American Journal of Engineering Research (AJER)
e-ISSN: 2320-0847 p-ISSN : 2320-0936
Volume-5, Issue-12, pp-313-317
www.ajer.org
Research Paper Open Access

Technology Enabled Learning –Survey

L. Venkateswara Reddy[1], Dr A. Rama Mohan Reddy[2]
[1.]*Department of Computer Science, Rayalaseema University, Andhra Pradesh, India.*
[2.]*Department of Computer Science and Engineering, S V U College of Engineering, SV University, Tirupati-5107502 , Andhra Pradesh, India.*

ABSTRACT: *The rate at which the Information Technology (IT) is growing today is evident from the fact that it has invaded almost every part of our life. Technological progress can be harnessed for augmenting both expansion as well as quality of education. Present endeavour in this direction has been mainly towards providing the infrastructure and network to the institutions of higher education. The digital resource development and utilizing the digital resource into quality certified programmers and courses need to be fully exploited by the universities. Research issues and challenges related to technology-enhanced learning are discussed for classroom learning at a distance, online learning, digital libraries, special collections and online resources, virtual laboratories, collaboration, and virtual environments. This paper presents a critical review of TEL.*

I. INTRODUCTION

The recent advent of wireless broadband Internet access and mobile communications devices has provided remarkable opportunities for 21st century blended learning models – simultaneous online and face-to-face – and seriously called into question the industrial-age traditional "egg crate classroom" model of teaching and learning. It has also enabled the emergence of a true synchronous/ asynchronous and virtual/physical matrix of learning opportunities for which our existing built learning environment infrastructure is not well suited[1].

It sets out what can be done to improve the process of moving from academic research and innovative prototypes to effective and sustainable products and practices. In doing so, it shows that technological development is only a small part of the picture. Significant and lasting TEL innovation requires long-term shifts in practice. These shifts are not confined to the classroom or training environment; they require alterations to many different elements of the education system. In order to make these shifts, different communities and groups need to work creatively together over time, so policymakers and funders should plan for engagement with teams to enable to initiate, implement, scale and sustain long-term innovation. An expert multidisciplinary team carried out the research underpinning this report. Initial analysis of the field of TEL research, development and policy was used to select key examples of TEL innovation for detailed study. Innovation was taken to be practical implementation of new ideas and technologies with a intention of having an observable impact on teaching and/or learning. The initial phase included systematic analysis of data collected from indepth interviews with key figures from research and industry. Each member of the research team brought substantial personal expertise to the research process, enabling them to set the findings within a broader context. This was a strength of study, allowing team members to link their analysis not only to the field of educational technology but also to understandings developed in the fields of organization behavior and innovation dynamics. This executive summary introduces the four key insights described in the report, links each with recommendations to enable successful TEL innovation and, finally, outlines the structure of the report.

Surprisingly a small proportion of published accounts of projects involving the use of technology for teaching and learning provide a clear indication of educational rationale and anticipated outcomes for both the teacher(s) and students involved and the institution. A lack of clarity on these matters makes it extremely difficult for those concerned — and any other educators who might be interested — to learn any useful lessons from the experiences of others. It seems reasonable to ask questions about the outcomes achieved following the investment of large amounts of time and money. Unfortunately, attention appears to focus too often on the technology or tools involved in a project, rather than the teaching or learning processes and practices. Many teachers seem to ask "What can we use this technology or tool for?" rather than "How can we enable our students to achieve the desired or necessary learning outcomes?" or "What forms of participation or practice are enabled for learning?" (Kirkwood, 2014). The use of technology in itself is very unlikely to result in improved

educational outcomes and ways of working among teachers and students. Various contextual factors exert far greater influence on the processes of teaching and learning problems are explained n this paper. However, educators (and senior educational managers) frequently appear to be taken in by the extravagant claims made about various technologies and the promised advantages and benefits they can bestow. As each new technology or tool is developed and adopted in educational settings, a collective amnesia about lessons learned from research into and evaluations of previous "innovations" also appears to develop. Enthusiasts tend to assume that each new tool or technology is so novel that there is nothing to be learned from the knowledge and experience derived from using older media and technologies (Kirkwood & Price, 2005). In reality, technologies and tools are far more transient and short-lived than the educational issues that they claim to address. In all sectors of education, various technologies have been used for teaching and learning purposes over many decades. Instead of assuming that "new" equates with "different" or "better," educators need to improve their understanding of the implications of what is already known about TEL, not just in terms of technical issues, as well in terms of the logical and educational consequences.

