Immersive Worlds for Learning eXperience+:
Engaging users in the zone of proximal flow in Second Life

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Strand: meeting new markets and learning needs, i.e. at the postgraduate level or related to knowledge alliances with the public and private sector, on top of the mission of widening participation

Abstract
Virtual Collaboration plays an increasing role among students, but also between innovative universities to run Communities of Practice and exchange benchmarking. Universities are currently engaged in the transfer of knowledge and best practices with the private sector focusing on stakeholder collaboration as one way for output-oriented quality development and to attract sponsors for research projects. Such new collaboration forms become an engaging factor for Virtual Collaboration and eLearning. Multi-user virtual environments such as Second Life (SL) can facilitate users from diverse sectors for creative group virtual collaboration due to the various applications of constructivist instructions, e.g. with narrative anchors, and connectivist approaches. Dynamic interactions take place via users’ Avatars working as alternative egos facilitating the development of empathy among the users; supported by such enriched environment, they also aid in building immediate strong ties between the group members. Such acceleration of the socio-cultural part of learning leads to rapid immersion for virtual collaboration. In SL, all educational material is integrated into the tools provided; also virtual interactions are immediately seen by all participants. Thus, SL unlocks different training possibilities for advanced Learning eXperience+ (LX+); LX+ is the creation of immediate, deeply immersive and memorable learning experience in SL. Distance training is accelerated and deepened engaging trainees within a learning zone, called the Zone of Proximal Flow (ZPF). In ZPF peer-to-peer collaboration and learning occurs between the boarders of creative challenge and anxiety. Our LX+ approach with ZPF was implemented in an Innovation Management eCourse in Moodle and SL.

Keywords: immersive worlds, immersive experience, collaborative learning, second life.

Virtual Collaboration in Immersive Worlds
Education is generally acknowledged as one of the crucial components of personal and professional development. The integration of Information and Communication Technology (ICT) in education as well as the social and collaborative nature of the Internet provided another medium for communication and training. In his foreword for the UNESCO report (2002), Daniels said that within a short time ICT has become one of the basic
building blocks of the modern society. The current shift occurring in the Web from a static content environment where end users are the recipients of information - defined as Web 1.0 - to one where they are active content creators - defined as Web 2.0 - can be described as a transition to a more distributed, participatory, and collaborative environment (Delich, 2006). Web 2.0 is a platform where “knowledge-working is no longer thought of as the gathering and accumulation of facts, but rather, the riding of waves in a dynamic environment” (Downes, 2005). To Berners-Lee (2007), the Web is not only a technological tool but also a social phenomenon that enables collaboration and creativity. Nowadays, the term Web 3.0 has been used for a variety of applications which have widened the classical Web 2.0 platforms. One of the Web 3.0 definitions includes 3D environments that can be modelled entirely by the user. Since the experience of moving in such virtual places can be described as “immersive”, a general term of “Immersive Worlds” has been set for software such as Second Life, Open Sim etc. or a combination of A/V communication tools. As the primary aim is collaboration and learning as a consequent outcome, Web 3.0 support virtual collaboration for quality group work and learning.

The Immersive Worlds LANETO group ([http://immersive-worlds.com/](http://immersive-worlds.com/)) builds on Web 3.0 virtual collaboration for online, onsite and blended interaction for group-work and co-creation. Virtual collaboration is the basis of sociability as acting together in the pursuit of shared goals. Therefore, collaboration is a coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem (Teasley & Roschelle, 1993). Collaboration is an interactive process that engages two or more participants working together to achieve outcomes they could not accomplish independently (Salmons & Wilson, 2008). Consequently, virtual collaboration allows many people to share in both synchronous and asynchronous time and as such, taps into collective intelligence. Today's globalised markets, with their distributed corporate functions and complex supply chains, old boundaries – physical, cultural, and organizational – are melting away. Virtual collaboration enables flexibility, creativity and innovation without benefit of a physical environment associated with traditional organizational structures of the 20th century. The ICT as the mediator platform for virtual collaboration in Immersive Worlds is mainly used for interactive meetings, virtual training, decision making, group co-creation, innovation management, creating communities of practice to name a few. Software tools and solutions like Voice-Over-IP, web meetings, virtual classrooms and virtual worlds enable a strong potential for synchronous collaboration experiences which are highly engaging. In addition, such activities include a great potential for joyful learning within groups.

**Immersive worlds** are multi-user virtual environments that facilitate users from both public and private sectors for creative group virtual collaboration. Immersive Worlds means upgrading the reality and pushing the boundaries of space as well as imagination, with quality services bundling the whole life cycle of synchronous online collaboration, from the planning, via preparing necessary items, running sessions and following-up such activities. Quality refers to fitness for purpose, and in this context it examines its relationship to socio-cultural collaboration, associated design and learning as a derived outcome. As such, we propose the following taxonomy model for Immersive Worlds Virtual Collaboration (Fig. 1).
Depending on the different users’/students’ needs the proposing evolving taxonomy supports virtual collaboration and co-creativity for small group, network as well as community members for sharing information, experiences and ultimately converge their dreams. This is possible by the active engagement in the planned activities via the steps of activation/motivation, building trust and belonging for sharing and co-creation that will lead to further inspiration and imagination. Such taxonomy can be applied to diverse working and learning environments successfully, for short and long term sustainable results adding value to every member’s activity and task with the organisation or company. For such taxonomy to work the mediating virtual environment is of crucial importance as it provides opportunities as well as presents constraints that need to be considered for planning and appropriate execution.

