Immersive spatial narratives as a framework for augmenting creativity in foresight-based learning systems

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Abstract

Purpose – The ability to project oneself into a future landscape is a critical aspect for studying and practicing the science of foresight and foresight-based learning systems. The purpose of this paper is to discuss how we can construct immersive spatial narratives through multimedia-enhanced learning approaches, to increase deeper learner immersion and levels of creativity to transport the learner into a simulated 2030 landscape by reducing the distance between the projected reality and the Self.

Design/methodology/approach – The author designed a foresight-based course on the Future of Mobile Learning underpinned by a new learning system that embraced the concept of immersive spatial narratives, combining physical, virtual and cognitive learning spaces, which enable students to explore complex, undiscovered or unstructured knowledge. Practicing was carried out on 35 students who had completed the course during the preceding three years through a questionnaire and interviews to establish increased levels of creativity in a simulated future landscape.

Findings – The paper established that the addition of multimedia learning environments and tools to foresight-based learning creates immersive spatial narratives that increase creativity and learner ability to project him/herself into a simulated future landscape. In all, 75 per cent of the respondents stated that having to think about the future and place themselves in a practicing landscape increased their creative skills.

Originality/value – A new, foresight-based learning system driven by the concept of immersive spatial narratives, enhanced with student-created multimedia learning tools. The system demonstrated how this approach helps to increase learner creativity and the ability to transition from their Present Self to their Future Self.

Keywords Foresight-based learning, From Present Self to Future Self, Immersive spatial narratives, Increasing learner creativity, Multimedia-enhanced learning environments and tools, Thinking and creating in simulated future landscapes

Paper type Research paper

1. Introduction

In 2014, the University of Agder invited me to develop an e-learning course as part of the university’s new Multimedia and Educational Technologies Master’s Program. The initial course, “The Future of Mobile Learning”, was designed as a fully self-contained, on-line, self-directed course. The course encompassed some multimedia elements, including video mentoring and content, video-making, collaborative watering holes, the learning of some multimedia tools and testing existing platforms, framework and authoring software. It was limited in its requirement for experiential creativity, but high on alternative thinking techniques, creative imagination, complex foresight processes and academic intensity. It was modelled to some extent on my course for PhD students at Georgia State University in Atlanta, GA, the USA at the time, titled The Future of Education and Learning. In the first semester, the UiA students, while happy at first with the course’s high level of self-direction...
and self-management, found the bridging of the science of foresight and mobile learning too complicated and their outputs and grades were lower than expected.

While the course was not ostensibly a class on the science of foresight per se, it used foresight methodologies, approaches and tools as a framework to study the future of mobile learning and was built on a foresight-based learning system. Foresight-based learning is the learning of a designated domain through the lens of the science of foresight (i.e. the future of mobile learning) within a learning system that uses the study of the future as one of the pillars of the overall system (Woodgate, 2018). The class followed and applied a commonly used six-stage foresight process (Woodgate, 2004; Hines and Bishop, 2012) that involves numerous methodologies such as alternative thinking techniques, computational forecasting and modeling, environmental scanning, extensive cross-mapping of potential future relevant influences and influencers, scenario building and evaluation, strategic implementation. The science of foresight is commonly applied to horizons of more than ten years into the future. Within the first year, I determined that while the students had relatively little difficulty in understanding the overall content of the course, they were generally unable to think beyond the very near future and had underlying difficulties in imagining in the abstract, considering and discussing discontinuity, unstructured and undiscovered knowledge and non-linear thinking. Further evaluation identified some obvious problem areas, such as: learner difficulty in dealing with complexity, sense of isolation, lack of real peer and mentor collaboration and social perspectives, leading to relatively limited engagement and creativity. Consequently, I revisited the course design to examine and rectify these student learning difficulties. A critical finding in my examination of the learner issues was that it was their first experience of both a fully self-directed course and, moreover, deep theory and non-linear thinking. Given this knowledge, I re-examined:

- the student cohort: 12 M/F master's students and their backgrounds;
- the evolving department need, specifically to integrate the Future of Mobile Learning course with the other new courses, namely, Interaction Design, Communication, Cooperation and Research Methods, eLearning and eTeaching games design and gamification, eCourse development, Visualization techniques; and
- technology resources relevant to the future of mobile learning.