II. WHAT IS TEL

Today's learners have access to increasingly powerful and affordable handheld computing devices, including smartphones, game consoles and tablet computers. They can share, interact and immerse themselves online with others through the use of social networks and virtual worlds. They can also create identities and user-generated resources that potentially have a virtual worldwide audience enabled by the Internet. Learners' activities can be captured in real time and feedback processes automated with increasing precision through learning analytics. Technologies that allow users to post material and messages online have the potential to support learner inquiry, to offer new modes of representation and expression requiring new forms of literacy, to support innovative thinking and problem solving through collaboration, and to allow publication of work to an authentic external audience [5]. TEL is able to make use of different forms and formats of technology in the pursuit of more engaging and beneficial forms of teaching, learning, pedagogy and assessment. As this report highlights, good pedagogic intentions lie behind some of this development but, 'many important TEL developments have often come from innovating with technologies developed for other purposes' [6]. Technology-enhanced learning has emerged as a preferred term of reference for the research community working in this area. The term is more generous and encompassing of new practices than the wide range of related labels, including 'educational technology', 'computeraided learning', 'Information and Communication Technologies' (or 'ICT', as they are often referred to in the schools sector), and 'e-learning', to name but a few. 'Technologyenhanced learning' stresses that the technology is employed in service of the learning, and that it is not just adopted, but is expected to deliver improvement. References to TEL, in relation to support and training, began to emerge in the 1990s and the first TEL conference appears to have taken place at the end of that decade. One critical factor for the successful implementation of TEL is the ability of teachers to know why, when and how to best use technology for teaching and learning. However, getting teachers to use TEL effectively is far from simple, as it involves taking into account a complex variety of intrinsic and extrinsic influences. While there is much published research on teachers' use of technology, it is much more difficult to find reports that relate those uses of TEL to how the teachers involved think about the processes of teaching and learning — their beliefs — and how they enact those beliefs in their teaching activities — their practices. Where TEL interventions have had disappointingly little impact on students' learning outcomes, it is most likely that the fundamentals of what constitutes teaching and learning have been taken for granted and/or not considered necessary. Only by changing the conceptions and beliefs of teachers regarding teaching and learning (with or without technology) can any significant changes be effected in their teaching practices. For the successful adoption of TEL, it is vital to support teachers in the task of reviewing, reassessing and modifying their conceptions of teaching and learning. That is far more critical than developing their technical skills and competence. For example, one review of competencybased approaches to professional development for online teaching found three important dimensions that were being overlooked and in need of further exploration: "empowering teachers," "promoting critical reflection" and "integrating technology into pedagogical inquiry" (Baran, Correia & Thompson, 2011).

III. RELATED WORK

Nfoshare LLC (www.nfoshare.com) is a social network for college classrooms. Nfoshare is a platform where students can connect with their professors, teaching assistants, tutors and their classmates. Ask questions in real time and participate in academic conversations, related to a specific course. It is similar to a "*Yahoo Answers/Facebook mashup*" for the college classroom. Nfoshare focuses on the social and gaming aspect of learning within a classroom, helping students get excited about learning and never having to feel like they are studying alone. At Nfoshare, students' login using "Facebook", ask questions to their class community and

have the ability to view and participate in all related academic conversations. The professor and the Teaching Assistant (TA)/tutor can follow all conversations and respond in real time. Additionally, tutors who are paid by the home institution, in this case the University of Delaware's Office of Academic Enrichment, provide real time answers to student questions. The program has initially been aimed at introductory classes and run throughout the semester. This approach leads to an ever growing repository of frequently asked questions that are tagged, searchable and stored for not only the current semester but for future use. Nfoshare's program highlights the social and gaming aspect of a classroom and leverages the value of the classroom relationships in a social network to enhance learning. For example, badges are assigned to students in a class that generate the best content. A student who answers a lot of questions well receives a 'Study Wiz' badge. This helps students who may be having difficulties while studying, connect and work with students who have been awarded the 'Study Wiz' badge.

