

Teachers, Technology and Transformation

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1. Esteemed Vice Chancellor, Prof. Vasudha Kamat, distinguished dignitaries on the dais, and teachers and students of SNDT Women's University; it is a matter of great pleasure for me to be here with all of you today. My sincere gratitude to Prof. Kamat and the University authorities for inviting me to deliver this Lecture, which is in honour of the founder of the University and one of the great social reformers of our country. It is a matter of great honour for me to be amongst scholars, and students to share some of my thoughts on Teachers, Technology and Transformation. On this World Teacher's Day, I dedicate this presentation to all my teachers, who have directly and indirectly shaped my thinking and because of whom I am standing before you today. My views are personal as a teacher and a trainer, and as a life-long learner.
2. Addressing the students of Allahabad University in 1947, Pt. Jawaharlal Nehru, the first Prime Minister of India said "University stands for humanism, for tolerance, for reason, for the adventure of ideas and for the search of truth. It stands for the onward march of the human race towards even higher objectives. If the universities discharge their duties adequately, then it is well with the nation and

the people". This succinctly presents the 'idea of the University' and the role that it should play in transformation of our societies.

3. For centuries, the university has been a place for teaching, research, and extension activities in all domains of knowledge. It differs from a single discipline research centre, a college focusing on teaching, and even from an advocacy agency such as Non-Governmental Organizations (NGOs). It should be an independent institution that has the moral and cultural capacity to pursue knowledge in its purest form. It is *not* same as 'higher education'. University as an idea is an ecosystem of teachers, students, teaching support personnel, and the society it serves. Therefore, it is always dynamic and is in constant state of change. It spreads higher education, but it is not just a space where students and teachers meet to exchange ideas; it is all about democratic values, freedoms, truth, innovation, business and cultural emancipation. It is a space where society expects little or no state control, as Popper says "too much state control in educational matters is a fatal danger to freedom"¹. A true university is *neither* bound by space and time considerations, *nor* limited to constraints of curriculum and transactional processes. It should operate within the 'academic freedom' defined in texts of international understandings.
4. On 11 November 1997, in its 29th session of the General Conference, the United Nations Educational, Scientific and Cultural

¹ Popper, K. (1945). *The Open Society and Its Enemies*, London: Routledge

Organizations (UNESCO) adopted “Recommendation concerning the Status of Higher-Education Teaching Personnel”², which states “Institutions of higher education, and more particularly universities, are communities of scholars preserving, disseminating and expressing freely their opinions on traditional knowledge and culture, and pursuing new knowledge without constriction by prescribed doctrines. The pursuit of new knowledge and its application lie at the heart of the mandate of such institutions of higher education. In higher education institutions where original research is not required, higher-education teaching personnel should maintain and develop knowledge of their subject through scholarship and improved pedagogical skills”.

5. The UNESCO recommendation is a very useful document that Governments, universities, teacher unions and teachers themselves may seriously look at as guiding ethical principles of professional practice. As a teacher myself, sometime back, I critically looked at the recommendation and found a long list of duties and responsibilities of a teacher inherent in our academic freedom.
6. I summarize some of these for the interest of the audience here. The duties and responsibilities of teachers in universities are: (a) to teach students effectively within the means provided by the institution and the state; (b) to conduct scholarly research and to disseminate the results of such research or, where original research

² http://portal.unesco.org/en/ev.php-URL_ID=13144&URL_DO=DO_TOPIC&URL_SECTION=201.html

is not required, to maintain and develop their knowledge of their subject through study and research, and through the development of teaching methodology to improve their pedagogical skills; (c) to base their research and scholarship on an honest search for knowledge; (d) to observe the ethics of research involving humans, animals, the heritage or the environment; (e) to respect and to acknowledge the scholarly work of academic colleagues and students; (f) to refrain from using new information, concepts or data that were originally obtained as a result of access to confidential manuscripts, funding applications and papers in the peer review process; (g) to ensure that research is conducted according to the laws and regulations of the state and does not violate international codes of human rights; (h) to avoid conflicts of interest and to resolve them through appropriate disclosure and full consultation with the institution employing them; (i) to handle honestly all funds entrusted to their care by the institution or other agencies for research or for other professional work; (j) to be fair and impartial when presenting a professional appraisal of academic colleagues and students; (k) to be conscious of a responsibility, when speaking or writing outside scholarly channels on matters which are not related to their professional expertise; (l) to undertake such appropriate duties as are required for the collegial governance of institutions of higher education and of professional bodies.