This refocusing resulted in the development of a new supporting learning system, the Living Learning System (LLS) (as discussed in Section 3 below).

In this paper, I discuss my approach to what I considered to be the most pressing student learning issue, given the future-focused nature of the course, namely the student’s ability to project oneself into and think in a future landscape. I decided that the key to helping to alleviate this issue was to find a way of creating a sense of deep immersion into the simulated future. Given the skills and background of the students, I decided to put more emphasis on the optimization of multimedia learning tools as a route towards augmented immersion. The development and use of multimedia learning tools provided a physical means of delivering greater levels and layers of immersion through a technology enhanced learning space. However, I needed to go beyond the physical to increase the learner ability to explore, think, create and evaluate the potential, relevance, feasibility, desirability and implications of experiencing a simulated future vision landscape with a time horizon of 10-20 years. This ability, I describe as “living in the future”. This specific learner ability is especially necessary for the study of courses that have a strong foresight-based structure. It requires a higher level of engagement and creativity and a bias towards the concept of multiple dimensions of change and the acceptance of re-conceptualized, re-contextualized notions of our world, space and time.

The paper and the accompanying research demonstrates the powerful role of deep immersion as a key to increasing learner levels of engagement and creativity both through
the development and use of multimedia learning tools and equally importantly the inner space and cognitive state that foresight generates in requiring learners to “live in the future”. Central to this work is the role of delivering inspirational immersive spatial narratives. The research deals with the reframing of the learning space in the service of creating more effective spatial narratives that are designed to deliver transformative approaches to learning and the development of new competencies to confront the complexities of foresight-based learning systems. In this context, I use the term spatial narrative beyond its more common meaning in architecture, urban development and deep maps, to mean the story and opportunities within a learning space, whether it is physical, virtual or cognitive. Spatial narratives enable us to navigate and explore complex and otherwise difficult to experience knowledge. Spatial narratives achieve this as transformative learning spaces, like AI agent mentored three-dimensional (3D) virtual worlds, together with their intermodal components, structural elements, their internal and external processes and social interactions and encounters. They act as an experiential map that portrays optimal ways with which we can experience and learn knowledge more relevant to the emerging worldviews.

I consider the transformative dimensions of learning spaces as afforded by the integration of multimedia into the foresight-based learning system. I discuss the construction of new spatial narratives that optimize access to and accelerated application of transformative learning approaches that augment learner personal ambience and increase engagement and creativity through immersion. Personal ambience (Woodgate, 2012) reflects an extended sense of sensation and encounter leading to the expressed higher level of desirability to learn. It is achieved through experiencing the integrated elements of the holistic learning narrative. It is frequently allied with a flow state of pleasure (Csikszentmihalyi), which research shows leads to increased motivation and improved learner performance (Guo et al., 2007; Pearce et al., 2005). This supports the assertion that achieving positive personal ambience leads to greater student satisfaction and, therefore, engagement. Accordingly, it is argued that a positive association exists between the flow experience of students participating in ODL curriculum and their learning outcomes (Lee et al., 2012). A study by Mayer and Estrela (2014) confirmed that emotionally appealing design enhanced learning and Efiklides et al. (2006) ascertained that positive emotions enhance motivation and overall cognitive abilities, while Isen and Daubmann (1984) determined that such cognitive processes increase divergent thinking and creativity as well as being able to apply heuristic strategies and abstraction processes, substantiated by Bless and Fiedler (2006).

Well-designed, multimedia-directed foresight-based learning should have intrinsic immersive qualities, which provide an environment where the powers of involvement, knowledge, observation and exposure come together to fuse the physical, the emotional, cultural and mental experiences (Isabwe et al., 2017). Augmented personal ambience helps to accelerate and better activate the learner propensity to optimize the impact of the experience, forming a higher level of intimacy and attachment. It is in the connective feedback spaces between the content, environment, interface and the human experience that personal ambience is created. To achieve this immersion and positive affect, I emphasized six key elements in the foresight-based learning course design: self-direction (active control), opportunity to enhance existing skills and deliver assignments in any/multiple formats (freedom), ability to contribute to the course development and the future of learning in general (pride), having to think and work in a future landscape (excitement), learning, applying and building multimedia (self-esteem), creating and delivering the unexpected (inspiration).

