats to prepare students and teachers for both short and long-term mobility actions between the participating universities.
- creation of prototypical content, formats and playful content for new media platforms and technologies in student-led exploration projects in collaboration with industry partners.
- creation of learning material on different Emerging Media topics together with industry partners.

- continued discourse about the societal impact of new media technologies.

Study Design

To further inform the design and implementation of a cross-national emerging media curriculum, the EMEX consortium conducted surveys among the consortium members, companies, and universities beyond the EMEX consortium.

The aim of the study was to triangulate the needs and goals of an emerging media curriculum from the perspectives of the teachers in the EMEX consortium. Through qualitative surveys and interviews, good practices in three distinct areas were investigated:

- teaching of Emerging Media to students,
- collaboration with companies which act in the realm of Emerging Media,
- virtual and blended mobility (including virtual collaboration).

The research used a purposive sampling technique with the aim of eliciting the status quo of knowledge on emerging media inside the consortium and comparing it to the needs and goals of outside stakeholders. While purposive sampling may limit the external validity of the research, EMEX was designed as a practice-oriented explorative project, investigating how universities today teach Emerging Media and to discover inspiration and ideas to innovate teaching emerging media.

The internal sample comprises 15 teachers at the participating universities which teach in the area of Emerging Media. A qualitative online questionnaire was designed to capture the current practice in teaching emerging media and in undertaking collaborations with industry. All questions were open full-text fields.

For the external university interviews, the interview partners were chosen because of unique projects or structures in the realm of at least one of the three good practice areas mentioned above. Based on the answers from the internal survey, an interview guide was conceived that covered teaching of Emerging Media, industry collaboration and blended mobility concepts. The interviews with FH Potsdam and IMLEX (University of Eastern Finland) were recorded and transcribed. The other interviews were done via email.

For the company interviews, the sample was selected to represent a diverse number of companies in different areas of Emerging Media and of different sizes. The interviews were conducted orally and the interviewers directly noted down the answers. The interview guide was derived from the “industry collaboration” section of the external university questionnaire by rephrasing the questions from industry perspective.

Data Analysis

Internal good practice data, industry interviews and external good practice data were analysed separately using a single inductive approach in accordance with Elo & Kyngäs, 2008. In each of the three parts of the study, two researchers collaborated in coding and categorization.

This document summarizes the analyses and findings of the research undertaken and shall provide a basis for identifying collaboration modes, partner needs and student competencies to feed into the EMEX curriculum framework and course design.

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1 Best practices inside the consortium

Summary and Analysis

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Introduction

The initial research phase of the Emerging Media Exploration (EMEX) project set out to identify existing 'good practices' within the consortium by inviting representatives from each partner to provide information on how they are addressing emerging media across a variety of contexts. The aim was to gain insights into our current practices by examining the recommended tools, processes, competencies and existing challenges for the study of emerging media, as well as examining examples of previous student-industry collaboration.

Methodology

An open-ended survey was circulated amongst the consortium partners (via Google Forms) as a means of eliciting authentic and expansive data. Open-ended surveys have been shown to be extremely useful in helping to explain or gain insight into organisational issues by addressing the different perspectives and experiences of a range of respondents (Sproull, 1988; Jackson & Trochim, 2002). The survey questions [Fig. 1.] centred around two core topics: 1) previous and existing applications of emerging media within the consortium; and 2) examples of student-industry collaboration.

By using Google Forms, the data was automatically collated into a spreadsheet; this data was then extracted as individual transcripts for further review. Qualitative content analysis was undertaken via an inductive approach in order to code the verbatim survey responses into a meaningful set of categories

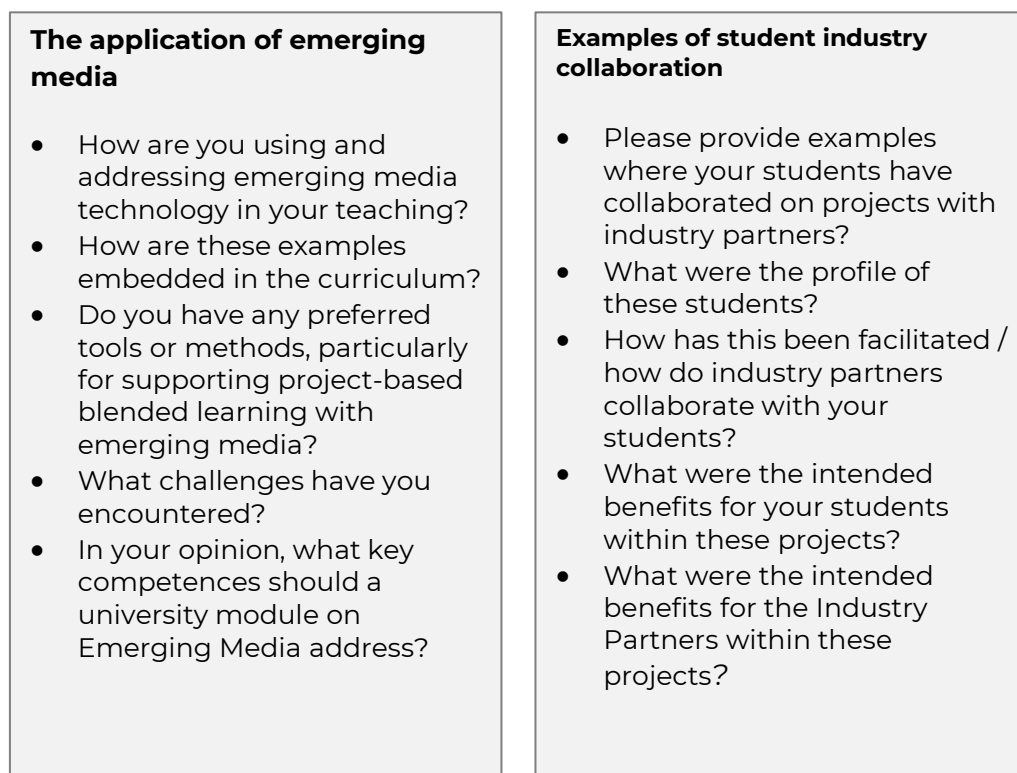


Figure 1. The open-ended survey questions circulated to EMEX partner

(Lavraka, 2008), where the indexing and categorisation of the data emerged in relation to the transcripts. An inductive approach is appropriate when prior knowledge regarding the phenomenon under investigation is limited or fragmented (Cho & Lee, 2014: 4). Rather than starting with preconceived codes or categories, as found in the deductive approach to content analysis, the inductive approach draws codes, categories, or themes directly from the data (Cavanagh, 1997; Cho & Lee, 2014).

There were 15 respondents in total [Fig 2], with representatives from each of the partner universities - Film University Babelsberg Konrad Wolf (FUB), University of Lincoln (UOL), Tampere University of Applied Sciences (TAMK), University of Tampere (UT) and University of Central Lancashire (UCLAN). Two of the respondents were representatives from our consortium industry partners, Rundfunk Berlin-Brandenburg (RBB) and Finnish Broadcasting Company (YLE). The range of respondents included lecturers, professors and learning advisors from a variety of media contexts (including media production, media studies, animation, creative technologies, new media and emerging media production), while the industry partners provided a professional perspective from their backgrounds in production development and project innovation.

Name	Partner Institution	Role/Position	Reference Key
Lena Gieseke	Film University Babelsberg Konrad Wolf	Professor, Visual Media Technologies	LG FUB
Angela Brennecke	Film University Babelsberg Konrad Wolf	Professor, Audio & Interactive Technologies	AB FUB
Björn Stockleben	Film University Babelsberg Konrad Wolf	Professor, New Media Production	BS FUB
Pierre Depaz	Film University Babelsberg Konrad Wolf	Research Associate	PD FUB
Stephen Fisher	University of Lincoln	Learning Advisor, Digital Media	SF UOL
James Field	University of Lincoln	Senior Lecturer, Media Production	JF UOL
Martyn Thayne	University of Lincoln	Senior Lecturer, Media Production & Media Studies	MT UOL
Carita Forsgren	Tampere University of Applied Sciences	Senior Lecturer, Emerging Media Production	CF TAMK
Kirsi Karimäk	Tampere University of Applied Sciences	Senior Lecturer, Emerging Media Production	KK TAMK
Tuomo Joronen	Tampere University of Applied Sciences	Lecturer, Animation	TJ TAMK
Markku Turunen	University of Tampere	Professor, Interactive Technology	MT UT
Onno Baudouin	University Central Lancashire	Senior Creative Technologist	OB UCLANn
Pierre Simmons	University Central Lancashire	Course Leader, School of Journalism, Media & Performance	PS UCLAN
Olli-Pekka Salli	Finnish Broadcasting Company	Development Producer / Financial Producer	OPS YLE
Annette Wilson	Rundfunk Berlin-Brandenburg	Head of Innovation Projects	AW RBB

Figure 2 - Respondents to EMEX consortium survey

The application of emerging media within the EMEX consortium

The first set of questions sought to understand how emerging media technology and practices are currently being addressed by the EMEX partners in their study programmes. The responses suggest that emerging media are being applied in three principal contexts: 1) curriculum content, 2) curriculum delivery, and 3) extra-curricular projects. The responses to these first set of questions have been further categorised into four main themes, with a number of related sub-themes [Fig. 3].

