







Figure 1: Revised Blooms Taxonomy adapted from Churches (2008)

The above figure, gives an indication how present technologies could be used by students under the guidance /facilitation of tutors onto how one could acquire the necessary thinking skills.

The motto behind the development of Web 2.0 was to create, share and collaborate, this in turn calls upon for active participation from users, creation of new materials and collaborating with peers and experts, all these features seems

to fit in perfectly with activities (ideally) implemented at Universities to develop creativity, innovation, critical thinking and enhancing competencies in students by exposing them to multiple perspectives through group engagement and teacher- student interactions within a traditional classroom setting (Bennett *et al.*, 2012;Junco, 2012).

Table 2: Benefits of using Ubiquitous technologies in e-learning systems at Universities, adapted from Gunasekaran et al., (2002), Alexander (2001), Weller (2000)

Benefits of using ubiquitous technology in e-learning systems at Universities
Betterment in the quality of learning and enhanced enthusiasm in students for acquiring it
Improved access to education, training and development from different sources made available through the World Wide Web.
The cost of education significantly reduced (almost free like edX etc)
Improving the cost effectiveness, time efficiency , student teacher relationship within the existing education practices put in place at Universities.

### 3. Designing Ubiquitous Learning Environment (ULE)

Learning theories and their right application plays a key role in the design of ULE's. One of the reason is, learning theories helps building relationships between learner, information sources, the facilitator and other stakeholders within the LE (Jacobs, 1999). Developing and fostering such a relationship within the LE is essential as Gersten *et al.*, (1998) points out, would help students understand and make

complete realization of what one is studying at the University, for example if students could see how things are done, they would be more able to retain and process the visual data than to just hear about it from the lecturer; this could enable students to understand the under pinned meaning of information they are gathering and their relevance in their own life and in the real world.

The VLE's used within Universities rely mostly on text-based communications; these systems lack visual-audio

capabilities. In such scenarios Ubiquitous technologies could provide not only text, but also video, audio and touch based systems at the disposable of the students. Hence when it comes to using Ubiquitous technologies, a good balance between the *course structure* and *mode of delivery* (including the online activities students should engage in) must be maintained in order to provide an optimal, value-add learning experience (Vrasidas, 2000).

With Ubiquitous technologies like Facebook, Twitter, Podcasts etc it would be possible to embed collaborative work and group brainstorming into existing design of e-learning systems. This would enable learners, free from space and time to interact with each other. Using systems, used by students as a part of their social activities, students might find it difficult to accept social and learning activities done together using the same system probably at the same time, but over a period both the activities would assimilate into one and thereby becoming a part of the student's daily routine in/outside University. When designing systems using Ubiquitous technologies due consideration should be given to the quality assurance factors pointed out by Alley *et al.*, (2001) which would have an impact on student engagement and their level of satisfaction while using such diverse online systems.

**Table 3:** QA factors under pinning Ubiquitous e-learning systems adapted from Alley et al., (2001)

Quality Assurance Factors underpinning Ubiquitous e-learning systems.
Construction of Knowledge
Self Paced learning
Active Learning
Moving up the pyramid of Blooms taxonomy from Lower order skills to higher order skills
Personalized learning depending upon on one's cognitive and learning styles
Experiential Learning in accordance to Kolb(1984)
Social and authentic learning
Epistemological assumptions needs to be constantly checked/evaluated
Constant evaluation of one's own learning cycle
Understanding the messiness of learning using different sources of information to analyze.

#### 4. Conclusion

Technology is growing at a rapid rate and advances taking place in the domain of ICT's, digital networks, mobile computing, handheld devices, social networks etc has an impact on the way we work today. These technological leaps have transformed the way we communicate with the technologies themselves and how we use these technologies to interact with other socially. But there is still a gap which needs to be bridged to transcend the growth of such technologies onto the learning, education and training domains.

ULE has the ability to impart knowledge, develop competencies, and engage/amaze learners with variety of media resources and mobile applications. But the success of these ubiquitous technology powered learning environment depends on how the system is designed, implemented and

evaluated. As highlighted above there are some benefits of using ubiquitous technologies into the current online/offline learning environment but there are some issues like the design frameworks, quality assurance, maintaining the motivation level of the learners through the learning cycle which needs to be explored and research upon.

Ubiquitous Learning Environment to some may sound futuristic and ambitious but over time just like any other technology they would blend into our day to day lives and we would be able to adapt to the new technologies and the pedagogy that might emerge from it, which could be seen as a new hope for the future of education.

