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Toward a Technology-Enhanced Pedagogy

Kumar Alok, Chandragupt Institute of Management Patna, India

Abstract: Educational technologies are yet to deliver their promise of transforming the pedagogy. This article presents a systemic model of pedagogy to analyze its potential to respond to technology. It warns against the fallacy of equating the pedagogical system with its elements or factors without taking into consideration their interactions. It envisages a technology-supported teacher to facilitate learner-centered educational practices.

Keywords: Elements, pedagogy, system, technology

Introduction

Technology has a long past in education (Saettler, 2004) and it is poised to impact its future as well (Economist Intelligence Unit, 2008). It can find its place in education on four grounds: social, vocational, catalytic and pedagogical (Cross & Adam, 2007). Social and vocational grounds refer to the need to familiarize students with technology and develop job-related skills; whereas, catalytic and pedagogical grounds refer to using technology to enhance education management as well as teaching-learning processes.

Educators have been enthusiastic about the pedagogical prospects of technology since long (Reiser, 2007). Educational institutes have fast adopted a wide range of technologies ranging from audio-visual and multimedia devices to computers and internet. However, it is yet to show a significant positive impact on teaching-learning processes (Merrill, 2002; Reiser, 2007; Salinas, 2008). It is clear that technology by itself cannot transform pedagogy (Merrill, 2002). This article attempts to analyze pedagogy in order to determine the prospect of technology to transform teaching-learning processes. In this process, it makes two primary contributions: -

- It presents a systemic model of pedagogy that identifies the teacher, the learner, the method and the topic as its elements. Based on the way teachers and students interact with educational topics and among themselves, it identifies six factors that influence the quality of learning experiences: purpose of pedagogy, scope of pedagogy, leadership, communication, learning environment and learning system of learners.

- It argues that communication, learning environment, learning system and methods hold maximum potential for technological enhancement. It posits that technology can better help teachers though it will facilitate learner-centered educational practices. Further, it stresses the importance of enlisting teachers and learners for a systemic response toward technological enhancement.

Technology can be used for a host of education related issues such as access, time, cost, and inadequate number of teachers (McGorry, 2002); however, for the purpose of this article, I will focus on its pedagogical potential.

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Systemic Model of Pedagogy

Pedagogy literally means the art and science of teaching children (Knowles, 1973) as against andragogy that literally means the art and science of teaching adults (Knowles, 1973; 1980). It is tempting to dismiss pedagogy in context of higher education; however, it is prudent to exercise much consideration in this regard. Unless there is a reason to consider human adults as essentially different from human children, the pedagogy-andragogy dichotomy hardly serves any purpose. Experimental literature provides little support to establish pedagogy-andragogy dichotomy (Rachel, 1994). Knowles, the most famous champion of andragogy, himself preferred to view them as two ends of spectrum rather than dichotomous models (Knowles, 1980). Therefore, it is better to expand the literal meanings of these words to include all human beings irrespective of their age or gender. I retain 'pedagogy' as it is much older in use.

Defining pedagogy as the art and science of teaching gives an impression that it is only concerned with teaching-learning processes. It is important to rectify such a view as there is much in pedagogy that comes before and goes beyond the actual act of teaching. Pedagogy needs to be seen as a system for achieving educational objectives comprising four interacting elements: the teacher, the learner, the topic and the method. The very idea of pedagogy is meaningless in absence of any one of its four elements.

Teachers and learners are the key elements in the system of pedagogy that justify its existence. Motivation, training, expertise, educational philosophy, values and principles, attitude and behaviors toward learners and learning process, workplace demands, teaching style etc. affect the way teachers engage in teaching-learning processes. Conducive organizational environment that sustains teacher motivation would go a long way in creating conducive learning environment. Learners come to higher education with their own background, aspirations, motivation, intelligence, personality, prior knowledge, attitude toward different courses, learning styles, self-efficacy beliefs etc. that impact their engagement in teaching-learning processes.

The method is the most visible element of pedagogy that depends on the teacher, the learner and the topic. Lectures, demonstrations, discussions, behavioral practices, drama, games, simulations, contract learning, collaborative learning, problem-based learning, project-based learning etc. are different methods that are used in higher education to meet different learning requirements. Some of these methods need adequate resources as well as training for a teacher to execute them successfully.