These connected feedback spaces add the dimension that transports space from the perspective of physicality whether real or virtual into an immersive sensory modality, which facilitates flexible, seamless interplay between switched modalities of optimized content augmentation and the role of experience as an enhanced mindspace. In addition, I consider the potential interaction between emerging learning technologies with rich
interfaces such as augmented reality, virtual reality, simulation, etc., embedded into intelligent learning environments; and the power of personalized AI learning agents to create interactive simulation and representation that expand human imagination beyond real-world knowledge. I will show how multimedia-based spatial narratives are able to transport the learner into new universes by using immersion to change the internalized narrative that we create from the holistic experience.

The paper outlines the importance of connecting consciousness in cyberspace and new definitions of Self with abstract virtual realism and the power of multimedia-based immersion. I show that foresight-based learning systems can be as much about the role and power of enhanced consciousness as about physicality and the technology itself.

2. Spatial immersion in foresight-based learning systems

The most critical aspect of this research was the ability to imagine the learner’s relationship with hihe/sher cognitive environment/mindspace within a holistic intelligent learning environment rather than simply the role of the enhanced learning technologies involved or the content being delivered through the course. Emerging forms of multimedia provide affordances that deliver technology-rich learning environments or spaces, which if designed optimally can enable higher levels of motivation, participation, engagement, creativity and learner performance through the state of spatial immersion. This can occur when the spatial structure and affective drivers make the learner world perceptually convincing or real. The interplay between the learner, knowledge agent, multimedia interface or delivery mode, the intelligent environment and enhanced cognition deliver an immersive spatial narrative that transports the learner from participant to immersant (McRobert, 2007). The addition of multimedia to powerful creative approaches and tools otherwise intrinsically present in foresight practices or applied specifically in the creative stages of the foresight process, such as “Think like a DJ” and “Remixing the imagination” (Woodgate, 2004, 2018), “Disruptive Mapping” (Morris, 2016) “Futures Window” (Hiltunen, 2010) and “Scenario roadmapping” (Drew, 2006), can significantly augment the foresight experience (Gabrieli, S. and Zoels, J.C.).

In conventional pedagogical terms, we talk about learner climate, knowledge transference, instructional strategies, sequencing and messaging, delivery against learner profiles and learning how to learn, etc. In contemporary pedagogical terms, we focus more on learner self-determination, emerging competencies and technologically based learner enhancement. We have witnessed the large claims of how ICT has the potential to transform learning in a way that our basic conceptions of knowledge will be rewired (Lankshear et. al, 2000; Cigman and Davis, 2009). As we study weak signals and emerging issues that are driving transformational change in education, we are aware that while structural and pedagogical approaches are dealing with the significant challenges of design experimentation, the learner is also developing new characteristics, identities, behaviors, competencies, anchors and signifiers. Understanding such developments enables us to design learner and spatial narratives that leverage those changes, especially the learner’s growing familiarity and experience with digitalization in all its entities. The emerging learner’s increasing ability to conquer varying forms of virtuality in Deleuzian terms (Ansell-Pearson, 2005), simulation, abstractionism and telepresence, etc., provides a fertile platform for the development of spatial narratives that deliver a holistic immersive learning experience.

My interest in this redimensionalization of space is inspired by Paul Miller’s (AKA DJ Spooky) observation that the spaces in between the rhythms are where the dialogue starts (Miller, 2006 interview). This led me to not only look at space through the lens of white spaces, black holes, reversed worlds and missing colours (Coulter, 1999 interview), but to question the subject-object roles of not teacher-learner, but the space in between and how that space could be leveraged to enhance learner performance. From this we can translate that multimedia, mixed media or converged media literally assume a space of integration,
which has its own dynamics, time, flow, etc. The same applies to transmedia. Although it is a single “story” that spans across multiple forms of media (Warren et al.), its integrating connectors provide a space for augmenting learner cognition and engagement. How do we make these connections active? How do we leverage these spaces as dynamic tools that dispose with the subject-object confrontation generally derived from multimedia learning interaction (Brenda Laurel see interface design as theatre in a similar vein). I am not even seeing these spaces as human–computer interface (HCI), more a space for the interjection of the Self, of an alternative Self or ego ideal. We can experience these spaces in the way that Fried diagnosed minimalist art, where he discarded the output as an object and injected the concept of self-discovery or self-construction, which I see being developed through exploration, experimentation, motivation, engagement and creativity. In this sense, I am deliberately forfeiting hierarchy, boundaries and roles by replacing them with a democracy of elements that together augment learner personal ambience and performance. This concept explodes unity, fragmentation or even chaos by centering around the dynamic of immersion. It simply adds active “silence” as space in which the learner can identify with the whole in his or her consciousness, while traveling through unexpected affective horizons. It is about motivating the learner to transfer his or her fascination with the emerging technology itself and give it greater experiential relevance.