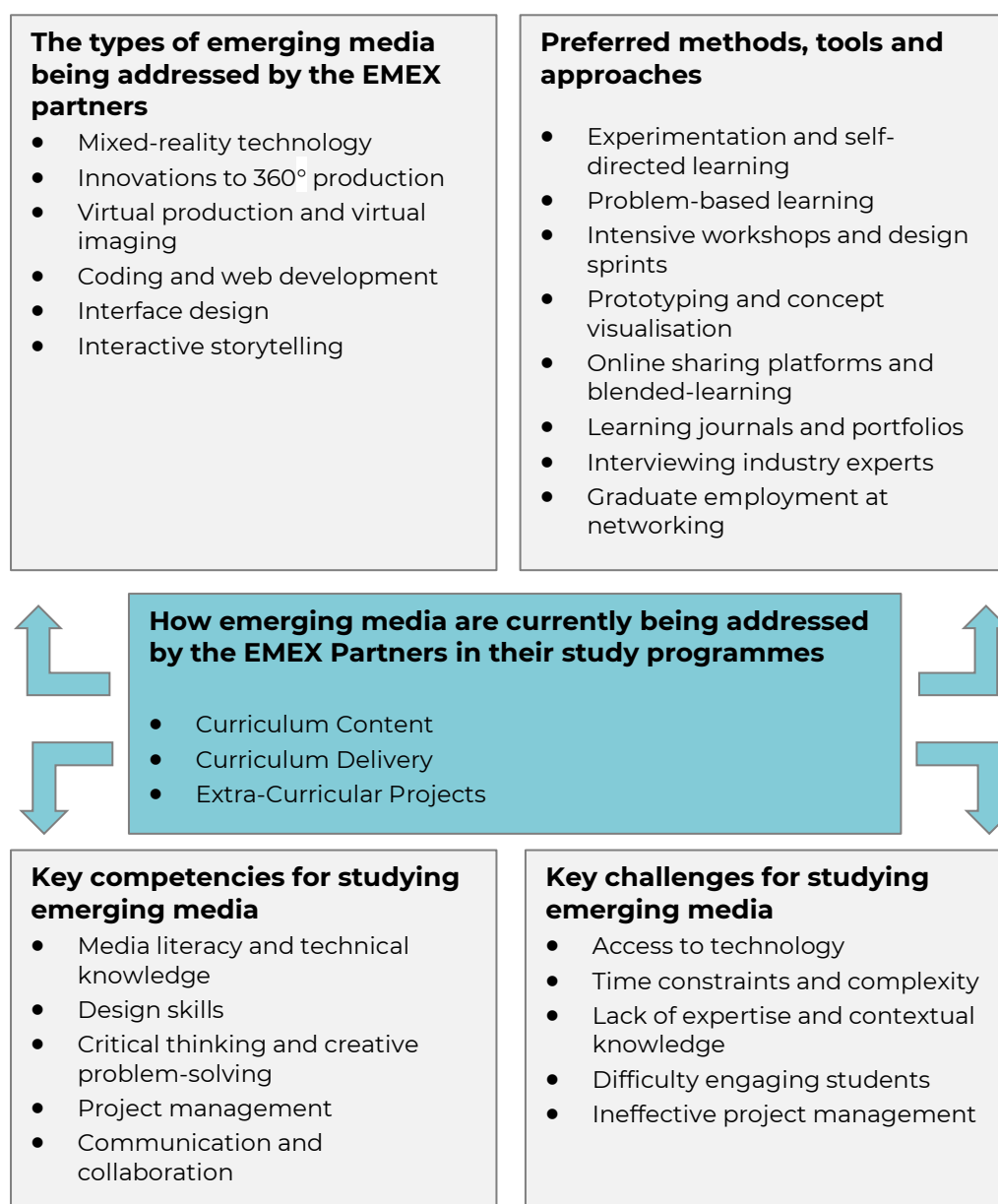


Fig. 3 - Categorising the application of emerging media technology within the EMEX consortium

Curriculum content and delivery

Emerging media is currently being addressed by all the University partners, although the degree to which this can be considered the central focus of study programmes does vary. For TAMK, emerging media is a key component of their minors for Visual Design, Animation and Emerging Media, where they both 'use and teach emerging media technology' [CF TAMK]. Emerging media is likewise

considered 'integral' for those teaching human-technology interaction at UT [MT UT]. Emerging media practices are explored at length throughout these courses, with lecturers and teaching staff developing the necessary expertise in order to deliver this content.

Elsewhere, emerging media is a regular focus of lectures and student projects, where students are provided instructions on how to use different tools and then tasked with acquiring further independent knowledge [LG FUB]. UCLAN, for example, has a number of modules where the rudiments of coding are taught alongside the study of emerging media, where students are required to research a range of technological developments [PS UCLAN]. Students at the partner universities are also often required to produce prototypes and concept visualisations in a variety of emerging media contexts [BS FUB; MT UOL]. Annette Wilson notes that RBB addresses emerging media in an educational setting too, as they run the Electronic Media School (EMS) in Potsdam. EMS facilitates media training programmes for journalists who 'learn and gather experience in how to prepare content for new and emerging media' [AW RBB]. Emerging media tools are also employed to manage the delivery and accessibility of course material across the consortium. For example, FUB has created custom software for presentations during classes, while web technologies are often used to organise class activities and readings [PD FUB; AB FUB]. This was echoed by Onno Baudouin, who has previously made advanced technology available to students by providing user-friendly (beginner) interfaces [OB UCLAN]. At UOL, emerging media equipment and materials have been adopted in support of teaching and learning, as well as being embedded into the curriculum itself [SF UOL; MT UOL]. It was suggested that the very nature of teaching and studying digital media requires a curriculum that is 'responsive' to technological developments as they emerge [JF UOL]. Addressing emerging media in the curriculum is therefore considered essential for ensuring students are prepared for industry once they graduate.

Extra-curricular projects

In addition to addressing emerging media within the delivery of curriculum content, the EMEX consortium also facilitates various extra-curricular activities (which are often the site for collaboration with industry). These projects tend to be positioned as optional activities that enable students to earn extra credits towards their studies [MT UT; BS FUB], or they are masterclasses, tutorials, or creative projects that students can engage with on a voluntary basis [SF UOL; MT UOL; BS FUB]. These extra-curricular activities tend to take on a more exploratory approach, where staff and students have the opportunity to experiment with emerging media in a non-academic context. The methods, tools and approaches piloted in these optional activities often inform curriculum development [JF UOL; MT UOL].

The types of emerging media being addressed by the EMEX partners

This category covers the various forms of emerging media that are currently being addressed by the EMEX partners in their study programmes. The sub-themes are categorised with regards to the specific types of emerging media discussed by respondents throughout the survey. Many of the related technologies, skills and practices can be considered interrelated and transferable.

Mixed-reality technology

Mixed-reality (XR) is being addressed across 'numerous courses in different ways' [MT UT]. By mixed-reality, we refer to both augmented reality (AR) and virtual reality (VR), as well as hybrid uses of these technologies. Topics like VR storytelling and user-experience design for mixed-reality are being addressed across a number of taught modules [BS FUB; KK TAMK; CF TAMK]. The consortium also facilitates optional workshops and 'XR challenge events' [TJ TAMK], which bring together students to produce VR experiences, AR tools and mobile mixed-reality applications [BS FUB; SF UOL; MT UOL]. These types of projects are often situated in a professional context, with students producing bespoke XR solutions for companies, artists and broadcasters [KK TAMK; BS FUB; PD FUB].

Innovations to 360° production

The consortium has addressed a number of innovations to 360° production in their study programmes, including working with 360° cameras and post-production processes [MT UOL; BS FUB]. TAMK has particular experience in this area, exploring 360° rendering, stitching and drawing in their courses [TJ TAMK]. Such approaches are also being explored by our industry partners, with RBB and YLE both exploring 360° for web-based news and journalism. This is another area that has fostered student-industry collaboration, as students are often commissioned to work for RBB on 360° productions [AW RBB].