The systemic model of pedagogy takes into account the way teachers and learners interact among themselves and with educational topics. In this system, a learner interacts with a topic through learning environment and learning system; whereas, a teacher interacts with a topic through purpose and scope of the pedagogy. Teachers and learners interact through communication, leadership and methods. Figure 1 presents the systemic model of pedagogy followed by detailed discussions on each of the factors.

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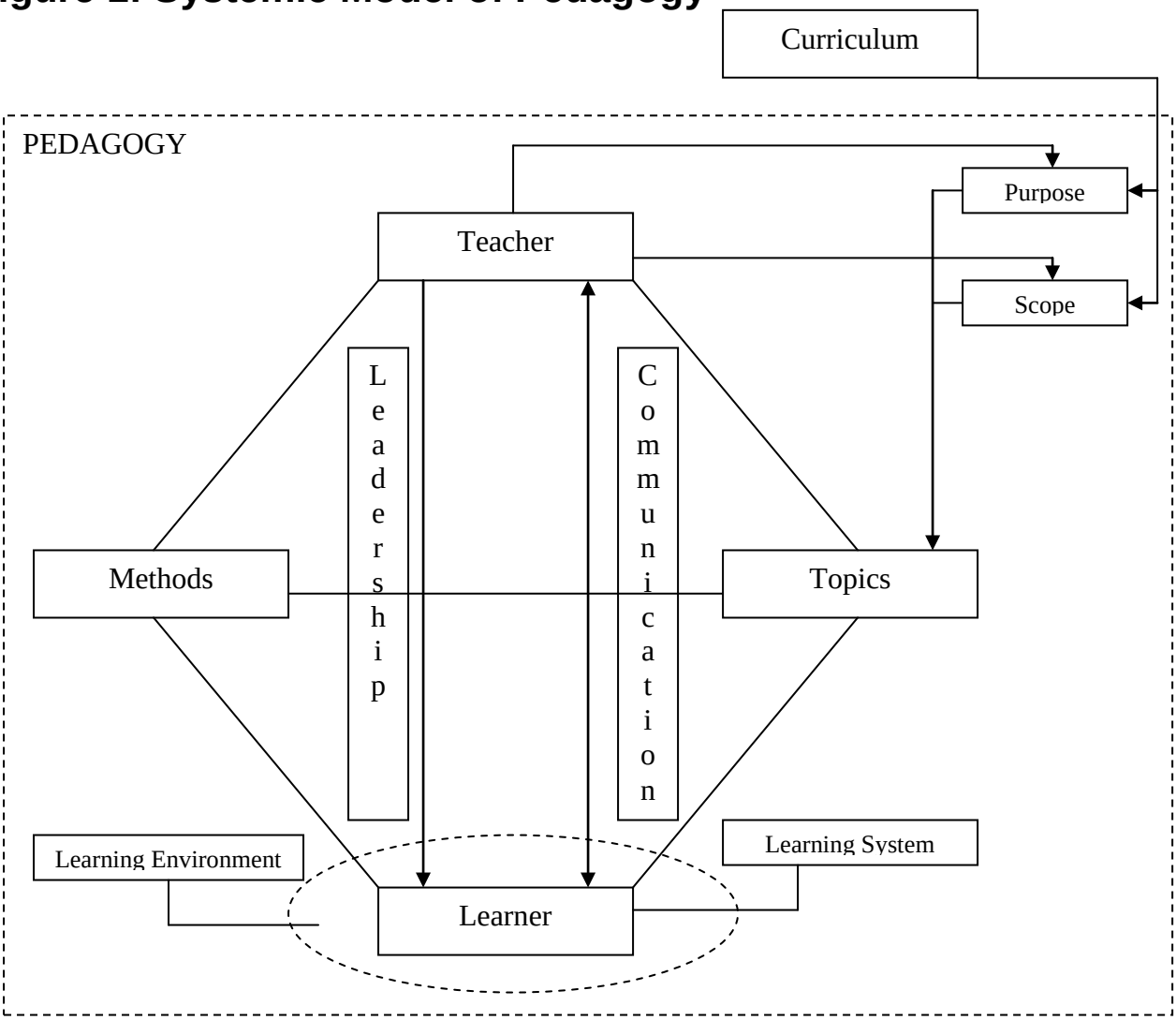
Figure 1: Systemic Model of Pedagogy



1. Purpose: The purpose of pedagogy is a factor of the curriculum and the educational philosophy of the teacher. It may vary from knowledge creation to information transaction, concept attainment to concept reinforcement, attitude formation to behavioral modification etc. It is purely conceptual and requires much discretion on the part of the teacher.