3.1. The impact on TEL of differing beliefs and practices:

What does this mean in practice? It is important to recognise that technologies and digital tools can be used in a range of different ways for a variety of purposes. There is little point in simply talking about "using a wiki," "making a podcast" or "creating a self-assessment test." For other people to understand what is being proposed, the purpose of and design for learning need to be made clear. In strategic terms, an individual teacher whose conception is teaching-focussed (or who works in a department or faculty that has a teaching-focussed ethos) is more likely to use technology in ways that support existing — usually transmissive — teaching strategies. He or she will tend to favour presentational forms — such as PowerPoint presentations, podcasts and webcasts — which support teaching-centred practices. Practitioners who have a learning-focussed conception of teaching (and are supported in this by their departmental colleagues) are, in contrast, more likely to exploit technologies and tools that facilitate and support the development of their students' learning. Such teachers design learning activities that use learning technologies as enablers, making it possible for students to do things such as critically examining sources of information or data, undertaking group tasks, or reflecting upon and demonstrating developments in their understanding and practices through the use of tools such as wikis, blogs, discussion forums and portfolios. As far as student learning is concerned, the most pervasive influence is assessment — how students are assessed or how they anticipate that they will be assessed. Many educators have referred to assessment as the de facto curriculum — what students actually focus on when studying. There is a considerable body of supporting evidence for this (Boud, 1995; Brown, 1997; Brown & Knight, 1994; Ramsden, 1992; Rowntree, 1987). So, any open and explicit discussion of teaching and learning — which would be the ideal type of discussion — also needs to extend to the role of assessment. For example, do teachers and students think of assessment primarily in quantitative terms (where the goal is the accumulation of more information to get higher marks or grades)? Or do they consider it more in terms of achieving qualitative improvements in students' knowledge and understanding (thinking about the subject in deeper, more complex ways)? You may need to scrutinize the extent to which the assessment tasks and examinations actually set for students match the stated aims and expected learning outcomes for your modules or courses. Is there too much emphasis on the recall of factual information? If your students are expected to demonstrate, for example, critical thinking, problem-solving skills or the application of ideas to novel situations, how are these abilities assessed? What role can TEL play in facilitating (or impeding) the development and demonstration of desired outcomes such as these?

3.2 . Preparing an institutional review for TEL

We suggest that a thorough review, or reality check, be undertaken before you proceed with the introduction — or expansion — of TEL in your institution. This will involve examining the existing environment and how prepared your institution is for the implementation of TEL. Teaching and learning with TEL is more than a simple transaction between a teacher and students in a closed room, so many associated aspects will need to be taken into account. The appropriate technical infrastructure must be installed in the institution and subsequently maintained. Academic staff will require professional development not only in technical aspects of TEL, but also in how to make best use of technology for their pedagogic purposes. Students will need support to adopt new ways of working digitally for their academic studies. Managers will need to adopt new ways of thinking about resource allocation and monitoring due to the new ways of developing digital materials for teaching and learning. That development of digital resources is likely to require input from specialists with pedagogic, design and media expertise. The review should therefore not just to focus on teachers and learners; it should also involve technical/support staff and senior managers/policy makers