Virtual production and virtual imaging

A growing area of interest amongst the consortium is modes of virtual production and virtual imaging, with real-time 3D graphics and game-engine technologies being addressed in a variety of contexts [MT UOL]. Software packages like Unity, Blender and Unreal Engine have become increasingly popular for developing emerging media projects, with a number of consortium partners introducing these tools into the curriculum [JF UOL; TJ TAMK; BS FUB]. Beyond the development of game prototypes [BS FUB], these tools are also considered 'creation engines' that can 'conquer the live TV, VFX, product design and architectural visualisation industries' [JF UOL]. YLE in particular has begun to innovate in this area by developing a motion capture studio: 'YLE has a unique open virtual production environment in Tampere, where you can create virtual sets with the help of virtual imaging technology based on top-of-the-line game engines' [OPS YLE].

Virtual production, therefore, represents an exciting and expansive field that is disrupting forms of media storytelling and existing production workflows.

Coding and web development

Coding and web development is prominent across the consortium, with HTML and CSS being taught alongside the study of emerging media at a number of the partner universities [AB FUB; LG FUB; PS UCLAN; MT UOL]. This includes web-based technologies, forms of data visualisation, and Integrated Development Environments (IDE's). Web technology is also often applied in the effective delivery of these courses. As Lena Gieseke notes, 'I really like teaching coding with Jupyter Notebooks as it gives you the option to merge a script or better text and images with executable code' [LG FUB].

Interface design

Often synonymous with the previous sub-theme, interface design is being addressed across the consortium in a number of contexts [OB UCLAN; AB FUB; MT UOL; KK TAMK]. Students learn about user-experience design, user-interface design, human-computer interaction, and interaction design, with these approaches being applied in the development of virtual interfaces, mobile applications, audio-visual tools and prototypes for digital systems.

Interactive storytelling

The consortium has explored various modes of interactive storytelling [MT UOL; BS FUB]. Students at FUB, for example, have developed prototypes for interactive TV and interactive web documentaries [BS FUB]. Innovations to televisual content have also been addressed by RBB. RBB were partners on a previous Horizon 2020 project that developed the 'Multi Platform Application Toolkit' (MPAT) and a range of interactive TV applications (visit mpat.eu for more details).

Preferred methods, tools and approaches

This category relates to the preferred methods, tools and approaches that have been adopted across the EMEX consortium in the context of project-based learning with emerging media. As was the case above, these methods are often inter-related.

Experimentation and self-directed learning

The EMEX partners emphasise the importance of providing opportunities for practical, 'hands-on' experimentation, which they suggest can support self-directed and discovery-based learning [SF UOL; LS FUB; TJ TAMK; CF TAMK; MT UOL; BS FUB]. Tuomo Joronen calls this process, 'learning by doing', which often leads to students acquiring further knowledge on their own [TJ TAMK; LS FUB].

A 'guided exploration' approach is advised, whereby students are acquainted with emerging media before being encouraged to discover novel applications and uses of the technology [BS FUB; CF TAMK; SF UOL]. This emphasis on experimentation can foster a 'fail fast' mentality (MT UOL). It can also empower students to become more 'self-driven' [TJ TAMK] by taking ownership of the direction of their research and practice [MT UOL]

Problem-based learning

Having students respond to a particular 'real-world problem' can be a useful way to engage them in emerging media projects [OB UCLAN]. This can be considered a form of problem-based or scenario-based learning (see Errington, 2010; Gorghiu, et al. 2015), where the focus on a specific brief, challenge or provocation presents the opportunity for students to immerse themselves in the situation [MT UOL]. This approach can engage learners in processes of creative problem-solving, decision making and critical thinking, as well situating practice in relation to the assumed roles, responsibilities, dilemmas and challenges of the professional culture (Errington, 2010). Problem-based learning can therefore provide a more authentic and professional context, particularly when project briefs and challenges are set by a broadcaster or similar commissioning editor [BS FUB].

Intensive workshops and design sprints

It was suggested that intensive modes of teaching can be particularly useful for supporting problem-based learning projects, with intensive workshops [MT UOL], masterclasses [SF UOL], and 'design sprint' approaches [TJ TAMK; CF TAMK; KK TAMK] being adopted across the consortium. For example, UOL has organised a number of 'collaboration labs', which typically run for 3-5 days. These workshops bring together staff and students from different disciplines to experiment with emerging media and address critical issues in contemporary digital culture. FUB has also adopted intensive teaching in the form of one-day workshops, production weeks and 'hackathons' [BS FUB]. TAMK, meanwhile, has experience with 'design sprints', where students create emerging media concepts and turn them into mockup demos [TJ TAMK].

Prototyping and concept visualisation

As alluded to above, prototyping and concept visualisation are considered important factors for studying emerging media, especially in the context of self-directed, problem-based learning. A range of user-centred design processes are explored across the consortium, with 'design thinking' [MT UOL], 'extreme exploration' (BS FUB), 'user-experience design' [KK TAMK] and 'SCRUM' methods [CF TAMK] being adopted to support the iterative development of emerging media prototypes. Getting students to produce these prototypes can help situate creative skills like sketching, wireframing, storyboarding and production planning [MT UOL; BS FUB; KK TAMK; TJ TAMK]. It can also help

students understand the potential limitations and opportunities of emerging media [OB UCLAN].

Online sharing platforms and blended-learning

A variety of online sharing platforms, production tools and blended-learning approaches have been adopted by the EMEX partners in support of both synchronous and asynchronous learning activities. The consortium utilises web-based tools in the context of project management, collaborative research, ideation and co-production [MT UOL; OB UCLAN; TJ TAMK], with some novel uses of sharing platforms being proposed. For example, FUB uses 'online pinboards', where students can share photos of their paper sketches to generate discussion and encourage peer-feedback [BS FUB]. 'Flipped learning' approaches have also been integrated across the consortium as a way of making curriculum content more engaging [JF UOL].

Learning journals and portfolios

It was suggested that learning journals and digital portfolios can represent an effective method for assessing emerging media projects. Students at UCLAN and UOL, for example, are required to write regular journal entries or blog posts, which either have an accumulative value for the final overall grade [PS UCLAN], or which act as a repository for research, practice and analysis [MT UOL]. By providing a space for students to document their works-in-progress, critical reflection and evaluation, portfolio-based assessment can be considered a useful approach for evidencing student engagement throughout a project. Compiling a learning journal 'during' rather than 'after' a project can also enable students to receive formative feedback from their tutors and peers [MT UOL].

Interviewing industry experts

Due to the 'cutting edge' nature of emerging media, with new technologies and practices being regularly introduced, the EMEX consortium advocates a number of independent research approaches as a way of keeping students up to date with the latest trends and developments. In particular, it was suggested that providing opportunities to research emerging technologies and interview media professionals can enhance student knowledge and preparation for industry. By interviewing 'start-ups' and industry experts, students can learn directly about their role, their company and any new developments within the sector [MT UOL]. This is especially beneficial for projects that require students to 'develop their own business models outside the classical frame of a film and TV production company' [BS FUB].

Key competencies for studying Emerging Media

This category addresses the key skills, abilities and competencies that the EMEX partners consider essential for studying emerging media. These skills are reflective of broader 21st century competencies, life-long learning skills and digital literacies (see Jenkins, et al., 2006; Gewertz, 2017; Trilling & Fadel, 2009)

Media literacy and technical knowledge

Studying emerging media requires students to have a good level of ICT proficiency and technical knowledge [MT UOL], with media literacy being addressed across the consortium. This includes an awareness of what emerging media technology can do, its limitations and possibilities, as well knowledge of 'what has already been done; a sense of history of the field' [CF TAMK]. Since they are required to engage with a variety of tools, platforms and production workflows [LG FUB], students should have a working knowledge of 'common media forms' [MT UT], as well as a basic understanding of interaction, data processing, coding and programming [TJ TAMK; AB FUB]. Students also need to be open-minded and adaptable with regards to 'future tech, mobile marketing, e-commerce, rich media, search techniques, communication especially via social networking' [PS UCLAN].

Design skills

Closely related to the previous sub-theme, it was suggested that studying emerging media requires a good knowledge of design principles. As we have discussed already, this includes modes of visual design, audio design, interaction design, speculative design, user-experience design and user-interface design [CF TAMK; MT UT; MT UoL; KK TAMK]. These skills are essential for the types of project-based learning being addressed by the consortium.

Critical Thinking & Creative Problem-Solving

Critical thinking and creative problem-solving are important factors for studying emerging media, with students required to use their initiative to develop solutions in response to a range of cultural issues and technological developments [MT UOL]. Students need to be forward-thinking and competent in both research and practice, informing the ideation of their projects by addressing the social and ethical impacts of emerging technologies [PS UCLAN; SF UOL]. They should also be able to 'self-theorise' and draw parallels to existing media, making this often-implicit process visible and using it in the context of more targeted 'action research' [BS FUB].