3D Virtual Environments and Immersive Worlds: Learning Experience+

Immersive Worlds are being leveraged to add value to enterprise learning and collaboration; therefore a 3D learning design is essential. Learning in 3D can be used for any learner such as executives, managers, faculty members, students and anyone on lifelong learning. 3D virtual worlds include multi-user virtual environments such as Second Life (SL); these are digital representations of the real world where human-controlled avatars evolve and interact (Lambropoulos et al., 2011). Second Life consists of viewer software that can be downloaded and installed; the program is booted each time the user begins a new inworld session within Second Life graphical worlds. There are two ways to access such environments, via a browser and via an installed viewer. In our course implementation we used Second Life installed viewer.
Course implementation in Second Life is anchored in initial immersion in the environment based on virtual collaboration. According to Corder and U (2010), virtual collaboration requires soft competencies such as effective communication, and the ability to build trust and understanding; such competencies are essential to build upon group common aims and directions. 3D virtual environments such as Second Life would not only enhance users’ experience, but could provide the solution for socialisation, collaboration and synchronous communication as well as building development of intercultural competences. Emails and discussion boards ‘lack the immediacy’ for relationship building and create sustained bonds that are necessary for group activities for richness in human interaction.

Dynamic interactions take place via users’ Avatars working as alternative egos facilitating the development of empathy among the users; supported by such enriched environment, they also aid in building immediate strong ties between the group members. Such acceleration of the socio-cultural part of learning leads to rapid immersion for virtual collaboration. In SL, all educational material is integrated into the tools provided; also virtual interactions are immediately seen by all participants. Thus, SL unlocks different training possibilities for advanced Learning eXperience+ (LX+). Next, we are going to discuss each of the previous key elements and their implementation in Second Life building on the Zone for Proximal Flow:

1. **Repeating as in trial by error:** Multimedia educational material is inserted in the tools available in Second Life being available for the users/learners to study at their own convenience, repeating their own activities towards shared objectives until they reach them, within a specific timeframe.

2. **Engagement in immersive educational practice and ZPF:** Immediacy, profiling, self- and group-presence (Lambropoulos et al., 2010) facilitated in Second Life activates empathy. In this way the group members pass the first social threshold for their own actualization; on a second level, group active engagement is enhanced and accelerated and thus the group members can stay longer in the ZPF.
3. **Purposefulness as providing meaningful targets for the skills in need.** Shared goals visions and objectives lead to shared dreams for the group, network or/and community to reach.

4. **Strong, Direct, Immediate & Measureable Feedback:** Feedback is the key to improvement; 360 degrees quality feedback (also called Multi-Rater Feedback, Full Circle Feedback or Upward Feedback) enables individuals to work towards overall effectiveness for permanent improvement.

5. **Learning Experience+:** All of the above key elements contribute to enhanced experience that can lead to learning. Enhanced experience in Immersive Worlds creates a strong vibration to remember, change of behaviour is the ultimate learning result.

Learning results in the change of thinking, understanding and behaviour that can be measurable compared to specific indicators before the virtual collaboration intervention. Learning Experience+ (LX+) is the creation of immediate, deeply immersive, meaningful and memorable learning experience in Immersive Worlds. Thus, it is appropriate, satisfying, successful, and related to the educational and humane values, also directed towards the specific learning objectives for each course or session to suit three types of workers or students: the ones who show up and do exactly as they are told; the ones who show up and do the tasks exactly as told as well as work and push themselves and reflect getting better than the previous ones; and the ones who show up having thought about how today’s session fits into the larger goal and picture. They work very hard, pushing themselves into the discomfort zone over and over, with full commitment, they reflect/analyze/critique their performances trying to achieve “the quantum leap” within the Zone of Proximal Flow (ZPF), which is discussed next.