7. I urge you all to review this very important document. Though it may need some revision, it is a very important instrument to keep the teaching profession focussed and assert its rights as per internationally agreed principles. We face serious challenges today as teachers, and collectively we can improve the situation.
8. Now, I turn to the second section of my presentation. It's about use of technology in teaching and learning. What technology can do to help us as teachers? Can it help improve student learning? Those of us working in the field of educational technology for years know well the potentials of technology use in education. It is less about technology itself than about appropriate use of technology for education.
9. Do media influence learning? -- is the often asked question following the research by Richard E. Clark. Research studies called media comparison studies have revealed that learners equally learned well, irrespective of the means of presentation. Clark (1983) emphasizes that "media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries cause changes in our nutrition"³. Clark suggested that research should focus instructional methods that are crucial in learning, whereas Kozma⁴ (1991)

³ Clark, R.E. (1983) Reconsidering research on learning from media, *Review of Educational Research*, 53, pp. 445-459.

⁴ Kozma, R.B. (1991) Learning with media, *Review of Educational Research*, 61 (2), pp. 179-211.

refuting Clark's assertion recommends examination of how media influence learning.

10. Ever since Thomas Edison predicted in 1913 that books will be soon obsolete in schools and motion picture will be prevalent in next 10 years – which is yet to happen, educators all over the world have experimented with numerous media and technologies – each having unique attributes of their own and affording different options and capabilities. From numerous innovations and research we know that efficient, effective and engaging learning is about appropriate use of the available technologies and their attributes to optimize student learning.
11. Notwithstanding the debate on influence of media on learning, media and technologies are here to stay in education as they “do create different cognitive processes at different levels of efficiency (with regard to speed, ease, effectiveness). In other words, the form in which information is presented can determine how it is processed in a mind, and hence how it can be learned”⁵ (Cobb, 1997).
12. Elsewhere⁶ (Mishra, 2006), I have presented use of technology in learning at three planes – learning *from* technology, learning *in* technology and learning *with* technology.

⁵ Cobb, T. (1997) Cognitive efficiency: Towards a revised theory of media, *Educational Technology, Research and Development*, 45(4), pp. 21-35.

⁶ Mishra, Sanjaya (2006) 'Learning from, in and with technology', in Ramanujam, P. R. (Ed), *Globalization, Education and Open Distance Learning*, (pp.163-175), New Delhi: Shipra

13. *Learning from Technology*, is a situation where different media are used as carriers to deliver information from which we learn, e.g., reading a *textbook*, listening to *radio* and watching a *television* programme. We learn from all these sources of information. Meaningful learning here is a generative process requiring learners to select relevant information from what is presented, organise it into a mind map and integrate the new map with prior learning. However, most of the time learning from technology is passive, and thus can be said to be least effective. To enhance learning from technology, it is important that the source (media) of learning be designed specifically for learning, making best use of its own symbol system. In order to learn from television, that uses iconic symbol system to represent knowledge, it is necessary that the learners have some prior experience on the topic through media notes, to establish relevance of the topic to individual learner. The use of learner control over media also enhances learning, as the learner can pause and play the programme to think, reflect, analyse and assimilate new learning.
14. *Learning in Technology* is an environment facilitated by the use of technology to learn from. In such a situation, technology is *integrated* rather than used as a stand-alone media. Thus, learners learn in a technological environment through multiple media. Such a situation is very much like a distance learning situation, or a teleconference based teaching-learning environment that enables a

virtual classroom situation. The use of web-based learning or online learning also falls within this category. The learning environment demands certain kind of responsibilities from the learners and assumes self-regulation and internal motivation as essential components of successful learning. Participation in the technological environment becomes crucial for learning to happen and can facilitate collaborative and cooperative learning through the use of new information technologies such as e-mail, discussion boards and chat facilities available on the Internet. Learning in technology is an improved approach towards effective learning and subsumes learning from technology. It is a much demanding situation for instructional designers and course developers, as planning and implementation of instructions are separated, where planning takes more time and effort.

15. *Learning with Technology* is a creative use of technology to allow learners to learn by working with technology, which means instead of watching a video programme or interacting with a multimedia, the learners are engaged in preparing the video or developing the multimedia. The new information technologies, particularly computer and the Internet provide this opportunity to learn with technology. For example, to learn web-based learning, students can work directly on a learning management system platform to

create a web-based learning environment. It is argued by Resnick⁷ (2002) that technology should be used to creatively express the hidden potential of the learners, and thus demands digital fluency. This approach goes with the constructivist approach to learning. Learning *with* technology envisages students' interpretive representation of knowledge expressed through appropriate and creative use of technology such as multimedia, TV or radio. Such an approach towards learning has been proved successful in training rural women to use video by the Deccan Development Society, India and develop literacy-training materials in the Commonwealth of Learning – Literacy Project in India. Bonk *et al*⁸ (1996) reported that in an experiment of learning with technology, fifth and sixth grade students created multimedia on weather. The results show significant gain in student learning and interest in learning science. Learning with technology puts the students in a more active role, where they creatively engage in understanding and identify the hard spots with appropriate meta-cognitive solutions to tackle the difficult part. As learning by doing is the essence of this approach, it is definitely superior to the other two applications of technology in learning. However, it requires considerably high resources for implementation.