2. Scope: The scope of pedagogy is determined by the curriculum and the teacher. Teachers in higher education often determine the extent to which they intend to develop their students. This holds good especially for autonomous institutions where teachers can design and develop their own curricula. Purpose and scope together determine the nature of the educational topic: conceptual, applied, experiential, factual, simple and complex.

3. Leadership: In India, teachers have been taken as role models for high conduct since time immemorial (Mookerji, 1969). Of late, the concept of teachers as leaders to transform learning and empower learners has gained prominence in educational literature (Frost & Harris, 2003; Harris & Muijis, 2005; Little, 2003; Sherrill, 1999).

Transformational classroom leadership is emerging as a defining quality of a teacher leader in schools as well as universities (Pounder, 2006). Inasmuch as teacher leadership enhances learning and empowers learners, it should be seen as integral to pedagogy itself.

4. Communication: It is the axis of teaching-learning processes. It can take diverse forms: verbal, non-verbal, single medium, multimedia, impersonal and personalized. Teaching style and language play a critical role in effective communication. Level of interaction is yet another aspect of communication that takes multiple forms: one-way, two-way, one-to-one, one-to-many and many-to-many (in case of peer-learning). The level of interaction is determined by the teacher, the learner and the constraints such as the number of learners, time and space. Generally small batch size and sufficient time facilitate better interaction between the teacher and the learner. Peer-learning within the class also needs sufficient space to facilitate group processes.

5. Learning environment: It includes physical, emotional and intellectual environment experienced or perceived by learners and teachers (Jamaiah, 2008). This definition equates learning environment with organizational environment. For the purpose of this article, learning environment and organizational environment will be treated as distinct. Learning environment will be treated as exclusively concerned with learners. Conducive learning environment is important for effective learning (Entwistle, 1995; Weinstein, 1979). It helps to sustain learner motivation and sets the context for learning. Classroom design, classroom density, classroom culture, comfort, safety and feeling of wellbeing, all constitute the learning environment. Poorly designed rooms, crowded classes, threatening and discouraging classroom culture, uncomfortable peer-relations etc. are known to hinder learning experiences.

6. Learning system: It comprises prior learning, learning style, intelligence, personality and values of the learner. It is internal to the learner. Learners develop their ways to interact with their environment and interpret their experiences. Thus they learn to learn as they learn. In other words, learning system keeps on evolving throughout life.

Scope for Technological Enhancement

Pedagogy involves educational decisions to be taken, monitored and implemented. The more well defined decision rules and procedures are, the easier it is to find a role for technology (Banerjee, 2004). In other words, the requirement for human intervention increases with uncertainty involved in decision situations. Unless educational processes are understood in details sufficient enough to be adequately defined, technology cannot substitute teachers in the system of pedagogy.

Motivation of teachers toward adopting technology for educational purposes is of paramount importance (Moser, 2007). If technology doesn’t integrate with the curriculum, then it will become an add-on leading to an increased workload and time crunch for the teacher. Such a scenario is less motivating for the teacher than a scenario where technology is an integral part of the curriculum itself. Long-term professional development for teachers is important for

integrating technology into curriculum (Wetzel, 2001). Pervasive use of internet, audio-visual devices and computer applications in management classrooms is the case in point. Management teachers find technology integral to the management education and get plethora of professional development options. Participation in professional associations, collaborative learning and practice can help teachers gain confidence in using technology (Becker & Riel, 2000; Cradler & Cradler, 1995). Prospects of inter-disciplinary research (Chandra & Patkar, 2007) might enhance teacher motivation to use technology.

Technology may motivate learners due to its novelty, interactivity or sheer range of things that it makes possible. Learners can solve real world problems by collaborating across time and place (Bhattacharya & Sharma, 2007). Prospects of higher order thinking and being in touch with the state-of-the-art knowledge in their areas of interest would contribute to learner motivation. Prospect of higher participation and greater interaction (Bhattacharya & Sharma, 2007) would further enhance learner motivation.