Project management

It was suggested that project management skills like flexibility, organisation, leadership and productivity are beneficial for undertaking emerging media projects [MT UOL]. Students need to embrace an 'agile' approach in order to adapt to changing circumstances and develop effective solutions [OB UCLAN].

Given that these projects increasingly take place online, the ability to work remotely and manage projects virtually has become particularly important. [LS FUB]

Collaboration and Communication

Team management skills such as collaboration, networking and interpersonal communication are also considered essential for studying emerging media, especially in the context of virtual teamwork [LS FUB; MT UOL]. These types of applied social skills, or 'soft skills' (Gewertz, 2017) are crucial for ensuring effective team management, with the ability to interact and co-create being central to project-based learning across the consortium [OPS YLE; OB UCLAN]

Key Challenges for studying Emerging Media

This category explores the various challenges that have been encountered by the EMEX partners in the delivery of their study programmes and emerging media projects.

Access to technology

One of the key challenges facing both educators and students when addressing emerging media is the uneven accessibility and availability of the related technology. Emerging media, by their very nature, are 'still somewhat unstable' [TJ TAMK], and it is often difficult to access 'proper robust enough technologies' [MT UT]. Since these tools are not always easily available, 'people cannot simply play with them, unless we talk of open software projects. If you have to deal with proprietary software or special hardware, things get complicated' [BS FUB]. This tends to result in a wide range of emerging tools and technologies being adopted in different contexts, which 'usually slows down workflows and efficiency' [AB FUB].

Time constraints and complexity

Given the complexity and broad range of skills that students are introduced to in emerging media projects, there is usually a 'steep learning curve' and it can often take a while to become familiarised with the technology [LG FUB]. This becomes even more challenging when considering the limited time that is usually allocated to deliver these study programmes. Emerging media projects are normally really challenging, and one semester is too short to learn the technologies and apply them effectively [KK TAMK]. Students are often only introduced to basic skills and practices, so it can be tricky to explore things in detail or develop prototypes to an advanced level [MT UOL]. As James Field highlights:

My biggest challenge is that because I only have effectively 9 hours of delivery per student group, there is only enough time to learn how to use the interface and create scenes with ready-created props and materials.

To learn the full pipeline to make these skills useful requires a huge time investment that I don't see my programme in its current format being able to accommodate. [JF UOL]

Lack of expertise & contextual knowledge

Another challenge encountered across the consortium is the fact that students have a 'very wide gradient of previous knowledge and interest' [OB UCLAN], with a general lack of understanding and inability to perform basic tasks often hindering emerging media projects [PD FUB]. Expertise in the new technology is still relatively low [OPS YLE], with students often lacking contextual knowledge of the related hardware, software, and practices. Students also tend to lack an awareness of existing trends and content, which can severely limit creativity and innovation. When students are tasked with developing new ideas and concepts for using emerging media, 'they often come up with things that have been done many times already, or they propose VR/AR variations of the same video games they are playing' [CF TAMK].

Difficulty engaging students

Although one might assume that students would be highly interested in emerging media technology, it is often difficult to foster student engagement with these projects [CF TAMK]. Some students struggle to adapt to the new skills to which they are being introduced, or they demonstrate a lack of interest in a particular set of tools and practices [OB UCLAN]. It is also often a challenge to engage students in extra-curricular projects, and it can take some effort to get participants to sign-up to optional activities [MT UOL]

Ineffective project management

Given that students are normally required to work collaboratively on emerging media projects, it can be difficult to ensure effective project management, particularly in the context of virtual teamwork. Students often struggle to communicate productively with their peers outside of the classroom during remote learning activities [MT UOL]. As Björn Stockleben explains:

Still one of the greatest challenges is to take creative decisions online. People are not good at taking these decisions in a time-constrained online meeting and usually procrastinate important decisions to the next physical session if there is one. It is key to prepare meetings well and to outline criteria and arguments asynchronously before the meeting, if possible. [BS FUB]

Previous Examples of Student-Industry Collaboration

The second set of survey questions was designed to provide an insight into the types of student-industry partnerships that have previously been initiated by the EMEX consortium. The responses to these questions suggest that collaborations between students and industry typically feature the following approaches: 1) the industry partner provides a specific brief or challenge; 2) the industry partner provides guidance or support on student projects; or 3) students are hired or work on an internship basis for the industry partner. The survey responses have been further categorised in order to identify what both the students and industry partners might gain from participating in these types of collaborative projects [Fig 4]. As we expand upon below, these projects represent a form of knowledge transfer that can be considered mutually beneficial for all partners.

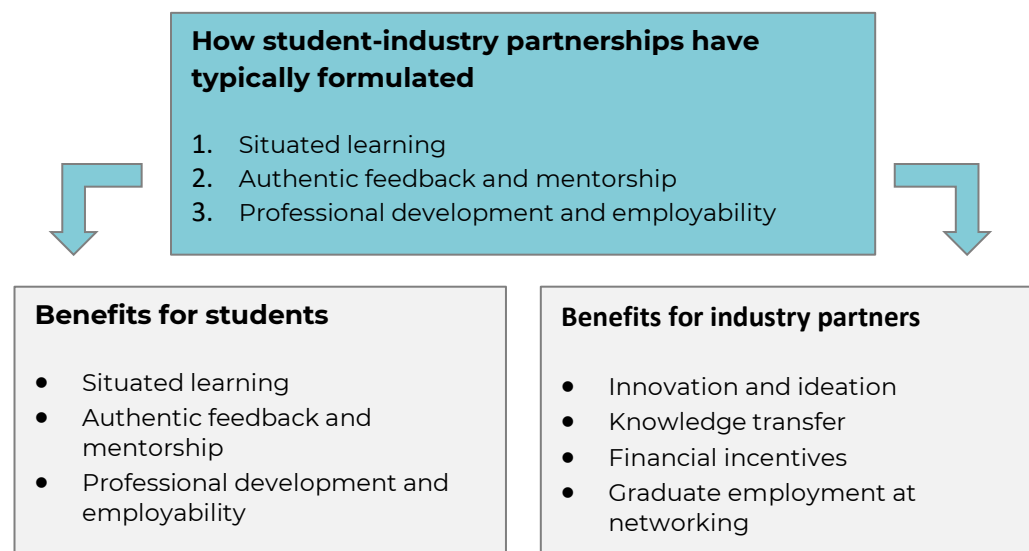


Fig. 4 - Categorising the examples of student-industry collaboration within the EMEX consortium

Industry briefs and challenges

One of the most common forms of collaboration between students and industry across the consortium has been for students to develop solutions in response to client briefs or tasks set by companies [TJ TAMK; JF UOL]. Industry partners are often invited to demonstrate emerging media technology and pose real-world problems for the students to address in their practice [MT UOL]. UT, for example, have organised numerous 'Demola innovation projects', where multidisciplinary teams of university students and industry experts work together on innovation challenges set by the company (visit demola.net for more information). At FUB, project briefs tend to be set by a broadcaster or similar commissioning entity, with students being tasked with pitching a number of concepts to the industry partner, which the partner can choose to licence or co-produce with the students [BS FUB].

Industry guidance on student projects

Another way that student-industry partnerships have been formulated across the consortium is for the industry partner to provide guidance and support on student projects [MT UOL]. TAMK has organised projects where the industry partner meets with student teams 3-5 times to tell them about their needs and provide feedback on their work [CF TAMK]. Industry partners are also often invited to 'comment on' student pitches [BS FUB], provide 'editorial and technical knowledge' [AW RBB], or 'monitor results' of student projects [MT UT].

Student internships and paid positions

The final most common form of collaboration between students and industry involves students being hired by an industry partner. This either takes the form of paid positions like 'student research assistant' [BS FUB], or they work for the industry partner on an internship basis. RBB, for example, offers internships for students of the Electronic Media School, which often leads to them being offered a temporary position at RBB after the successful completion of the course [AW RBB]. UOL, meanwhile, has set up an 'industry outreach provision called New Media Lincs that acts as a facilitator connecting incoming requests for paid work with students capable of producing it' [JF UOL] (see newmedialincs.com/ for more information).

Benefits for students

This category explores the key benefits for students that have taken part in student-industry partnerships across the consortium.

Situated learning

Student-industry partnerships tend to provide a 'very realistic working experience' [BS FUB], where students get the opportunity to test their skills in real projects' [OPS YLE]. Students are situated in the real-world contexts of collaborative research and practice [MT UOL], where academic skills and concepts are applied to 'real-world tasks' [MT UT; KK TAMK]. This can be considered a form of 'situated learning', as students get to experience authentic situations and learning is 'embedded in the social and physical context within which it will be used' (Brown, *et al.* 1989). Students gain first-hand experience of planning, producing and distributing across various platforms [AW RBB], and are often exposed to emerging media tools, solutions and workflows 'not typically available to HEIs [PS UCLAN]. This type of 'real-world experience' can help students gain a 'deep understanding of modern media' [AW RBB], as well as realising 'the limits of commercial pressures vs quality solutions' [OB UCLAN].