3. Multimedia’s role in creating immersive spatial narratives

Emerging forms of multimedia provide affordances that deliver technology-rich learning environments or spaces that designed accordingly can enable higher levels of motivation, participation, engagement and learner performance (Wankel and Blessinger, 2013). While the technologies themselves and their intrinsic qualities and applications are paramount as facilitators, it is the interplay between the various entities involved in spatial narratives with their ability to create a holistic immersive experience that determines the effectiveness and agency of the content, multimedia, learning climate, approach and environment, as well as the learner him or herself. Multimedia can enhance both cognitive attention and emotional engagement by creating a learning narrative and environment that reflects coherent and authentic representations of knowledge (Wankel and Blessinger, 2013), while providing an engaging platform for cognitive enhancement through deep experiential immersion. In addition, the scope of multimedia applications allows for flexibility in delivering multiple learning styles, approaches, levels and objectives. It is as relevant for situated learning as contextual learning and is central to the interconnectedness of open and blended programs.

Multimedia is centred on social constructivism (Vygotsky, Mayer, Piaget, Bandura, etc.) and more recently collectivism and Mayer’s work on the Cognitive Theory of Multimedia Learning (Mayer, 2005) reinforces the idea that instructional messages are more effective when grounded in sound design principles based on how the mind works. While there are numerous affiliated drivers to this increased effectiveness, such as the power of digital narratives and storytelling, video annotation, self-authoring and the role of cognitive loads, etc., I am focusing on multimedia’s ability to interplay within the holistic learning process to deliver immersion and, in turn, greater motivation, engagement, creativity and performance. Multimedia’s added strength is its ability to deliver both tacit and explicit conceptualized knowledge, especially the former, which involves engaging multiple senses and even experiences. Multimedia-enhanced, foresight-based learning exemplifies the relevance of space, through its social platforms, ability to travel across large distances, unlock unknown knowledge frontiers, work within intelligent learning environments, etc. It also leads to increased communication (peer and mentor), pacing flexibility based on mood and involves self-direction and the ability to deliver a higher level of affective engagement through dynamic, spontaneous learning opportunities (Wankel and Blessinger, 2013). In this paper, I also discuss the importance of learning to use and develop creative tools, all of which
involve increased engagement and opportunities for designing immersion into the learning narrative. In its essence, foresight-based learning is often framed as meeting the needs of the learner as perceived by the learner: a wave to self-direction. Research has also shown that positive attitudes about their online course experience led to increased engagement, motivation, creativity and performance (Howland and Moore, 2002), also including an openness to self-direction.

Foresight-based learning design offers the opportunity for the development of learning narratives that optimize the sensory modality and immerse the learner in a way that fully engages the learner’s activities and interaction. Moreno and Mayer list five common types of interactivity as dialoguing, controlling, manipulating, searching and navigating (Moreno and Mayer, 2007). However, developing the immersive, affective interactions of the learning narrative are the focal issue here.