Inasmuch as it can enhance the factors and methods, technology holds the potential to enhance the system of pedagogy. What follows is a critical analysis of the potential of technology to enhance the elements and factors.

1. Purpose and Scope: These are highly conceptual, even philosophical areas involving decisions on keenly debated grounds. Debates such as constructivism vs. objectivism are hardly settled and are hard to settle as well. Though the curriculum presents a framework to take such decisions, much depends on the sound judgment of the teacher. In autonomous institutions, teachers design, develop and deliver their courses and hence hold almost complete control over these factors. Practically there is little scope for technology to directly contribute to these factors.

2. Leadership: Teacher leaders can influence technology adoption in their institutions (Sherry & Gibson, 2002); however, technology per se cannot create a teacher leader. It can at best help teacher leaders transform their pedagogies. Thus it can act as a wonderful tool in the hands of teacher leaders.

3. Communication: Technology holds the greatest promise to enhance communication and interaction. Radio, television, videos and films are extensively used in higher education. Web 2.0 applications such as blogs, instant messaging, internet telephony and social networking sites allow collaborative communication, content creation and sharing, and facilitate social learning (Maloney, 2007). Multi-modal teaching, online collaboration, learning management systems and presentation tools would have a profound impact on the academic experience in the days to come (Economic Intelligence Unit, 2008). www.youtube.com provides many hours of classroom videos from Ivy League universities. Access to educational resources has never been easier with online libraries, journals and educational channels such Gyan Darshan. EDUSAT satellite is taking the classroom to the doorsteps of Indian learners. Online education and e-learning initiatives are unthinkable without information and communication technologies. Again a word of caution — technologies focusing on enhancing communication can at best achieve what the best communication strategy can possibly achieve. Technological interventions in education are likely to turn up into huge disappointments, if they equate communication with pedagogy.

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4. Learning environment: Technology has already influenced learning environments of learners. Presence of laptops and cell phones in classrooms are a perceptible reality in higher education. While such mobile devices can facilitate collaborative learning (Nilson & Weaver, 2005), they can potentially interfere with attention and motivation of students to learn in the class. Virtual learning environments such as *Second Life* and *Markstrat* are changing the way many courses are taught. Such computer-based simulations are gaining ground in the higher education with significantly positive learning outcomes.

5. Learning systems: It is personal and internal to the learner. Because it is evolutionary in nature, technology can significantly enrich it through facilitating articulation and reflection (Jonassen, 1994). Technology can facilitate self-paced learning to a much greater extent than what is possible without it. It can allow heavy customization and personalization of learning experiences as well as adaptive assessment.

Inasmuch as they are well defined, almost all pedagogical methods stand to gain from technology. Modern technologies can support instructional methods that were not practical earlier (Hastings & Tracey, 2005). However, unless the technological advancements are matched by methodical innovations, technological capabilities would remain subservient to the ongoing practices (Salomon, 2002).

Teaching methods are much more comprehensively defined than learning methods that vary from mind to mind. Therefore, technology would be able to support teachers better than learners. Simultaneously, the role of teacher would experience a shift from information providers to mentors (Economic Intelligence Unit, 2008) as access to information and content is no longer an issue. Learners can go through the content at their own convenience; however, they are also prone to educational malpractices such as plagiarism. They would still need teachers to stimulate higher order thinking and develop high moral and ethical standards. Teachers would leverage the newfound technological prowess to facilitate self-paced and personalized learning experiences. Thus the educational landscape is poised to experience a shift from teacher-centered to learner-centered educational practices.

Conclusion

A system approach to pedagogy opens new vistas for conceptualizing pedagogical transformation. It makes it clear that pedagogical transformation requires working with elements and factors of pedagogy and not just infusion of educational technologies. It is apparent that communication, learning environment, learning systems and methods hold maximum potential for enhancement through technology and they need to be targeted for maximum impact. It is important to reiterate that these factors and methods per se are not pedagogy and hence their enhancement does not necessarily mean pedagogical enhancement. System involves a set of interrelationships as well that are initiated by teachers and learners in this case. To evoke a systemic response from the system of pedagogy teacher and learners should be enlisted first.

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