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Making the Teacher Relevant and Effective in a Technology-Led Teaching and Learning Environment

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Abstract

Growing use of technology in the process of teaching and learning has made the role of teacher subservient if not irrelevant. The teacher has been reduced to the level of an informer and a facilitator. Added to these are the commercial trends which have made the teacher a paid service provider being compensated for his efforts; thus making the noble profession of teaching a commercial enterprise. It has also relegated the traditional function of the teacher as a guide and a mentor, influencing and shaping the lives of students, building their character on higher moral principles. The increasing use of technology has depersonalized the whole process of teaching and learning, taking away the moral high ground and pivotal position the teacher always held. This is a challenge faced by the teachers in a technology-intensive environment. This paper aims at analyzing these factors with a view to exploring ways to make the teacher relevant and effective in a technology-led teaching and learning environment.

1. Introduction

Technology has greatly transformed the dynamics of teaching and learning. It is restructuring education, teaching, and learning, in ways that impact everything (Minocha, Schroeder, & Schneider, 2011). It has not only changed the process of education, it has also affected the teacher-taught relationship and the value system governing these relations. Recent studies on the impact of technology on students, conducted by Pew Research Center and Vicky Rideout, show that "technology is deeply altering how students learn," that digital technology

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hampers the attention spans of students and their "ability to persevere in the face of challenging tasks" and also highlight that "technology was as much a solution as a problem." (Richtel, 2012). The real challenge is the fact that technology has almost relegated education that it was envisaged to support (Schacter, 1999). The teacher is getting marginalized in the process and is under tremendous pressure to outperform and remain relevant to the students excited and allured by technology surrogates. While technology is satisfying the increasing appetite for new information, it has serious limitations in attainment of higher levels of learning in cognitive, affective and psychomotor domains, not to mention moral uplift of students and acquisition of tacit knowledge. It can only be possible if we keep technology in a subservient position in the process of education and help the teacher regain the leadership in the changing dynamics of education in the new millennium.

2. Impact of Technology on Education

Traditionally, the teacher was a guru and a guide, controlling the entire process of teaching and learning. The students were invariably passive recipients of information provided by the teacher who also determined the pace and direction of learning. The students would ask questions and seek clarifications but seldom challenged his authority or leadership. However, there has been a paradigm shift in the process for teaching and learning with the introduction of applied disciplines, and more so with the advent of technology, allowing greater access to information and sources of knowledge. "The instructor is no longer the king of the classroom but rather a middleman between information and student." On the other hand, "the student has now become an active informational architect, procuring, rearranging and displaying information, instead of a passive sponge soaking up knowledge." (loraevanousk, 2011)

Technology has been used in education in four different ways: as a part of the curriculum, for delivery of teaching contents, as an aid to instructions and as a tool to enrich learning experience. Its role is more pronounced in student-centered learning or constructivist approach wherein the "students are active participants in their learning; they learn at their own pace and use their own strategies; they are more intrinsically than extrinsically motivated; learning is more individualized than standardized". (Walle, Virak, Cnudde, & Mono). It includes project-based learning, problem-based learning and inquiry-based learning. Here, the teacher is made to take a back seat and become a facilitator and a collaborator. This methodology seems to work better with problem solving and project work. Although "facilitation" can be a form of leadership in certain pedagogical models where the teacher remains on the sidelines and directs the process of learning, allowing greater freedom to the students, it falls short of the leading role of the teacher.

The combination of education and technology has created "more stimulating learning environment" and new possibilities to make the process of education more innovative and enjoyable. There have been numerous studies, mostly at school level, to ascertain the impact of technology on education but few are conclusive and definite. Some important conclusions are as under: (loraevanousk, 2011)

- Easy access to information.
- Greater interest in learning.
- Increased retention of information.
- Robust information storage.
- Better presentation of information.
- Teaching made interactive.
- Knowledge sharing made easy.