Virtual reality as a spatial narrative, can elicit a sense of presence, the subjective experience of “being there” in a simulated reality and provide learner feedback simultaneously (Dalgarno and Lee, 2010). Augmented reality (AR), which Milgram and Kishino (1994) refer to as the “digital continuum”, provides the potential bridge of real-world activities and digital experiences, allowing the learner to connect their conscious with their imagination and boost their creativity (Chirico et al., 2016). AR transforms passive environments into active spaces that can generate a new sense of being with fresh ideas, through divergent thinking. This is sometimes called “Augmented Creativity” as it employs AR on mobile devices to enhance real-world creative activities, support education and open new interaction and cognitive possibilities (Zünd et al., 2015). AR also has the potential to include experiential/kinesthetic learning in the foresight-based learning format, by taking the spatial narrative beyond the basic course learning environment into the real world. It has the power to visualize and augment complex simulated future-world 3D spaces, while manipulating the virtual content and the interactive learning experience.

With personalized learning experiences becoming central to “student centered learning” practices, wearables and ultimately implants are emerging as efficient components of spatial narrative design. As we witness the increase in technology interfaces for the Internet of Things (IoT), we will expand the opportunities for personalized learning supported by neurofeedback and other cognitive enhancement tools. This will significantly change how we and contextualize space, connectivity, time, content and the concept of learning itself. It will drive a new paradigm for learning and living and their interrelationship, which in turn will have a major impact on where the responsibility and scope for education lies beyond self-direction and life-long learning. Adjacent and inter-connected with this clamor for personalized learning will be the role, potency and status of personalized learning and intercultural agents, cognitive robots with cultural signposts and lower level avatars. Avatar apps as science coaches in immersed learning environments have already been able to deal with medical data and instructional embodiment to guide scientific learning.

As data knowledge building platforms use machine/deep learning artificial intelligence to rapidly accumulate, structure, explore, analyze, validate, disseminate, share knowledge in real-time, student reactions to capacity building, response to questions and assignments, etc., will accelerate, potentially making knowledge a status-layered commodity. Other technologies such as simulation and holograms will take their place in spatial narrative design as and when their inclusion proves unique, novel and meaningful or when their potential metadata provides valuable assets to the overall learning narrative. Research on the use of holographic and robot teachers has so far been limited, but the use of reflective holographic teachers has been going on for some time in medicine and “mixed reality” technology is enabling history students to experience 3,000-year-old building or science students to step inside a molecule or witness the inner workings of the human heart. Critically, these multimedia enhanced learning spaces and tools provide the opportunity for digital creativity exploration (Black and Browning, 2011).
4. Learning in multimedia space to develop multimedia learning tools

As mentioned in Section 1: Introduction, I revisited the initial design brief for the course provided by the University of Agder and embarked upon building a new learning system founded on constructivism/collectivism-based blended learning (Al-Huneidi and Schreurs, 2012) as a framework for the Future of Mobile Learning course. A key objective was to obviate the issues identified from my observations around the initial course semester and its e-learning only structure. The blending integrated various event-based learning activities, including face-to-face class room, live e-learning, student-centered learning, experiential learning and self-paced learning. In constructivism theory, learners become more active in developing and creating knowledge, both individually and socially, based on their experiences, perspectives and interpretations. The new learning system, which I named the Living Learning System (LLS) incorporated the positives from the original course approach, such as alternative and future thinking, self-directedness, the content itself. In building the LLS, I took account of the initial learning from the Foresight Study that I had undertaken on the future of education and learning with a horizon of 2028 (Woodgate and Isabwe, 2018), with emphasis on our understanding of the emerging learner and enhanced human potential. The LLS builds on ten underlying learner platforms, namely:

- each student learns to his/her own strategy – personal relevance;
- alternative thinking techniques are critical;
- technology enhanced immersive exposure and interaction;
- optimized Zone of Proximity Transitioning;
- open communication;
- opportunities for constant testing and enhancement of individual competencies;
- technology supported learning;
- increased creativity (input and output);
- freestyle delivery of assignments; and
- contribution to the course design and progression (Woodgate and Isabwe, 2018).

The Living Learning System was designed to create a learning climate, structure and pedagogical platform that provides a sustainable future for learning in line with the outputs from the foresight study. I redesigned the Future of Mobile Learning course based on the Living Learning System.

The course is divided into three units, namely: Exploring the future, Creating the future and Delivering the future. The science of foresight process provided the backdrop to the course. In addition to The Futures Lab’s six stage process, emphasis was placed on the understanding of how concepts such as learning, social, friend, etc., change over time (Figure 1).