Authentic feedback and mentorship

Similar to the previous sub-theme, these projects present the opportunity for students to receive authentic feedback from commissioning editors and media practitioners [OPS YLE; BS FUB; MT UOL]. By taking part in student-industry projects, students are exposed to expert knowledge [AW RBB] and a 'higher level of evaluation' from industry professionals [PD FUB]. The industry partners also provide mentorship and advice to the students in a variety of contexts [MT UOL; AW RBB].

Professional development and employability

Student-industry projects are particularly beneficial for students in terms of professional development and employability, as they are able to 'place real client work on their CV' [JF UOL], build their portfolios [MT UT], or get their emerging media formats commissioned [BS FUB]. As we have discussed, students often receive payment or 'monetary compensation' [MT UT] for taking part in these projects. It can also result in students gaining further employment, trainee positions, internships and freelance work [MT UOL; CF TAMK; AW RBB; KK TAMK].

Benefits for Industry Partners

This category explores the ways in which collaborating with students on emerging media projects can be considered beneficial for industry partners.

Innovation & Ideation

The major benefit for industry partners in these types of projects is the opportunity to deploy students in the development of fresh ideas and new concepts [BS FUB; CF TAMK; KK TAMK; TJ TAMK; MT UT; AW RBB]. This often results in 'new innovations, workable prototypes and new format visualisations' [MT UOL], where the industry partner 'walks away with something tangible and implementable' [OB UCLAN]. Students also contribute to the prototyping and user-testing of existing projects in development, leading to low-cost solutions and new possibilities [PD FUB].

Knowledge transfer

By collaborating with students and academics from a range of disciplines, the industry partner can benefit from a 'substantial' and 'intense' transfer of knowledge [MT UOL; BS FUB]. These projects represent an opportunity for companies to get the latest know-how on emerging media [OPS YLE], with students often contributing new knowledge and technical solutions [AW RB; KK TAMK]. This can lead to massive contributions that neither party could have intended [OB UCLAN].

Graduate employment & networking

The possibility to work with students on emerging media projects is beneficial for companies as they are able to 'get to know' [CF TAMK] and network with emerging new professionals [OPS YLE]. These projects therefore represent an ideal opportunity to identify talented graduates and potential future employees [OPS YLE; TJ TAMK; AW RBB].

Financial incentives

There is often a financial incentive for companies to participate in student-industry partnerships, as they are able to ideate, prototype and test without significant investment [PD FUB]. Given that student labour can be implemented at a reduced cost [MT UOL], the industry partners are sometimes motivated by saving money [BS FUB]. While this can be considered a little exploitative [JF UOL], these projects are normally mutually beneficial for the students (as we have discussed above). There is also often a grant or funding budget attached to working with universities on these types of student-industry partnerships [MT UOL]. For example, RBB is a 'partner to several EU funded research projects, as well as looking for national funded projects' [AW RBB].

Summary of key findings

Emerging media is currently being addressed in both the content and delivery of study programmes at each of the partner universities, in addition to a variety of extra-curricular and student-industry projects. A range of technologies and practices have been adopted across the consortium; most notably: AR, VR, 360° production, real-time imaging, interactive storytelling, coding, web development and interface design. It was suggested that the key competences for studying emerging media include technical knowledge, ICT proficiency, media literacy, design skills, critical thinking, creative problem-solving, project management skills and the ability to collaborate, communicate and co-produce.

A variety of online sharing platforms, production tools and blended-learning approaches have been employed across the consortium, with the EMEX partners proposing a number of methods and approaches for supporting emerging media projects. It was suggested that providing opportunities for practical, 'hands-on' experimentation can support self-directed learning. Intensive workshops and 'design sprint' approaches have proved particularly useful in this regard, with students producing prototypes or concept visualisations in response to specific briefs or challenges. Providing opportunities for students to interview industry experts and research emerging technologies are considered effective approaches for enhancing student knowledge and professional development. It was also suggested that learning journals and digital portfolios are effective assessment methods for documenting student engagement with emerging media projects.

One of main difficulties for facilitating these types of projects is the uneven accessibility and availability of the related technology. This is often exacerbated by timetable constraints and a lack of student engagement, particularly when

there is a 'steep learning curve'. It can also be a challenge to ensure effective project management and collaboration.

The EMEX consortium provides regular opportunities for students to engage with industry on emerging media projects, with industry partners either setting a specific brief or challenge for students to respond to, or they provide feedback on student projects. Students are also often hired or work on an internship basis for industry partners on a variety of emerging media projects. For the students, these projects represent an authentic learning environment, where emerging media skills and knowledge is situated in a more professional context. Not only do students learn how to respond to a client brief, they also have the opportunity for mentorship and support. The industry partner, meanwhile, has the opportunity to network with talented students, putting them to work (usually at a reduced financial cost) to help with the ideation and innovation of emerging media projects.

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2 Industry Interviews

Summary

This document summarises the views of industry partners, some of whom were also project participants, on the cooperation between universities and the media industry. We cover the various aspects of participation, specific aspects of cooperative projects and identify areas of future interest for industry partners.

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Interview partners

Name, Role	Company
Stephan Schindler, Head of people and culture	Exozet
Fax Quintus, CEO	I-Immersive
Dirk Martens, CEO	House of Research
Graham Thomas	BBC
Zakaria Jaiathe, CEO	Xibit
Annette Wilson, Head of Innovation projects	RBB

Motives for Cooperation

Exozet sees the lack of commercial pressure on the part of the universities as both an advantage and a challenge, i.e. universities have time to really focus on issues, but have less incentive to stick to short-term deadlines.

HoR sees value in the students' provision of authentic project cases and industry contacts, along with the possibility of additional funding allowing projects to be more elaborate than regular university projects.

For the BBC, access to specific expertise, lab or testing environments is a motive for collaboration with universities. In addition, universities may also provide access to funding for particular topics. Motivation includes access to special expertise, labs or test environments.

RBB sees university collaborations as offering access to new technologies and knowledge, as well as bringing research expertise.

Cooperation in Practice

Exozet stated that while they frequently work with students, they have not so far worked with universities as organisations. They deem it complicated to cooperate with universities on an organisational level, with the exception of long-term research projects. Exozet prefers to completely integrate students in their teams and give them longer-term contracts.

I-Immersive experiences universities as partners providing the frame and the room (in both spatial and metaphorical senses) for common projects. In addition to student collaborations, I-Immersive sometimes subcontracts universities to do research.

House of Research usually works with PhD students (and occasionally with master students) working on their final thesis. Sometimes the major part of project supervision lies with HoR, sometimes with the university. This depends upon ownership of the project, e.g. whether House of Research gave the briefing or the university. The cooperation is more centred around individuals and usually does not involve classic teaching, i.e. presentations to larger groups of students.

At BBC Research, most cooperative projects with universities are funded by the UK government and other funding bodies. The BBC also cooperates with universities in areas where the university partners have access to further funding programmes for particular areas. The hosting of PhD students is at the core of most cooperation. The students spend a number of months at the BBC premises to do their research and collaborate with other students and BBC staff onsite, but they also do hours at their home university. So far, the BBC has created a very large network of university cooperation partners. During the cooperation, partners work with technology, content or data that the BBC owns or develops. For the BBC, a key point in communicating with students is bringing them onsite to their lab. They point out that in cooperations where students were working in academic environments with minimal weekly or monthly meetings with BBC, there was a danger that the project would be overly influenced by the academic supervisor and the prime motivation would become the publishing of another paper. The BBC underscore that "if the students spend a significant proportion of their time in our lab [...] it's the key to get everything working well".

Xibit feels there is a disconnection between universities and the start-up scene, making it difficult to create relevant industry contacts for start-ups. However, Xibit note that they have not previously considered working with students and that there might be untapped potential in doing so.

RBB's closest cooperation is with the journalism school EMS. While it is partly owned by RBB, the school also trains journalism students working at other companies. The focus of the school is multimedia journalism, meaning that the students get a broad training across all media. The students are tightly integrated into journalistic projects and learn about the day-to-day business at a media publishing house. RBB also has a network of European universities with whom they cooperate in international research projects. This cooperation may involve students, but usually this is handled by the university and RBB staff do not get in direct contact with students (with the possible exception of PhD-level students).

Initiation of Cooperative Partnerships

I-Immersive does not actively look for university partnerships. On one occasion when trying to initiate a cooperative project, feedback from the university side was too slow, so they abandoned the project.