Whereas there are many admirers of technology who are simply overawed by its range and reach, there is no dearth of dissenting voices, such as Clifford Stoll, the author of Silicon Snake Oil (1996) who talks about

"depersonalization of education and the substitution of 'real people' with technology". He strongly urges that "students need to be interacting more frequently with teachers and other students--not technology". (Stoll, 1996)

Although technology can be used effectively in both pedagogical practices—teacher-centered and student-centered--there is no hard evidence to favor one against the other. Moreover, most of the studies are school-based; thus cannot be taken as authority for all levels and types of education. John Hattie's 2009 publication Visible Learning: A Synthesis of over 800 Meta-Analyses Relating to Achievement, is based on the effects of a large range of strategies for learning. Its findings are somewhat unexpected for many and merit reconsideration of our approaches to teaching. He places teacher (Expert teacher against experience teacher and a novice) at the centre stage of what he calls "active" teaching. It is excellence in teachers that make the greatest differences. Among the top fourteen influences, as many as eleven are related to the teacher, with greatest size of influence. (Hattie, 2003)

There are others who talks about Digital Nativism, Digital Delusion, and Digital Deprivation (McKenzie, 2007), and "clutter of online information, the social media hype, the overwhelming technologies, the misguidance and misinformation online" (Buehler, 2013). While Buehler talks about seven deadly delusions in the domain of business, McKenzie forcefully refutes the technology Pied Pipers, like Prensky (who advocates "digital nirvana" of video-game learning) and warns of digital deprivation due to lack of contact with the real world: "A Digital Waste Land is a poor substitute for the rich flavors, smells and touches of the real world. Leading psychologists have signaled their concern in reports like Fool's Gold. FaceBook, MySpace and Second Life are poor substitutes for face to face communities and the playground." (McKenzie, 2007)

Technology has travelled a long distance and opened new avenues of learning. From Computer Based Teaching (CBT) and Computer-Aided Communication (CMC) to E-learning and Web-Based Training (WBT), education technology has helped create innovating learning environment. Its singular achievement has been in the field of distance learning in which several people can learn simultaneously from different locations. However, its success largely depends on good student-teacher interaction, proper use of technology, meticulous planning and effective management. Thus, technology may work wonders but may not be able to substitute the teacher and his ability to guide the students and equip them with knowledge, skills and values to face the challenges of the real world.

While technology is a sharp and powerful tool, its effectiveness depends on the ability of the teacher to determine the needs of the students, design and develop the contents and make strategies to deliver them effectively.

3. The Challenges

The dynamic environment of technology poses new challenges for teachers to maintain academic ascendancy over the students and master teaching technologies as well. Mastery over the subject or professional knowledge and capacity to absorb change can still make the teacher the leader of educational experience. His ability to transmit knowledge and culture can keep him relevant, provided he keeps their interest and curiosity alive. Some of the challenges are discussed hereunder:

3.1 Digital Divide

There are two types of Digital Divide: Technology Divide and Generation Divide. Both the divides impact the teaching and learning processes. The teacher has to overcome and bridge these divides to remain effective. While "Technology Divide" is beyond the control of the teacher, the "Generation Divide" is manageable at the individual level.

"A digital divide is an economic inequality between groups, broadly construed, in terms of access to, use of, or knowledge of information and communication technologies (ICT)." (Norris, 2003) It is closely linked with social disparities and economic inequalities. It is a challenge for the teachers teaching in institutions which attract students from diverse communities and social backgrounds. What the teacher can do is devise ways and means to ensure that digital inequalities do not put socially dispossessed students at a disadvantage against those who have greater access to technology.

The teachers and students invariably belong to different generations with separate mind-sets, attitudes, work ethics, etc. We know of Generations X, Y and Z. The generation gaps do pose new challenges but may not make the older generation irrelevant as suggested by enthusiasts like Prensky, who speaks of Digital Nativism and terms the pre-iPod generation as Digital Immigrants. (McKenzie, 2007) Barring such extreme views, the fast-moving technology will continue to challenge generations of teachers.