The course is 15 weeks long, plus final project and consists of 15 multimedia modules with full commentary and readings on-line. The first two modules are conducted in person over two days in the Future Learning Lab and Future Interaction Lab at the University of Agder in Grimstad, Norway (UiA). After which eight modules are conducted via Adobe Connect with students both in a lab environment and/or fully mobile. This is followed by a full week-long (40-hour) theory and practice workshop in the labs (including two modules), conducted in assigned teams consisting of transdisciplinary students with a variety of differing skills. The class has ranged between 10 and 25 students over the past five years. Students can deliver their assignments in any format unless specified, to continue to grow and demonstrate their core skills (Plate 1).

By the time the workshop occurs, the class is already starting Stage 4 of the Foresight process and have become more familiar with a wide range of multimedia tools and
interaction design tools, some coding good understanding of the relevant theories they need to consider: pedagogical, media, change and cognitive. Specifically, the students become familiar with technologies likely to be involved in the future of mobile learning (augmented reality, virtual reality and 3D/4D worlds, holograms, simulation, machine learning and deep learning, new devices technologies, structures, materials, batteries and interfaces, neural networks, frameworks and platforms, cognitive feedback, xAPI, avatars and learning agents, apps, Web 4.0 and 5.0, natural interfaces, GPS, LMS, quantum computing, implants, even claytronics, etc.). Furthermore, during the course, the students are required to learn:

- How to learn in alternative spatial narratives such as 3D worlds?
- How to create augmented reality tools?
- How to consider holograms for teaching and learning potential?
- How to build a learning avatar/agent?
- How to develop learning apps, distributed component-based architecture for student adaptive eLearning, and much more?
Here is an example of teaching augmented reality development. Working with my colleagues Jason Hahn and Elaine Raybourn from the US Government’s Advanced Distributed Learning team, I modified a lightweight system that could be understood and used by a broader base of students. The students worked with 3Ds Max modeling and rendering software, but many brought their own ideas and programs to the classroom. While the smartphone provides the necessary sensors, students used the AR toolkit for marker tracking. The process allows for different types of data handling, that is, visual patterns, multimedia content and 3D models (Figure 2).

Instead of using Problem-Based Learning (PBL), which is where an initial problem serves as a catalyst for subsequent learning (Fogarty, 1997; Kingsland, 1996) and is an important principle of Engagement Theory (Miliszewska and Horwood, 2006), I opted for Opportunity Oriented, Problem Based Learning (Oganisjana and Laizans, 2015). This is relevant as my coursework is based on creating a plausible future landscape and scenarios, where the problems are not necessarily identified until the process is completed, as well as helping the students develop the future-focused multimedia enhanced scenarios, which simulate a plausible future reality.

At the workshop, first, the whole class together to develop future opportunity maps and create the critical future platforms for the future of mobile learning and then in groups of four develop multimedia designed and delivered future scenarios. The lab environment inspires deeper immersion into the scenario building both throughout the process and in the outputs, themselves. The students have at their disposal a full lab of virtual reality (VR), augmented reality (AR), holographic, animation tools, motion capture, avatar and agent development tools and a wide range of software from game design to complex interactive fluid interfaces. The scenario outputs range from animated, interactive 3D learning environments to future learning and engagement tools and devices and systems for mobile education in the coming decades.

Examples of outputs from the workshops (Figure 3):

Given that the learning climate incorporated a learning narrative around reflective and experiential processes. The students are expected to vastly increase engagement and creativity, as well as performance. The key has been to integrate a significant level of immersion at critical learning junctures in the course, namely:

- creating a video that would demonstrate that the learners had understood and developed critical future drivers;
- demonstrating that they had mastered alternative thinking techniques;
- building multimedia designed future scenarios; and
- future curriculum design for a course in 2030.

Figure 2  AR modeling by advanced distributed learning
The last three modules are again taught remotely. The final project requires the students to master the learnings from all the 15 modules, that is, all the knowledge and experience around the future domain of mobile learning, pedagogical theory, the six stages of the science of foresight in theory and practices and the knowledge, experience, application and creation of multimedia technologies. It entails creating a design brief for a future curriculum on a domain of their choice to be delivered to learners in 2030. Again, it can be delivered in any format and there are no size requirements or limitations.