#### References

- [1] Alexander, S., (2001), *E-Learning developments and experience*, Education+Training, Vol.43, No.4/5, pp 240-248.
- [2] Alley, L. R., Jansak, K.E., (2001), *Ten keys to quality assurance and assessment in online learning*, Journal of Interactive Instruction Development, Vol.13, No.3, pp 3-18.
- [3] Alonso, F., Lopez, G., Manrique, D., Vines, J.M., (2005), *An Instructional model for web-based e-learning education with a blended learning process approach*, British Journal of Education technology, Vol.36, No.2, pp 217-235.
- [4] Apple, (2008), *Apple classrooms for tomorrow-Today : Learning in the 21st Century*, [online accessed on 13 April, 2012], [http://education.apple.com/acot2/global/files/ACOT2\\_Background.pdf](http://education.apple.com/acot2/global/files/ACOT2_Background.pdf)
- [5] Bennett, S., Bishop, A., Dalgarno, B., Waycott, J., Kennedy, G., (2012), *Implementing Web 2.0 technologies in higher education: A collective case study*, Computer and Education, Vol.59, Issue 2, pp 524-534.
- [6] Chruches, A., (2008), *Bloom's Taxonomy blooms digitally*, [online accessed on 12, September, 2013], <http://www.techlearning.com/studies-in-ed-tech/0020/blooms-taxonomy-blooms-digitally/44988>
- [7] Derouin, R.E., Fritzsche, B.A., Salas, E., (2005), *E-Learning in organizations*, Journal of Management, Vol.31, No.6, pp.920-940.
- [8] Escobar-Rodriguez, T., Monge-Lozano, P., (2012), *The acceptance of Moodle technology by business administration students*, Computers and Education, Vol.58, pp 1085-1093
- [9] Gersten, R., Baker, S., (1998), *Real world use of scientific concepts: Integrating situated cognition with explicit instruction*, Exceptional Children, Vol.65, No.1, pp 23-36.
- [10] Gunasekaran, A., McNeil, R.D., Shaul, D., (2002), *E-Learning: Research and Applications*, Industrial and Commercial Training, Vol.34, No.2, pp 44-53.
- [11] Jacobs, M., (1999), *Situated Cognition: Learning and Knowledge Relates to Situated Cognition*, [online accessed 11 December 2011] <http://www.gsu.edu/~mstsw/courses/it7000/papers/situated.htm>
- [12] Jones, V., Jo, J.H., (2004), *Ubiquitous LE: An adaptive teaching system using ubiquitous technology*, In R.

- Atkinson, C. McBeath, D. Jonas-Dwyer & R. Phillips (Eds), *Beyond the comfort zone: Proceedings of the 21st ASCILITE Conference* (pp. 468-474. Perth, 5-8 December.
- [13] Junco, R., (2012), *The relationship between frequency of Facebook use, participation in Facebook activities, and student engagement*, *Computers and Education*, Vol.58, pp 162-171
- [14] Krumm, J., (2009), *Ubiquitous Computing Fundamentals*, CRC Press, Taylor Francis Group, September, 2009.
- [15] Michailidou, A., Economides, A., (2003), *E-learn: Towards a collaborative educational virtual environment*, *Journal of Information Technology Education*, 2, 131-152. Retrieved from <http://jite.org/documents/Vol2/v2p131-152-92.pdf>
- [16] Siragusa, L., Dixon, K.C., Dixon, R., (2007), *Designing quality e-LEs in higher education*, In *ICT: Providing choices for learners and learning*. Proceedings ascilite Singapore 2007. [accessed on 12 November 2011] <http://www.ascilite.org.au/conferences/singapore07/procs/siragusa.pdf>
- [17] Smith, A.D., Rupp, W.T., (2004), *Managerial Implications of computer-based online/face-to-face business education: a case study*, *Online Information Review*, vol.28, no.2, pp.100-109.
- [18] Vrasidas, C., McIssac, M.S., (2000), *Principles of Pedagogy and Evaluation for Web based learning*, Education Media International, [online access 17 May 2012], <http://vrasidas.com/wp-content/uploads/2007/07/webasedemi.pdf>
- [19] Weiser, M., (1991), *The computer for the twenty-first century*, *Scientific American*, September 1991, 94-104.
- [20] Weiser, M., (1993), *Some computer science issues in ubiquitous computing*, *Communications of the ACM*, Vol.36, No.7, pp 74-83. In Special Issue, *Computer-Augmented Environments* [online access 2 February, 2012] <http://www.ubiq.com/hypertext/weiser/UbiCACM.html>
- [21] Weller, M.J., (2000), *Creating a large scale, third generation distance education course*, *Open Learning*, Vol.15, No.3, pp 243-252.
- [22] Wong, D., (2007), *A Critical Literature Review on e-Learning Limitations*, *Journal for the Advancements of Science and Arts*, Vol.2, January 2007, pp 55-62.

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