3.2 Personal Learning Environments (PLE) and Self-Regulated Learning (SRL)

PLE represents a paradigm shift in teaching and learning (Elliott, 2010). In PLE structures, "the learner constructs knowledge socially with the help of knowledgeable peer mentors and teachers"(McLoughlin & Lee, 2010). It is particularly relevant to on-line and distance learning scenarios. However, the role and competencies of the teacher are considered critical components of PLE design, delivery and management, including effective use of technology (Shaikh & Khoja, 2012). Recent studies in this area reassert the importance of teacher's role in the process; especially in cases where learners do not get started despite PLE and find it difficult to attain learning objectives. Likewise, success of SRL also depends of the competence of the teacher.

3.3 Transmission of Cultural heritage

Transmission of cultural heritage and value system always formed part of the philosophy and process of education. Cultural deprivation of a single child was considered "irreparable loss to all humanity". (Smith, 1979) Its ownership rested with the schools (state) and teachers. During the 20th century, there rose many strong voices against "indoctrination" of the youth. Questions were raised over types of values to be taught, when to be taught and where to be taught. It became difficult in multi-cultural societies that adhered to separate sets of values. However, there are exponents of universal or living values who want them to be included in the curriculum. In higher education sector, where education is less encumbered by moral trappings, because of built-in freedom, institutions still inculcate and value intellectual honesty, professional ethics, tolerance, team spirit, etc, to prepare their graduates for competitive job markets. Teaching of "global citizenship" and additional foreign languages is encouraged. All these activities demand an active involvement of teachers and educators, in line with Greek word Pedagogy which means "to lead the child".

3.4 Transmission of Tacit Knowledge

The term "tacit knowledge" was introduced by the Hungarian polymath Michael Polanyi with the assertion that "we can know more than we can tell." (Polanyi, 1966) . It is the inherent knowledge which is deeply ingrained in individuals (and organizations with such individuals) and is difficult to articulate and transmit. It has acquired significance with the studies in the field of Knowledge Management, especially pertaining to processes and practices in business and industry, where "know-how" plays an important role (Nonaka & Takeuchi, 1995). In the field of teaching and learning, tacit knowledge, or insight and experience of teachers, especially in the domains of processes and skills, play an important role. In such cases, the teachers being the repositories of tacit knowledge become key players because acquisition of tacit knowledge lies in some form of shared experience.

3.5 Teacher Training

There have been two main philosophies of teacher education: teacher-based, in which teachers are trained to be experts in knowledge or exceptionally well-educated, where effectiveness depends on their "ability to interest, motivate and instruct"; and competency-based to prepare him as a guide in the learning process to engage the students in discovery. (Jalalzai, 1993) With ever-increasing role of technology, teacher training is getting more and more complex and challenging. Besides learning educational philosophies, pedagogical theories and practices, the teacher has to learn the use of technology in teaching strategies--most importantly, getting feedback and modifying the design and measurement of learning objectives. Thus, technology-related training is a must for new generations of teachers. Added emphasis on competencies has weakened the focus on academic excellence and ability of the teacher to mold minds and characters.

3.6 Caring Touch

Computer-based and web-based learning has depersonalized the process of education, where teacher and students become virtual entities, with limited human interaction or considerations. Whereas electronic linkages are expanding, human bonds are weakening. "Most strategies focus on goals and outcomes; very few focus on real student and his problems as a person."(Harrison & Killion, 2007). Students frequently need teacher's attention for positive reinforcement, guidance, counseling and direction. Jeremy Boggs talks of three roles for teachers using technology: Instructor as a Role Model, Instructor as Tech Support and Instructor as Cheerleader. Of these, he terms cheerleader as the most important for positive reinforcement in higher education. (Boggs, 2009) Success of a teaching strategy thus lies in teacher's ability to intervene and lend a personal touch to personalize the process. That is a challenge for teachers working with technology-driven processes.