For HoR, project initiation may come from both sides. Sometimes they need to tap into specific knowledge and identify a professor to approach. In other cases, individual professors or students approach them with an idea. Even though they regularly do have university cooperations, HoR notes that some universities are difficult to understand from the outside and that structures and modalities under which cooperation may happen are not transparent.

In former times, the BBC randomly approached universities at academic conferences to ask whether they had students looking for supervisors. However, recently they are trying to focus by creating theme-related clusters of core university partners. BBC researchers regularly give university courses and conference presentations, briefly sketching an initial idea and then approaching academics as to whether they were interested in disseminating the idea to their students. The students would then further frame the research project with guidance from their academic supervisor. BBC focus is usually on longer-term PhD-projects.

The start-up Xibit has few opportunities for getting in contact with universities and would prefer universities to be more proactive in approaching start-ups.

RBB coordinates students' assignments with the EMS media school and as far as possible accommodates themes chosen by students, who are completely responsible for the conception and production of their content. For EU-funded research projects, RBB is often contacted by its international partner network.

Cooperation Methods

Exozet sees practical problem solving as the essential skill learned by students in company settings, as well as gaining access to professional technologies. In general, Exozet is looking for long-term engagements of students, as it takes a long time to onboard and integrate them into the team. This is why they usually do not take interns for a couple of months but prefer to give annual part-time contracts (20h/week).

I-Immersive wants students to conceive and create new stories and aesthetics. They usually start with a lecture delivering input about the particular project field, along with existing examples of good practice. This is followed by a phase where the students do research by themselves and share their findings with their peers. The concept phase starts with brainstorming in groups or individually and can take the shape of a Design Thinking workshop to push people to spontaneously create ideas. This is followed by a 3-day prototyping phase and a final pitch presentation. I-Immersive works with interns, who sometimes become employees.

HoR works with interns and students from a variety of fields, with a focus on computer sciences and social sciences, where the latter have basic technology skills. Most HoR interns remain on a student employment contract until graduation. When working with master students, HoR prefers short-term projects with intense contact. They employ daily design sprints to keep the pace.

The BBC prefers that students have research contracts with their universities and the BBC usually compensates universities for the time the PhD-students spend in the BBC lab.

Xibit has not collaborated so far with universities/student projects, but is currently in talks with a university institute. They propose giving workshops or showcases of their technology and then providing it to the students to see where it might lead. However, Xibit have also been working with student groups at their premises, where student teams are completely integrated into their team, without a university acting as mediator.

IPR

I-Immersive view obtaining usage rights for project results as a follow-up negotiation with the respective students after the workshop.

HoR usually deals with the problem of confidentiality by having students write selected passages in a more abstract manner.

The BBC usually secures all relevant rights to research results. They are interested in practical and focused results from an industrial point of view. If the BBC funds students themselves, they use their own contract template. If the idea comes from a university, it would be the university's agreement that is used. Even though the BBC is eager to retain commercial rights, the university usually keeps the right to freely use the results in research and development or teaching. Students are also free to publish their thesis unless there is any confidential information, which is described as a rare case.

Project results are published and featured by RBB, and all IPR belongs to RBB under their apprenticeship contract.

Results of Cooperation

Exozet is generally very satisfied with student employees, to the extent that they often obtain a full-time position after they graduate. University staff, especially professors, help by recommending students for different positions.

I-Immersive emphasises that there is a great variation among the results by the student groups: some stay close to the briefing, others create surprising results while others stray far off topic without reflection. They consider it a challenge to bring students into the right mind-set and to brief them accordingly, emphasising it takes time and energy, "but once you achieve this, usually they

are quicker to find the perfect solution". Yet they also mention that there is always a natural range of performance in the group and, from their point of view, usually only a couple of students deliver satisfactory results.

The BBC is particularly interested in computer sciences, human-computer interaction, software engineering, psychology and related areas. They have had very good experiences with (PhD) students, particularly as they spend a lot of time in the BBC lab.

Duration of Projects

Exozet sees a challenge in university collaborations regarding reliable deadlines and communication, especially during semester breaks.

I-Immersive suggests intense, short-term projects to keep the focus with student groups, preferably of one week's duration. Middle or long-term planning of student collaborations is difficult because of the intense co-working needed to realise such projects and potential collision with students' regular curriculum.

HoR prefers shorter periods from a day to a couple of weeks depending on the scope of the project. HoR projects tend to be realised faster than university projects, as HoR clients often want their projects to be realised within a couple of months, and sometimes have fixed deadlines in form of exhibitions or other specific events.

The BBC has the longest engagements, often spanning over the full PhD qualification cycle of four years, but they also take interns, who stay for three months over the summer. Usually, BBC projects with universities aim at the long-term perspective and they prefer longer cooperations to deliver substantial results.

Xibit prefers a limited time frame of one to two months for collaborations, feeling that students might lose interest if the interaction takes place over a semester-long course of two hours per week.

Technologies of Future Interest

With regard to the theme of emerging media, Exozet envisions a world where production and production tools for creating digital media content of any kind are completely democratised and accessible for all. Currently, Exozet are especially looking for students with expertise in Virtual Reality and immersive media technologies. Exozet also needs people who know both about game engines and camera capture technologies. Exozet sees the field of immersive media as offering potential for companies to learn from universities.

I-Immersive are looking for a broad range of skills in animation, virtual environments, storytelling, virtual cinematography. They also express a special need for the theme of live streaming in virtual environments and people who

can combine interaction design with artistic approaches. I-Immersive is interested in developing worlds and assets for sets and installations. This is currently a more technical task but could be extended to format development.

HoR sees potential for Virtual Reality in gaming and business, but not so much in the domain of cinema. In a project with master students, HoR developed a tool for media analysis, which analysed the music played by every radio station in Germany for a period of one year. On occasion HoR also provided their own tools for the students to work with, e.g. a special application to measure media perception.

The BBC shapes the topics of student collaborations together with the respective student and the university. In general, they are interested in exploring all forms of media and their potential uses for different audiences. This currently includes VR, XR, AR and AR audio, incorporating aspects of human behavior and psychology but also politics. A particular cornerstone of their research agenda is the concept of object-based media, which allows the adaptation of the media experience on the side of the receiver, delivering a personalised and contextualised experience. They mention various example projects: one student is looking at an information presentation in augmented reality, conducting such experiments as providing an AR TV programme guide. Another student is working on the theme of “narrative importance”, to improve the way audio is mixed for TV programmes, to make it easier for people with hearing problems to follow the narrative of a TV show.

Xibit has a number of research projects that include machines, in which they would like to involve students. They want to use both new and existing technology to communicate in new and different ways.

For RBB, Emerging Media includes “all new media formats, technologies, distribution and consumption forms”. In the short-term, RBB is interested in attractive content in new and unusual forms and their long-term perspective is in acquiring well-trained journalists with a deep understanding of the modern media landscape.

1 MOTIVES FOR FOR COOPERATION			
New ideas & technologies	HOR	RBB	BBC
Access to new/enhanced funding possibilities	HOR	RBB	BBC
2 COOPERATION IN PRACTICE			
Integrate students on long/short term contracts	Ex	HOR	I-I
Sub-contract or cooperate w/unis	I-I	BBC	RBB
Integrate PhD (Master) students on individual basis	HOR	BBC	RBB

None	Xibit		
Media school			RBB
3 INITIATION of COOPERATIVE PROJECTS			
No cooperation	I-I	Xibit	
Bi-directional	HOR	BBC	
Passive, from networks	RBB		
Co-operation with media school	RBB		
4 COOPERATION METHODS			
Short-term sprints, group workshops	HOR	I-I	Xibit
Solving existing problems	Ex		
Students determine content/production, internships	RBB		
Integration of students into own team	Xibit		
5 IPR			
Follow-up discussions	I-I		
IPR secured in advance	BBC	RBB	
6 RESULTS OF COOPERATION			
Relevant/useful	I-I	BBC	Ex
Irrelevant	I-I		
7 DURATION OF PROJECTS			
Short (1 week)	I-I		
Medium (2 weeks - 2 months)	HOR	Ex	
Long (3 months - 4 years)	BBC		
8 TECHNOLOGIES of FUTURE INTEREST			
Open technologies	Ex		
VR/XR/AR	HOR	BBC	RBB
Own tools	HOR		
Immersive media	Ex	I-I	BBC

3 Best practices outside the consortium

Summary and Analysis

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Introduction

To complement the surveys on good practices in handling emerging media within the consortium, this research phase of the Emerging Media Exploration (EMEX) project set out to identify existing 'good practices' outside the consortium by inviting representatives who have either an advanced Emerging Media Curriculum [EMC] with inspiring/innovative courses or who have successfully implemented some form of blended mobility concept [BMC], ideally in the realm of art and media, or who have developed concepts for involving students in industry projects [SIC] in research and transfer.