The assessment approach is primarily competency driven and is based on the following scale: Originality/Creativity: 20 per cent, Future-focus: 20 per cent, Mastering course content, analysis, reflection: 25 per cent, Application of course knowledge: 25 per cent and Contribution to future development of the course: 10 per cent.

The learning and assignments throughout this course mean that students had to transport themselves into the future, which, among other aspects, meant considering how the role of multimedia enhanced spatial narratives and multimedia tools could be integrated into the course. This requires the students to immerse themselves cognitively into a future world, where future worldviews prevail and many aspects of living and learning will be vastly different. Simultaneously, using the LLS in a blended Open Distance Learning (ODL) environment provided the opportunity to integrate fresh elements into the learning narrative, such as student content creation, peer instruction, future-focused thinking, collective intelligence building, immersive multimedia environments and multimedia tool development. Thus, the design of the course is based on a “multimedia in-multimedia out principle”. Students learn within a multimedia enhanced environment how to use and develop multimedia and then are expected to create multimedia learning tools or multimedia-based spatial narratives that can be specifically applied to their final future curriculum design assignment.

In general, the final project requires the students to develop a multimedia- driven learning space with the relevant live interfaces and interactions. The students need to determine the relevant integrated multimodal academic activities and cadence and show that their outputs
can work across a variety of context-relevant learning environments that would potentially use transmedia or mixed media learning tools.

The students then apply those learning narratives to a specific future curriculum. This means having a solid understanding of how the subject matter for the course will change during the determined horizon, that is, 10 years out. Much of this is self-directed, using and enhancing existing competencies or leveraging the skills of class peers. The student can deliver in any future-focused format. Together we discuss how best they can enhance their existing skills or learn something new that helps them immerse themselves deeper in the project, course and extend their future potential (Figures 4-6).

5. Research

After five semesters of teaching The Future of Mobile Learning course at the University of Agder, I conducted some qualitative and quantitative research to understand whether the LLS-directed OSL had met the goals of immersing students in a way that would lead to increased engagement, creativity and overall performance. The quantitative research delivered 33 respondents (from the 45 contacted). All 33 are current or have been graduate students and have taken The Future of Mobile Learning Course within the past three years. A part of the results from the quantitative research, which was conducted in the form of a 25-question questionnaire under the guidance and approval of Norwegian Center for Research Data (NSD) is shown below. This was followed up with personal interviews with six of the respondents. The research looked to investigate the benefits of the content and design of the Future of Mobile Learning course compared to parallel courses within the

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**Figure 4** UIA students’ assignment outputs – Final Project (1)

> Fully interactive virtual reality language course with real world conversations, based on real-time AR conversations in the country of the language

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**Figure 5** UIA students’ assignment outputs – Final Project (2)

> Avatar Mentor with personalized interface  
> A VR game with ARIS AR mentor students  
> Robotics Course with Agents

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Multimedia and Educational Technology Master’s Program in terms of generating greater levels of engagement and creativity. The research specifically explored the roles of multimedia and foresight, both singularly and collectively on increasing engagement and creativity through greater levels of affective stimulation and personal immersion.

5.1 Engagement

- 73 per cent felt that they were more engaged in this course than in parallel courses, because they were inspired by new learning modes and experiences. This was qualified as more affectively stimulating, freedom to express and be creative without fear, opportunities for self-direction, need to step out of one’s comfort zone, more choice of learning and assignment delivery approach.

- 67 per cent considered learning, experiencing and creating multimedia enhanced their level of engagement.

- 57 per cent felt that creating future scenarios (future-focused subject matter) was key to engagement through excitement and inspiration.

- 48 per cent felt that freedom of expression was key to increased engagement.

- 47 per cent expressed that future thinking techniques were critical to engagement.

5.2 Creativity

70 per cent strongly agreed or agreed that the course helped increase their personal creativity. They qualified this by stating that this was down to being able to develop unique, novel ideas (60 per cent), deliver in any format (56 per cent), learning in and with and creating multimedia (60 per cent), applying alternative thinking techniques (43 per cent) and creative thinking (50 per cent).

75 per cent stated that having to think about the future and place themselves in a future landscape increased their creative skills.