Table 3.1: Overview of network analysis methods and findings

Study	Metrics	Findings
Moolenaaret al. (2012)	Density, Centralization	Density affects teachers' perceptions of collective efficacy
Capuano et al. (2011)	Eigenvector, Degree, (flow) Betweenness, Closeness, Neighborhood centrality	NA
Dawson et al.(2011) Lomi et al. (2011)	Degree, Betweenness, Closeness, Eigenvector Degree, betweenness, Reciprocity	Weak correlations between interview score and closeness and eigenvector values students perform similarly to their peers' average; students that perform similarly are more likely to form friendship and advice ties
Mödritscher et al. (2011)	PALADIN software	detection of 'conversationalist' and 'pioneer' interaction patterns
Rodríguez et al. (2011)	Block modeling	core forum topic threads (m-slices)
Dawson(2010)	Degree	high-performers make more connections than lowperformers; scholars connect to peers of similar academic standing; teachers take more often part in high-performer networks than low-performer networks.
Heo et al. (2010)	Density, flow betweenness	high density affects communication, cohesion and mutual support
Merlo et al. (2010)	Connectivity	detection of textual copy communities
Yao (2010)	Density, Centralization, Share, Reciprocity	student interactivity drops after teacher withdrawal; change of discussion design did not change relative student contribution
An et al. (2009)	Density, Centrality, Share, Reciprocity	presence of a teacher hinders student interaction
Chatti et al. (2009)	Degree, Closeness, Betweenness	several network visualizations
Ryymin et al.(2008)	density, degree	four teacher networking patterns: counsellor, inquirer, collaborator and the weakly social.
Cho et al.(2007)	Degree, Betweenness, Closeness,Structural holes	communication style is reflected in ego network structure
De Laat et al. (2007)	Degree	interaction patterns change over time
Nuankhieo et al. (2007)	Density, Centralization	small groups of 3-4 individuals share more information and knowledge than dyads; small group activity yields higher sense of community and social ability
Klamma et al. (2006)	Degree, Closeness, Betweenness, Structural holes	identification of the troll role, a person that "aims at drawing attention and starting useless discussions"
Posea et al. (2006)	Density, Closeness, Eigenvector, Centralization	n/a
Aviv et al. (2003)	Cliques, Bridges, Role groups, Eigenvector centrality, Degree, Density	high cohesion exists in structured asynchronous learning networks
Martínez et al. (2003)	Density, Centralization	a mixed methods approach can be used to identify networking patterns
Reffay and Chenier (2002)	Cliques, Clusters	hierarchical cluster analysis is a useful pre-step in cohesion analysis using cliques

IV. CONCLUSION

Technology-enhanced learning (TEL) research focuses on how technologies can add value to teaching learning process. The changing learning environment (e.g. non-linear learning, the use of social media) poses new challenges that can be addressed by SNA(Social Network Analysis). In the field of Technology enhanced Learning (TEL), SNA as a research method has taken off, but mainly in the form of visualization and analysis. In general, the authors propose an increase in the use of network simulations to predict or extrapolate behavior, and interventions driven by SNA. What is most pleasing from authors viewpoint is that there are exciting alternatives emerging to the traditional closed classroom and these are gaining increasing acceptance. Further quantitative study is required to support these qualitative findings.

REFERENCES

[1] Mitchell, W. (2003), "21st Century Learning Environments", presentation at a workshop on new learning environments at Queensland University of Technology in conjunction with K. Fisher.

[2] Crook, C. and Harrison, C. Web 2.0 *Technologies for Learning at Key Stages 3 and 4: Summary Report.* Becta, Coventry, http://www.becta.org.uk 2008.

[3] Noss, R., Cox, R., Laurillard, D., Luckin, R., Plowman, L., Scanlon, E. and Sharples, M. *System Upgrade: Realising the Vision for UK Education*. Available at http://telit.org.uk/, http://telit.org.uk/ 2012.

[4] Gao, N. TEL-isphere 1999: The Caribbean & Technology- Enhanced Learning. Humanities and Social Sciences Net. http://h-net.msu.edu/cgi-bin/logbrowse.pl?trx=vx&list=ED TECH&month=9904&week=c&msg=TmqV6TPCYpeMPw/ UHTlrKw 1999.

[5] European Commission. *Open Consultation: New Research Challenges for Technology Supported Learning*. Available at http://cordis.europa.eu/ist/telearn/consultation.htm 2001.

[6] STELLARnet Concept and Project Objectives. http://www.stellarnet.eu/about/ 2013.

[7] Moolenaar, N.M., Sleegers, P.J.C. and Daly, A.J. (2012) 'Teaming up: linking collaboration networks, collective efficacy, and student achievement', *Teaching and Teacher Education*, Vol. 28, No. 2, pp.251–262.

[8] Capuano, N., Laria, G., Mazzoni, E., Pierri, A. and Mangione, G.R. (2011) 'Improving role taking in CSCL script using SNA and semantic web', *2011 IEEE 11th International Conference on Advanced Learning Technologies*, IEEE, pp.636–637.