⁷ Resnick, M. (2002) Rethinking learning in the digital age, in *Global Information Technology Report, 2001-2002*, [2004/09/24] New York: OUP Accessed online at http://www.harvard.edu/cr/pdf/gitrr2002_ch03.pdf [2004/09/24]

⁸ Bonk, C.J.; Hay, K.E. & Fischler, R.B. (1996) Five key resources for an electronic community of elementary student weather forecast, *Journal of Computing in Childhood Education*, 7(1-2), pp. 93-128.

16. We can see that all the three approaches to technology applications in learning have their specific roles to play, and therefore, as teachers, we must choose mixed use of technologies depending on the requirements of learning task. In *Transforming Education: The Power of ICT Policies* (UNESCO, 2011), Robert Kozma⁹ presents a conceptual framework for use of information and communication technology (ICT) in education, which is similar to this approach and provides a three step ladder – Knowledge acquisition, Knowledge deepening, and knowledge creation.
17. In this context it is important to highlight the importance of teacher capacity building and continuous professional development of teachers to use ICTs in innovative ways. The National Mission on Education through ICTs¹⁰ has been working in this direction through several of its schemes on content development and capacity building.
18. Let me now turn to the most significant part of my presentation on which I am *not* an expert. Transformation has several connotations in mathematics, statistics, physics, chemistry, biology, law, sociology, etc. While we are concerned with educational transformation, in a broader sense of its use I am referring to social transformation that happens due to education, and our interventions as teachers. Teachers play the role of a *change agent* to bring in social transformation through their action. Generations

⁹ UNESCO(2011). *Transforming Education: The Power of ICT Policies*, Paris: UNESCO

¹⁰ <http://www.sakshat.ac.in/>

have followed their teachers as role model, and therefore, the possibility of transformation due to appropriate teacher behaviour in use of technology to improve student learning is positively linked. It is in this context that every university teacher may reconsider his/her predisposition to use technology. Teacher educators have a more significant role to play in this context, as their role will have significant impact in the school education sector. Universities need to create appropriate enabling environment to facilitate use of technology in teaching and learning.

19. In order to facilitate the transformation processes, universities need to have appropriate infrastructure and policies for Open Access to scientific information and research, production and use of Open Educational Resources, and guide to appropriate use of social media.
20. Open Access (OA) is "free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of ... articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control

over the integrity of their work and the right to be properly acknowledged and cited"¹¹ (BOAI, 2002).

21. OA has gained momentum due to the rising cost of journals, and the initiative of scholars and scientific establishments to respond to the situation through different ways to promote OA to scholarly information such as the Green route, Gold route, and recent one Platinum route.
22. The green route refers to OA archives/repositories through which authors provide access to their work as pre-print or post-print and with or without publisher's embargo. The earliest OA archive is arXiv¹² developed by Paul Ginsparg in 1991 at the Los Alamos National Laboratory, USA, and currently hosted at the Cornell University providing access to over 700,000 e-prints in Physics, Mathematics, Computer Science, Quantitative Biology, Quantitative Finance and Statistics. Bjork et al¹³ (2010) estimated that 11.9% of all scholarly articles published in 2008 were available through green OA. The green route can take the form of institutional repositories or subject repositories, and most OA advocates see this as least problematic and achievable road to OA.
23. The gold route is about journals that are available online for free access. The Directory of Open Access Journals¹⁴ (DOAJ) listed 8242

¹¹ <http://www.soros.org/openaccess>

¹² <http://arxiv.org/>

¹³ Björk, B-C, Welling, P, Laakso, M, Majlender, P, Hedlund, T, & Gudnason, G (2010). Open Access to the Scientific Journal Literature: Situation 2009. *PLoS ONE*, 5(6): e11273. doi:10.1371/journal.pone.0011273

¹⁴ <http://www.doaj.org>

journals in end of September 2012. Björk et al¹⁵ (2010) estimated that 8.5% of all scholarly articles in 2008 are available through gold OA. Gunasekaran and Arunachalam¹⁶ (2011) reported that of the 4603 papers contributed by Indian researchers reported in *Web of Science – Science Citation Index Expanded* in 2009, 15.88% were published in OA. The gold OA has shown many innovative access routes such as the mega journals like PLOS ONE that published about 14000 articles in 2011.