**Zone of Proximal Flow (ZPF)**

Distance training is accelerated and deepened engaging trainees within a learning zone, called the Zone of Proximal Flow (ZPF). In ZPF peer-to-peer learning occurs between the boarders of creative challenge and anxiety for innovative thinking. Nowadays innovation via virtual collaboration occurs within groups where the mix of ‘older’ and more experienced with ‘younger’ and less within coherent framesets is of great importance. In fact, it has been proven that such perfect mix is the foundation of great success (Lehrer, 2012). Knowledge acquisition and symmetry are needed in such groups are based on the alignment of asymmetrical interactions between more capable peers (Vygotsky, 1962). Vygotsky introduced two significant concepts, the “zone of proximal development” (zpd) and “scaffolding”; the individual could reach a higher level of development with the help of a more capable other. Socio-cultural learning attached significance to the level of symmetry/asymmetry between the members of a group. Creative flow is the self-engagement in virtual collaboration activities which require skills just above their current level. Thus, for Csikszentmihalyi (1996), exploratory behaviour can be explained by an intrinsic motivation for reaching situations which represent a learning challenge. Internal rewards are provided when a situation which was previously not mastered becomes mastered within an optimum amount of time: the internal reward is maximal when the challenge is not too easy but also not too difficult. Creativity is a combination of personal interest and a sense of discordance in the environment, and thus the creative process is a search for interest and novelty by changing the environment to reduce discordance (Martindale 1990).
In small group collaborative eLearning taking place in 3D Immersive Virtual Environments users/learners interact with the environment as well as between them or/and the tutor (i.e., human-human interaction). 3D Immersive Virtual Environments provide the space to curiosity, desire to learn, and ability to gain imaginative insight into a domain. This demands a proper integration of the conative dimension. As we conceive it, conation is a central aspect of the creative imagination, which, while certainly involving cognitive and affective aspects is clearly not exhausted by these. The Zone of Proximal Flow (ZPF) is the area where flow occurs within the zone of proximal development. In this way learners’ interest and engagement counteract the anxiety experienced in the creative flow. However, in order for the learners to experience ZPF for an enhanced learning experience, immersion is required.

Capturing attention to promote deep engagement facilitates students’ involvement in mental state of flow. Flow happens when a person in an activity is fully immersed in a feeling of positive energized focus, full involvement, and success in the process of the activity. Ultimate individual or group performance occurs when harnessing the emotions and positively enhanced, channelled, energized, and aligned with the task to promote ultimate learning and performing. There are ten factors to promote flow and not all of them need to happen simultaneously to experience flow: 1. Clear goals where the challenge level and skill level should both be high; 2. Concentration and focused attention; 3. Loss of feeling and 4. Distorted sense of time as in immersion; 5. Direct and immediate feedback; 6. Balance between ability level and challenge (the activity is neither too easy nor too difficult); 7. Sense of personal control over the situation or activity. 8. The activity is intrinsically rewarding, so there is an effortlessness of action; 9. Lack of awareness of bodily needs; and 10. Absorption into the activity.

There are also three conditions that are necessary to achieve the flow state: (a) Orchestrating activities with a clear set of goals so to provide direction and structure to the task; (b) Balancing between the perceived challenges of the task and own perceived skills. One must have confidence that he or she is capable to do the task at hand; and (c) Providing clear and immediate feedback to adjust performance so to reach the targets.

The Innovation Management eCourse: Virtual Collaboration for Creativity and Open Innovation
The markets are more and more segmented leaning out for individual customized solutions and more and more the “client” is also “producer” involved in the international value chain. This new reality reflects new competencies needed by university students powered up by co-creativity and innovation co-construction and peer production (Leadbeater, 2007). This is also stressed by the European Qualification Framework (EQF, 2008); learning outcomes are specified in three categories – as knowledge, skills and competences. To get an effective the cooperation between actors holding different culture is not “an easy thing”. As experience can show projects can be slowed or stopped by intercultural discordances (D’Iribarne, 2012). Intercultural cooperation especially in online education is now a reality for many of our students at ITIN and perhaps it is a coming future for many
institutions, educational organisations and training companies for Computer Supported Collaborative Work and Learning (CSCWL). The innovative aspects of the Innovation Management eCourse are the following:

- Promote entrepreneurship and innovation knowledge and skills in action
  - Apprenticeship within authentic environments
  - Activating the multiple intelligences
- Reduce transactive cost for virtual collaboration
  - Accelerate team-based work and learning by condensing a semester in a week
- Create sense of belonging in a working group
  - Define specific purpose within a specific time span
- Orchestrate collaborative learning convergence
  - Activities coordination and knowledge team building
- Promote synergy for direct fit between
  - Social needs, working demands &
  - Virtual collaboration and educational tasks, methods and tools
- Use 3D Immersive Worlds to enhance two ways communication for virtual collaboration

**Conclusions and Future Trends**

In the late 20th century and early 21st century numerous organizations started taking advantage of virtual collaboration employing 3D Immersive Worlds advantages such as the feeling of space, the immediate familiarisation with the participants based on emotional intelligence, small interventions in existing courses can make a difference, people’s behaviour in a realistic way among others. Organisation and Planning in Immersive Worlds are of great importance to orchestrate and enhance knowledge, skills and competencies acquisition in a very short time such as within a crash course. Such accelerated virtual collaboration which can result to learning is possible only with careful and detailed planning and preparation as well as use of appropriate tools. The next technological step will go through the integration of Virtual and Augmented Reality Technologies at our fingertips as 3D Immersive Worlds evolution (Morris &; 2012; Tang et al., 2012; Hedman, 2011). Thus, by providing the user more immersive multisensory stimuli (e.g. touching, movement capture, haptic sensor) the emotional channels (affective computing) will be enhanced resulting in the ability for the systems to adapt to diverse users creating novel and unique immersive experiences.

**References**