4.   Analysis

Technology has transformed education; and has the potential to influence it even more in the foreseeable future. Regardless of his position as "a sage on the stage" or "a guide on the side," his role still remains important if we consider the old maxim: "student learning depends first, last, and always on the quality of the teachers." While it opens new opportunities for students, it gives the teacher new communication tools and a wider reach. It can have "real impact on education if used intelligently with effective teaching practice." (Harrison & Killion, 2007). Surprisingly, instead of sidelining the teacher, new researches in teaching strategies tend to place him at or around the centre stage to manage complexities of the evolving scenarios and learning environments.

4.1 Teacher Competencies in Technology-led Environment

Studies in PLE perspective have identified the teacher roles and competencies as critical components (Minocha et al., 2011). Since the process of teaching is dynamic, the teacher has to excel in these competencies to deal with the changes effectively (Shaikh & Khoja, 2012). Many studies, such as Global Teacher, 2010, see teacher as a role model, leader, manager and change agent. Based on these studies, Sheikh and Khoja (2012) have summarized these competencies as follows:

- **Planning and Design (Designing/Planning Role)**. Roles identified: planner, designer, instructional/learning designer, programmer.
- **Instruction and Learning (Instructive/Cognitive Role)**. Roles identified: lecturer/instructor, demonstrator, theorizer, master artist, learner, critic, agitator, motivator, mentor.
- **Communication and Interaction (Social Role)**. Roles identified: coordinator, facilitator, partner, connector/communicator, moderator, convener, salesperson, collaborator, participant, collector.

- **Management and Administration (Managerial Role).** Roles identified: leader/change agent, administrative manager/bureaucrat, curator, coach, guide, concierge, goal setter, evaluator.
- **Use of Technology (Technologist Role).** Roles identified: alchemist, sharer, network administrator, technician, technologist, media publisher/editor.

Educational potential of wikis is being explored and developed for collective cognition. There is a role and space for the teacher in these initiatives as well:

When learners and teachers engage in collective cognition and across online as well as offline contexts, multiple activity structures come into play. For teachers, the complexity of the learning environment increases dramatically. At the same time, the practices we have examined point to the need for a teacher's space in the wiki. This space is not a fixed position in a structure but is an activity space in which wiki features make it possible for the teacher to trigger, stimulate, monitor and guide online as well as offline activities conducive to learning. How to develop such activity spaces is a question that guides our continued research on the educational use of wikis. (Lund & Smørdal, 2006)

4.2 Student as Apprentice

There are many domains of knowledge and professions where students learn best as apprentices, such as medicine. Likewise, there are many skill-based domains which involve "know-how" or "technique" more than the theoretical knowledge, such as sports and arts, where guided practice leads to higher attainments. Much talked about web-based teaching methodologies are not relevant at all in many areas. So, while talking about the teacher, we should not limit teacher's role and scope of activities to classroom environment of a particular level of education only, or divorce him from real-life experiences. Moreover, if learning is based on experience, vicarious experience and aided discovery can be more rewarding.

4.3 Teacher as a Powerful Influence

". . . Excellence in teaching is the single most powerful influence on achievement." Based on numerous studies, John Hatties has drawn a set of possible influences on the achievements of students. Major influences, with highest effect size, are in the hands of the teacher. Thus, excellence of teacher is the most powerful influence, which makes the greatest difference as seen below: (Hattie, 2003)

Table 1 - Possible Influences on the Achievement of Students

Influence	Effect	Source of Influence
Feedback	1.13	Teacher
Students' prior cognitive ability	1.04	Student
Instructional quality	1.00	Teacher
Direct instruction	.82	Teacher
Remediation/feedback	.65	Teacher
Students' disposition to learn	.61	Student
Class environment	.56	Teacher
Challenge of Goals	.52	Teacher
Peer tutoring	.50	Teacher
Mastery learning	.50	Teacher
Parent involvement	.46	Home