24. A third model of OA is emerging in the recent past due to the influence of the Web 2.0 technologies. It is called the platinum route – the social networking approach to sharing research work. While it is a self-archiving approach, it is neither institutional nor subject-based. Some of the popular research works sharing platforms are Mendeley¹⁷, Academic.edu¹⁸, and Research Gate¹⁹. UNESCO in November 2011 launched the Global Open Access Portal²⁰ (GOAP), which I helped develop as a staff member at that time, provides knowledge snapshots of OA developments in different countries of the world, linking to different initiatives, projects, repositories and journals.

¹⁵ BJÖRK et al, *Op. Cit.*

¹⁶ Gunasekaran, S, & Arunachalam, S (2011). Use of open access journals by Indian researchers, *Current Science*, 101 (10), 1287-1295.

¹⁷ <http://www.mendeley.com/>

¹⁸ <http://academia.edu/>

¹⁹ <http://www.researchgate.net/>

²⁰ <http://www.unesco.org/ci/goap>

25. Almost at the same time when researchers and librarians were trying to create a system and movement to provide OA to scholarly information, another group of academics were engaged in improving the quality of teaching and learning through sharing of educational materials over the Internet. After all, teaching is one of the scholarly activities within the world of scholarly communication, and technological developments made it easier for scholar teachers to share their educational learning content freely using the Internet. In 1998 David Wiley coined the term 'Open Content', and in 2001 MIT announced its OpenCourseWare initiative²¹. In 2002, UNESCO organised a forum on the *Impact of Open Courseware for Higher Education in Developing Countries* that defined Open Educational Resources (OER) as "the provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for no-commercial purposes" (UNESCO, 2002)²². Since then the OER movement has not only grown leaps and bounds, but is also helping scholars to share their educational content easily through a variety of platforms and initiatives. Some of the successful models of OER platform are: Connexions²³, Wikieducator²⁴, LearningSpace²⁵, Open Learning

²¹ <http://ocw.mit.edu/index.htm>

²² UNESCO (2002). Forum on the Impact of Open Courseware for Higher Education in Developing Countries: final report, Retrieved 6 Feb 2012 at <http://unesdoc.unesco.org/images/0012/001285/128515e.pdf>

²³ <http://cnx.org/>

²⁴ http://wikieducator.org/Main_Page

²⁵ <http://openlearn.open.ac.uk/>

Initiative²⁶, and FlexiLearn²⁷ of the Indira Gandhi National Open University (IGNOU). In June 2012 UNESCO and the Commonwealth of Learning organized the World OER Congress that released the Paris declaration²⁸ of OER urging governments to encourage development and use of OER and educating stakeholders about appropriate licensing models.

26. The growth of social media such as blogs, wikis, micro-blogging and social networking on the World Wide Web (WWW) has created new opportunities for teachers to share their work rapidly and also to share their innovations as well as establish 'scientific paternity'. The statistics about social media use is progressing so fast that it is changing every minute. There are almost 800 million Facebook users, 190 million tweets happen over a day in Twitter, and more than 600 new videos are shared in YouTube every minute. How can these social media be used to improve teaching and learning?
27. While social media is considered superfluous and merely a tool to distract ourselves from real-time events and discussions, Van Eperen and Marincola²⁹ (2011) recommend that such attitudes be shelved and we recognize social media's power in communicating advancements in the scientific field by acknowledging that

²⁶ <http://oli.web.cmu.edu/openlearning/>

²⁷ <http://www.ignouflexilearn.ac.in/flexilearn/>

²⁸

http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/Events/Paris%20OER%20Declaration_01.pdf

²⁹ van Eperen, L & Marincola, F.M. (2011). How scientists use social media to communicate their research. *Journal of Translational Medicine*, 9, 199. Retrieved 6 Feb 2012 at <http://www.translational-medicine.com/content/pdf/1479-5876-9-199.pdf>

successful communication can only be achieved by employing the channels in which the general public is currently engaged. A recent study by Gruzd et al³⁰ (2011) reported that online social media tools are gaining acceptance and trust in academic circles; scholars use social media to keep up-to-date with the developments in their research area; many academics like to read and comments on blog posts; academic social networking sites are becoming popular, and only 7% scholars surveyed reported that social media activities are counted towards tenure or promotion reviews at their home institutions.

28. It is high time that universities make policies and guidelines to use social media, OER and OA to create an environment of openness that will transform not only the educational landscape, but also bring in more social transformation. As teachers we have a significant role to play in the transformation process of the universities to adopt technology. We as champions of ICT use in education can build pressure to improve ICT infrastructure to create that much needed enabling environment for transformation. Teachers and Technology together can accelerate the Transformation process.
29. Thank you for your attention.

³⁰ Gruzd, A., Goertzen, M, & Mai, P. (2011). Survey results Highlights: Trends in scholarly communication and knowledge dissemination in the age of online social media, Social Media Lab report, Dalhousie University, Halifax, NS, Canada.