[9] Dawson, S. (2010) '"Seeing' the Learning Community: An Exploration of the Development of a Resource for Monitoring Online Student Networking', *British Journal of Educational Technology*, Vol. 41, No. 5, pp.736–752.

[10] Mödritscher, F. and Law, E.L. (2010) *Utilising Pattern Repositories for Capturing and Sharing PLE Practices in Networked Communities*, September, pp.150–161.

[11] Rodríguez, D., Sicilia, M-A., Sanchez-Alonso, S., Lezcano, L. and Garcia-Barriocanal, E. (2011) 'Exploring affiliation network models as a collaborative filtering mechanism in e-learning', *Interactive Learning Environments*, Vol. 19, No. 4, pp.317–331.

[12] Dawson, S., Macfadyen, L., Lockyer, L. and Mazzochi-Jones, D. (2011) 'Using social network metrics to assess the effectiveness of broad based admission practices', *Australasian Journal of Educational Technology*, Vol. 27, No. 1, pp.16–27.

[13] Heo, H., Lim, K.Y. and Kim, Y. (2010) 'Exploratory study on the patterns of online interaction and knowledge co-construction in project-based learning', *Computers & Education*, Vol. 55, No. 3, pp.1383–1392.

[14] Merlo, E., Rios, S., Àlvarez, H., L'Huillier, G. and Velasquez, J.D. (2010) 'Finding inner copy communities using social network analysis', *Knowledge-Based and Intelligent Information and Engineering Systems*, Springer, pp.581–590.

[15] Yao, Y. (2010) 'Comparing two discussion designs in terms of student online interactions', *2nd Conference on Education Technology and Computer (ICETC)*, Vol. 1, IEEE, pp.V1-219–V1-222.

[16] An, H., Shin, S. and Lim, K. (2009) 'The effects of different instructor facilitation approaches on students' interactions during asynchronous online discussions', *Computers & Education*, Vol. 53, No. 3, pp.749–760.

[17] Chatti, M.A., Jarke, M., Indriasari, T.D. and Specht, M. (2009) 'NetLearn: social network analysis and visualizations for learning', *5th European Conference on Technology Enhanced Learning, EC-TEL 2009: Learning in the Synergy of Multiple Disciplines*, pp.310–324.

[18] Ryymin, E., Palonen, T. and Hakkarainen, K. (2008) 'Networking relations of using ICT within a teacher community', *Computers & Education*, Vol. 51, No. 3, pp.1264–1282.

[19] Cho, H., Gay, G., Davidson, B. and Ingraffea, A. (2007) 'Social networks, communication styles, and learning performance in a CSCL community', *Computers & Education*, Vol. 49, No. 2, pp.309–329.

[20] De Laat, M., Lally, V., Lipponen, L. and Simons, R. (2007) 'Investigating patterns of interaction in networked learning and computer-supported collaborative learning: a role for Social Network Analysis', *International Journal of Computer-Supported Collaborative Learning*, Vol. 2, No. 1, pp.87–103.

[21] Klamma, R., Spaniol, M., Cao, Y. and Jarke, M. (2006) 'Pattern-based cross media social network analysis for technology enhanced learning in Europe', Nejdl, W. and Tochtermann, K. (Eds): *Innovative Approaches for Learning and Knowledge Sharing*, Vol. 4227, Springer, Berlin, pp.242–256.

[22] Posea, V. and Trausan-Matu, S. (2010) 'Bringing the social semantic web to the personal learning environment', *2010 IEEE 10th International Conference on Advanced Learning Technologies (ICALT)*, pp.148–150.

[23] Aviv, R., Ehrlich, Z., Ravid, G. and Geva, A. (2003) 'Network analysis of knowledge construction in asynchronous learning networks', *Journal of Asynchronous Learning Networks*, Vol. 7, No. 3, pp.1–23.

[24] Martínez, A., Dimitriadis, Y., Rubia, B., Gómez, E. and de la Fuente, P. (2003) Combining qualitative evaluation and social network analysis for the study of classroom social interactions', *Computers & Education*, Vol. 41, No. 4, pp.353–368.

Present Address of First Author:

L. Venkateswara Reddy,
Professor,
Department of Information Technology
Sree Vidyanikethan Engineering College,
Near Tirupati-517102, A.P.