Homework	.43	Teacher
Teacher Style	.42	Teacher
Questioning	.41	Teacher

4.4 Teacher-Student Relationship

Rudolf Steiner (1861-1925) considered sympathetic relationship between the teacher and the taught as the secret of effective education, while Giovanni Gentile believed in a spiritual relationship between the two. (Smith, 1979) It is a neglected area in modern teaching-learning strategies, especially is the affective domain. Technology has dangerously weakened the student-teacher relationship. Teachers tend to ignore the significance of affective attributes and a relationship based on mutual respect. Expert teachers, on the other hand, treat their students as persons and show care and commitment to build a human bond with them. "By having such respect, they can recognize possible barriers to learning and can seek ways to overcome these barriers." (Hattie, 2003) In Germany, the Supervisor is called "Doktor-Vater" or "Doktor-Mutter" meaning father or mother. The very title lends a personal touch to teacher-student relationship, which "is the foundation of effective instruction". (Lickona, 2004)

4.5 Excellence of Character

Aristotle talked about two kinds of human excellences: excellences of thought and excellences of character. Many educators from ancient, medieval and modern times have supported the need of character building and the role of teacher in shaping that character. Technology has given us amazing access to information and ideas, thus, facilitating excellences of thought. However, the flux of information carries distortions and misrepresentations, besides socially and morally repugnant material, which has created new moral challenges. While there is a need to guide the students to sift facts from fabrication and safely navigate through clutter and chaos, there is a need to strengthen him morally and spiritually to withstand the new hazards brought in by technology. There is none other than the teacher who can help the students through these turbulent times. Neil Hawkes espouses value-based education which "creates positive culture for teaching and learning that is so vital for successful education in the 21st century." (Hawkes, 2012) Thomas Lickona says that character and academics should be thought simultaneously. (Lickona, 2004)

5. Conclusion

Education is a very comprehensive and purposeful activity, which includes "all the elements of experience—cognitive, contactive and affective. (Saiyidain, 1992) It involves mental, moral and spiritual uplift of students or a desirable transformation. It cannot be restricted to passing on information or knowledge only. More than knowledge, it is the understanding of principles and application of knowledge which is important. Superior or expert teachers exhibit genuine interest in their students and lead them through vicarious experience and guided discovery or inquiry. They engage them intellectually, emotionally and spiritually, and mold their character by inculcating universal values. They guide them to excellence through aesthetic education creating opportunities for experiencing beauty in its diverse forms and manifestations.

Present day teacher is required to prepare the students for a highly competitive globalised world, equipped with far better professional, soft and life skills than ever before. It is too serious a matter to be left to the students alone. The teacher cannot sit back and leave the students at the mercy of the environment. He has to take the lead. Research after research tells us that best result can be achieved through leadership role of the teacher. Even in student-centered strategies, competences of the teacher are considered crucial for success. (Shaikh & Khoja, 2012) Hattie's synthesis, based on thousands of studies, shows that quality feedback is the single most powerful influence for improvement among students—and it is totally teacher dependent or teacher led. (Hattie, 2003)

Therefore, "the effective teacher must be a leader who can inspire and influence students. . . This teacher empowers students and gets them to do things of which they did not think they were capable." (Sandy, 2005)

Technology has a powerful presence in the modern-day educational environment, with ever-expanding possibilities for innovative strategies. It can yield best results if it is used as a tool and a technical support to connect and communicate. There is a need to guard against its depersonalizing effects and lure to take the teachers and students into a virtual world—divorced from reality and life. The teachers therefore should respect and lead the students as persons, guide them and help them compete in the globalised environment. Only as leaders and role models can they influence the students morally and inculcate such virtues and values which can help them steer through the stormy times. As leaders, they will remain effective and relevant in technology-led environment.

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