The aim was to gain insights from successful current practices in the teaching of emerging media, and in addressing the challenges of industry collaborations and intercultural distance learning.

Methodology

Six of the universities interviewed met at least one of these criteria and made themselves available for a qualitative, partly structured interview.

Name	Institution	Role/Position	Criteria	Reference Key
Markku Reunanen	Aalto University	Head of New Media Design and Production.	EMC, SIC	MR A
Artem Smolin	ITMO	Head of Information Systems in Art and Humanitarian Sciences department/ Information technologies in Design / Multimedia technology)	EMC	AS ITMO
Prof. Paul Coulton	Lancaster University	Professor of Speculative and Game Design	EMC, SIC, BMC	PC ULanc
Dave Stikkolorum	The Hague University	HBO-ICT Team Manager at The Hague University / The Hague University of Applied Sciences	BMC	DS THUAS

Prof. Constanze Langer	University of Applied Sciences Potsdam	Pro-dean for special tasks: Head of study course interface design chief financial officer	EMC, SIC	CL FHP
Prof. Markku Hauta-Kasari	University of Eastern Finland	Programme Director of IMLEX, Master of Science in Imaging and Light in Extended Reality	EMC, SIC	MHK UEF

Table 1 - Respondents to the interview

Since some interviews took the form of a discussion the statements of the interviewer Prof. Björn Stockleben [BS FBKW] are also given. Depending on the focus of the university, different blocks of questions were addressed.

Question blogs for universities	
<p>1. General Questions</p> <ul style="list-style-type: none"> Name of Institution Faculty and Study programs represented Individual background of the person interviewed personal motivation and relation towards emerging media 	<p>2. Emerging Media Curriculum & Courses</p> <ul style="list-style-type: none"> What role does emerging media play in your curriculum? When did you start to integrate emerging media as part of the curriculum and why? Which are important competencies to teach with regard to emerging media (related to your respective disciplinary background) and how do you teach them? How do you harmonise the rather static concept of a curriculum with the rapidly changing landscape of emerging media technologies? Do you collaborate interdisciplinarily and if so, with which disciplines and why? How do you teach being creative with emerging media? How do you teach the technology basics of emerging media?
<p>3. Blended Mobility Concepts</p> <ul style="list-style-type: none"> What is the main purpose of your blended mobility concept? How do you define blended mobility? How do you create sociability? 	<p>4. Student-Industry Collaboration</p> <ul style="list-style-type: none"> How do you involve students on any level in industry collaborations? What kind of projects are you looking for?

<ul style="list-style-type: none"> • How do you create a transnational atmosphere? • How are onsite and online parts intertwined? 	<ul style="list-style-type: none"> • How do you find and select your industry partners? • Why do industry partners collaborate with you? What are the core competencies they value and what do you expect? • Did you ever disappoint an industry partner and what are likely causes for such disappointments? • How do students work on the briefs? • How do you integrate the industry partner throughout the course? • How do you cope with the different pace and structure of work at a university and outside (academic year vs. project driven industry, long-term vs. short-term planning)
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Table 2 - Blocks of questions

The qualitative content was analysed via an inductive approach in order to formulate the verbatim survey responses into meaningful categories answering the key questions of the EMEX project.

Emerging Media Curriculum & Courses

Roles and types of emerging media addressed by the interview partners

The role of emerging media and the different types addressed vary greatly, depending on the focus of the programs offered.

The Aalto university focuses on a program for majors on 'Game Design and Production, New Media Design and Production, and Sound in New Media [MR A].' The students from ITMO have to take mandatory courses on 'Digital culture'. For the students at Bachelor level this means: Introduction to digital culture, Analysis and storage of digital data, applied statistics and digital culture in professional life. Students in the master program need to take: Data processing and analysis and applied artificial intelligence.

The University of eastern Finland is very specialised regarding emerging media, focussing on Imaging and Light in Extended Reality.

The creative exchange program in Lancaster and the design courses in Potsdam do not focus on emerging media technologies, because: 'Technologies aren't inherently immersive [...] [PC ULanc].' Similarly, Prof. Constanze Langer of the design program in Potsdam, states that the solution to a design problem does not necessarily lie in emerging media [CL FHP].

Managing and Teaching Emerging Media

Curriculum

All universities that teach emerging media have different approaches to deal with rapidly evolving technology.

Regarding the curriculum: 'This has been identified as a big challenge [MR A]. Therefore, Alto University adapts its curriculum every two years and the responsible teachers discuss and decide on the new curriculum in a group. But a main point '[...] is to have focus on the constants, i.e. methods, not on expiring devices and technologies [MR A].'

A similar approach is used in the IMLEX (Master of Science in Imaging and Light in Extended Reality) study program. The modules consist of two parts, one

fundamental section focussed on teaching the unchanging basics and another applied section which is flexible and adapts to technological developments. Industrial speakers are invited to take new technologies into account [MHK UEF].

The curriculum of the creative exchange program in Lancaster allows a good amount of freedom and exploration. For study programs that are more design-oriented, the curriculum does not focus upon specific technologies. [CL FHP].

Teaching technology

Due to the continuous and rapid development of technology, current knowledge is not always available at the university. In order to cope with this situation, experts are invited. This is done by:

1. Inviting Alumni to lead workshops [CL FHP],
2. giving academic scholars and teachers a short time teaching position or inviting them to workshops [MR A; CL FHP; MHK UEF],
3. or inviting industrial representatives to the lectures [MR A; MHK UEF].

For most universities which have an emerging media curriculum, providing workshops in which students can explore the technology is an essential part of the teaching concept [MR A; CL FHP; PC ULanc].

Teaching creativity

As indicated in the survey carried out within the EMEX Consortium, critical thinking and creative problem-solving are important factors for studying emerging media. To foster these skills, the principal approach is to engage students in workshops and project work [A; PC ULanc; MHK UEF; PC ULanc; CL FHP; MHK UEF].

'Hands on with minds on' is the motto at Aalto University, but 'there is no explicit teaching regarding creativity [MR A].' At ULanc and FHP the starting point is always '[...] the problem a person has or you want to solve [CL FHP].'

'The main purpose of the Creative Exchange was designed to bridge students with industry problems [PC ULanc].' In the Creative Exchange Program

from Lancaster University students are engaged in exploration and discovery rather than jumping to a solution. The focus is on the process [PC ULanc].' Prof. Paul Coulton emphasises that they want to move beyond western thinking. 'Allowing for very different perceptions of the world [PC ULanc].'

Other practices in teaching emerging media

Design disciplines are not necessarily familiar with emerging media, but there are ways to shape the experience. If the solution of a problem includes emerging media, students with less experience in emerging media are instructed to approach the result with several prototypes to simulate the real experience: 'aesthetically perhaps by Photoshop retouch, conceptually rather by the comic strip.' [CL FHP]. Style and experience prototyping can be realised in VR. It is important to take away 'the fear that it has to be finished [CL FHP].'

Prof. Markku Hauta-Kasari, Program Director of IMLEX-Master, finds it very important to keep the groups together throughout the semester [MHK UEF].

The IMLEX-program developed a smart virtual laboratory to demonstrate physics courses for use between campuses, and to which students have access during their entire study [MHK UEF].

Teaching interdisciplinary and intercultural

Most of the universities working with emerging media collaborate and teach interdisciplinarily [MR A; PC ULanc; CL FHP]. Lancaster collaborates 'with computer scientists; hardware level, data, AI, psychologist, sociologists and more recently philosophers [PC ULanc].` Prof. Paul Coulton considers work with philosophers to be particularly important when working in AI and ethics.

The Alto University collaborates with movie, arts and media technology, the design field and photography, and visiting teachers and students have a variety of backgrounds.

The University of Applied Sciences Potsdam collaborates with disciplines that show interest in the technology. Those are mostly related disciplines - recently it has been civil engineering, building information modelling, and architecture [CL FHP].

The program of the University of eastern Finland is very specialised. They bring in four different perspectives by having international cohorts composed of European and Japanese students. The entire study program takes place in four different countries. The first semester takes place in Finland for all students; in the second semester the group splits up according to their major and goes to France or Belgium, and in the third semester the students meet again in Japan [MHK UEF].

Key competencies for Emerging Media

From the universities' point of view, basic knowledge is required to tackle the field of emerging media. However, what this basic knowledge contains is described quite differently.

For Prof. Constanze Langer it is simply 'Math, German and English [CL FHP].'

A major component of the IMLEX Program is the teaching of basic knowledge in relation to their specialisation in Imaging and Light, like photonics and the physical characteristics of optical lenses, that will not change over time [MHK UEF].