59 per cent claim that the course was better than other parallel courses at increasing personal creative skills.

5.3 Multimedia

- 60 per cent state that multimedia enhanced their creativity.

- 66 per cent believe that having to learn in and use multimedia to create something for the future was key to increased creativity.
66 per cent consider that they were especially engaged when using multimedia.

64 per cent state that multimedia increased their creativity and engagement because it helped extend and augment their personal creative skills.

To the question: which multimedia learning environment, skill and creative build was most important: AR (86.7 per cent) and VR (53 per cent). Which multimedia helped enhance your creativity: AR (47 per cent), interactive design tools (44 per cent), VR (36 per cent) and interactive video (46 per cent) and games design (37 per cent).

5.4 Living Learning System (LLS)

67 per cent stated that the LLS approach significantly increased their well-being and attitude towards learning. This was qualified with aspects such as personalization, feeling in complete control, as self-directed, they could pursue and own their ideas, the system delivers higher levels of engagement and creativity.

80 per cent found the LLS approach and course design inspiring and novel.

63 per cent said that the integrated elements within the LLS together increased their creativity levels.

They felt that the fact that the LLS allowed them to be more creative, which made it easier to be creative.

Respondents were asked to elaborate on why the LLS approach increased their overall well-being and academic performance:

- “By going deeper into theoretical design of future learning, it made me more engaged”.
- “The new learning modes made it easier to step out from the comfort zone”.
- “Thinking outside the box and engaging interesting technologies, helped me with my motivation and engagement”.
- “The ability to choose approaches and tools that I felt comfortable with or interested in, vastly increased my ability for self-direction/self-determination”.
- “I felt confident, because the course was really personalized.
- “I felt like I was in complete control of my learning, and how the information was given to me. This feeling of control of my own ideas and execution allowed to feel that I wanted to go on, rather than I was instructed to”.
- “Interesting to see how futurists believe the world will change regarding learning and how students will interact through digital tools and devices”.
- “The future thinking processes made us feel more free and engaged than other courses and allowed us to express ourselves in a creative manner”.

6. Conclusion

The ability to “live in the future”, that is, to project oneself into the future to explore, think, create and deliver plausible, future-relevant scenarios, concepts and strategies proved to be difficult for the initial multimedia students that undertook the Future of Mobile Learning course at the University of Agder. After revisiting the overall design and structure of the said course, I introduced my LLS, which is a foresight-based learning system that induces a high level of imagining in the abstract, considering and discussing discontinuity, unstructured and undiscovered knowledge and non-linear thinking. The course had a pedagogical framework based on social constructivism/collectivism and the theory of Opportunity-
Oriented, Problem-Based Learning. The design and development of the LLS system made it possible to rethink my approach to the central issue for the students, that of finding a connection between their Present Self and the Future Self to create and experience the optimized potential of a simulated future landscape with a 10- to 20-year horizon. I established that by creating a deep immersive learning environment, one that elicits a sense of presence and the subjective experience of “being there” in the simulated reality, the learner achieves a state of personal ambience that enables the learner to connect their conscious with their imagination and boost their operability in the simulated future landscape. The delivery of this augmented level of immersion required the introduction of a combination of immersive spatial narratives that engage the physical, virtual or cognitive simultaneously. The immersive spatial narratives were augmented by multimedia enhanced learning tools, that showed learners to increase and accelerate their learning performance, as well as reaching increased levels of engagement and creativity resulting in both developing highly advanced multimedia learning tools and simulations reflected through relevant futures scenarios and visions for the future of mobile learning.

There are multiple studies identifying the intrinsic affordances of multimedia and ICT and their potential to reconceptualize learning in a way that our basic conceptions of knowledge will be rewired (Lankshear et al., 2000; Cigman and Davis, 2009). Equally, technology enhanced learning environments are known to enable higher levels of motivation, participation, engagement and learner performance (Wankel and Blessinger, 2013). However, there is little research demonstrating how foresight-based learning systems can perform as a credible driver for increased engagement and creativity or that immersive spatial narratives provide a framework for immersing and transporting the learner into a future world, in a way that enables him or her to fully explore, think, create and strategize in a simulated future landscape.

References


Further reading


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