ITMO has a mandatory course on "Digital culture" including:

Intro to digital culture, Analysis and storage of digital data, Applied Statistics, and, for Master students, Basics of machine learning and data analysis, Digital culture in a professional life [AS ITMO].

Required competences on the part of the industry partners can also vary.

Markku Reunanen from Alto university declares 'there is no systematic picture of company needs but group working skills, and capability to work in an international environment appear to be important. Programming skills are valued, of course. Project management and design skills as well. Social media related course has been recently added since companies seem to value those skills [MR A].'

The cooperation partners in the Creative Exchange Program at Lancaster University '[...] expect high quality research, a pathway to impact and decent output [PC ULanc].'

Blended Mobility Concepts

Purpose of the blended mobility concept

Both universities that were interviewed about their Blended Mobility Concept state that the purpose of their concept is to provide their students with an international working environment [PC ULanc; DS THUAS]. The Hague University hopes to: 'Facilitate an understanding of what it is like for designers to work with developers within international teams [DS THUAS].'

The main goal for Lancaster University is to: 'Decolonising our own curriculum in the sense of attracting scholars from around the world rather than a very narrow western set of values [PC ULanc].' The aim is to open up students' experiences regarding social, cultural and networking skills.

Challenges of Blended Mobility

Working in a virtual presence can bring several challenges. Technical difficulties can make communication difficult. To create sociability in a physical space is easier and kind of takes care of itself [DS THUAS]. In addition,

problematic group dynamics can be better perceived and accordingly better addressed [PC ULanc].

Blended mobility concepts are based on the idea of implementing a project partly through virtual learning and partly in a physical meeting in which the ideas are implemented [DS THUAS]. The COVID-19 situation shows that both parts are needed. 'Especially when we base a lot of the practical work in the studio, we can't replicate this online. We allow for experimentation as part of the learning process. It is this that we struggle to do online [PC ULanc].'

Good practices for Blended Mobility Concepts

'The key is to use platforms students are already familiar and engaging with for their normal social activities [DS THUAS].' For the physical meetings it would be perfect if students could visit their peers in their home country, so that each group can experience a different culture [DS THUAS].

Student- Industry collaboration

All the universities teaching in the field of emerging media do some kind of industry collaborations, but on different levels. The collaborations also emerge in different ways.

Project Acquisition

Prof. Paul Coulton and the University of Applied Sciences Potsdam are well known for their work. They are recommended and industry partners contact them with project requests [CL FHP; PC ULanc]. For the ITMO university in St Petersburg and the Alto university in Helsinki industry collaborations do take place, but mostly with no direct involvement from the university. Students arrange industry collaborations themselves in the form of internships and are often linked to the topics of their thesis. At ITMO a practical training experience at work must take place at least for three months. ITMO and Alto university only rarely facilitate industry collaborations where company cases are utilised for students' project work.

Selection of projects

In the early days of the program ULanc took whatever project they could get and paid a small fee for it. 'This was really important for the small companies we worked with as there would have been no way these types of companies would have been able to work with us [PC ULanc].' Nowadays Prof. Paul Coulton is mainly interested in data driven experimental research.

The FHP also selects the projects 'according to the amount of research [CL FHP]. Gaining knowledge must be a part of it [CL FHP].'

Student involvement

At ULanc the students run the projects as project managers alongside collaborators and academics. 'This is really important as the students need to get their PhD out of it, they need to gain experience from running a project, the industry partner needs to see something that is usually in the form of an output and the department gets the exposure [PC ULanc].'

For the University of Applied Sciences in Potsdam there are different ways to involve the students, depending on their skills and the complexity of the project [CL FHP]. Projects are either integrated in the teaching and students earn credits for it; students are contracted as freelancers or working students or, as a third version, a team of students gets assembled depending on their competencies to fulfill a certain task [CL FHP]. In the experience of Konstanze Langer, there is rarely a briefing at the beginning of a project, so one of the first tasks for the students is to approach the topic together with their teachers and develop a brief and narrow down the requirements.

At Aalto University 'students find projects they can do for companies and they get credits from these [MR A]. In the IMLEX program of the University of Eastern Finland the students are brought together with industry partners for their master thesis [MHK UEF].'

Industry involvement

Industry partners are integrated by being invited to the university, be it to give lectures, participate in joint workshops, or give feedback to the students [MR A; CL FHP; MHK UEF].

At the IMLEX program the industry partners have not been invited to lectures so far, but this is under discussion, at least to explain the need for the work that is done. Prof. Constanze Langer also appreciates when the partners come to contextualise the project [MHK UEF; CL FHP].

Lancaster University and the University of eastern Finland have regular meetings with their partners. At UEF the partners are part of a quality administrative board and give feedback on the IMLEX program. They are also invited to the IMLEX-day that takes place after the first semester and where students are also present [MHK UEF].

Challenges

'Matching the interests is hard [MR A]. The reasons for this are different expectations on the part of the university and the industry partners [MR A; CL FHP; PC ULanc]. Sometimes companies expect free labour [MR A; CL FHP], or they offer 'bread and butter' business not suitable for project work at universities, because they are 'irrelevant for academic training' [CL FHP]. It happens, however, that potential clients consider the university a state-financed agency [CL FHP].

Another challenge can be the semester structure and mismatching schedules [CL FHP; MR A]. The summer break is problematic for partners, as installations often take 6 months to complete so they must continue over a semester [MR A]. Although there are teachers who maintain a collaboration over several semesters, it can have the disadvantage that students are occupied with only one topic for a long time [CL FHP].

Regarding the schedules it is especially difficult for small companies to make time available for a collaboration. Unlike industries, universities should not have 'to focus only on efficiency and effectiveness', but the expected pace gets faster [CL FHP].

Depending on the university and project, it can be a problem to protect the intellectual property rights of the students [CL FHP]. Students own 'of course only the copyright, not necessarily the right of use [CL FHP].'

Setting up the contracts 'is incredibly tough and it takes an incredible amount of time [...], if you really want to take everything into account [CL FHP].' And 'the more you work in the commercial sector, say automotive, pharmaceutical or something else, and the bigger the company, the more they push to patent everything [...] [CL FHP].'

Good practices

Regarding intellectual property, other universities have "No big problems, relaxed practises. Students own rights to results, acknowledgements are given [MR A]. In the creative exchange program of Lancaster University it is made clear, 'that our work is open, we publish our works and materials in open access platforms [PC ULanc].'

There are certain conditions which are given in cooperation with universities. For ULanc it is very important to clarify the expectations early on and also

'shielding the industry from university politics and procedures is key [PC ULanc]. To avoid delayed response times, students are the first point of contact for collaborators in Lancaster [PC ULanc]. If the conditions and expectations are not right, the cooperation should not be started [PC ULanc; CL FHP]. Prof. Constanze Langer from Potsdam University for example did not enter a co-operation after long negotiations, since the contracts were not acceptable [CL FHP].

But cooperation with big companies can have some advantages. Such companies often allow more freedom, because they have the resources to bear the risk of an uncertain outcome. When it comes to expectations: 'Experience shows that humanities scholars are more limited in their understanding of what design can achieve than engineers. And the engineers or the companies usually leave more room for freedom, simply because they are more similar in the way they work [...] [CL FHP].'

Prof. Constanze Langer from Potsdam University also thinks that projects should fit into a semester, because students mostly have plans for the following semester, for which they need a clear mind, and additionally the summer break [CL FHP].

Regarding the project process it is really important that industry partners are there at the beginning of the project to contextualise and to describe in detail the problems to be solved. After the first ideas have been created, industry partners also need to be present to explain why some ideas are especially useful to them [CL FHP].

Prof. Björn Stockleben from the film university in Babelsberg and Prof. Markku Hauta-Kasari from the IMLEX -program in Finland both agree that new technologies need to be tested early in the development and student industry collaborations are a way to do that [BS FBKW; MHK UEF].

Also the collaboration of PhD-students and industry partners are known to be very fruitful [MHK UEF].

Key findings

Emerging Media Curriculum & Courses

- Industry collaborations are necessary to keep up with the latest developments in technology.
- Industries need to be involved to contextualise the need and to give feedback on interim results.

- Since the production for most emerging media formats, such as virtual production, is very time consuming, prototypes in all stages are especially important.

Blended Mobility Concepts

- Although theoretically any form of teaching can take place online, physical meetings are necessary to turn a group into a team.

Student-Industry collaboration

- Big companies can be good to cooperate with, because they have the resources to accompany the creative solution finding process and give the needed feedback, but on the other hand they tend to be very restrictive regarding contracts.
- A way to work around this problem is to work with small companies and pay them a fee, or to decide that every outcome is 'open to use' and make it a condition for collaboration.