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Multimedia in Teacher Education: Perceptions & Uses

Gourav Mahajan*

Sri Sai College of Education, Badhani, Pathankot,Punjab, India

* E-mail of the corresponding author: gaurav.pse@gmail.com

Abstract

Educational systems around the world are under increasing pressure to use the new technologies to teach students the knowledge and skills they need in the 21st century. Education is at the confluence of powerful and rapidly shifting educational, technological and political forces that will shape the structure of educational systems across the globe for the remainder of this century. Many countries are engaged in a number of efforts to effect changes in the teaching/learning process to prepare students for an information and technology based society. Multimedia provide an array of powerful tools that may help in transforming the present isolated, teacher-centred and text-bound classrooms into rich, student-focused, interactive knowledge environments. The schools must embrace the new technologies and appropriate multimedia approach for learning. They must also move toward the goal of transforming the traditional paradigm of learning. Teacher education institutions may either assume a leadership role in the transformation of education or be left behind in the swirl of rapid technological change. For education to reap the full benefits of multimedia in learning, it is essential that pre-service and in-service teachers have basic skills and competencies required for using multimedia. This paper, therefore, explores the latent benefit of using multimedia tools particularly in professional teacher education. The paper also discusses why pre-service teachers need to use multimedia technologies within the context of students' familiar, technology-rich living spaces to develop their own teaching skills and the technology skills of their students. In addition, the author also explains the role of multimedia in enhancing the 21st century skills.

Keywords: Multimedia, Teacher Education,, Pre Service Teachers, 21st Century

1. Introduction

Globalisation has completely re-shaped the world in which we live. Technologies are a major factor in shaping the new global economy and producing rapid changes in society. It possesses power, and has the potential to transform the human condition. Within the past decade, the new tools provided by technology have fundamentally changed the way the people work in every sphere of life. They have produced significant transformations in industry, agriculture, medicine, business, engineering and other fields. However, the advantages of technology come with a price within the field of education. To a great extent, technology itself can colonize the life world of education and educators. McLaren (2003) contends that 'technocratic consciousness is looked upon as the new educational mechanism for generating classroom health,". This affects the quality of teaching and nature of educational reforms. As a result of over-dependence on technology "schools have passively surrendered educational reform to a fetishism of

procedure," .They also have the potential to transform the nature of education-where and how learning takes place and the roles of students and teachers in the learning process.

Educational systems around the world are under increasing pressure to use the new technologies to teach students the knowledge and skills they need in the 21st century. The 1998 UNESCO World Education Report, *Teachers and Teaching in a Changing World,* describes the radical implications the new information and communication technologies have for conventional teaching and learning. It predicts the transformation of the teaching-learning process and the way teachers and learners gain access to knowledge and information. It states:

New possibilities are emerging which already show a powerful impact on meeting basic learning needs, and it is clear that the educational potential of these new possibilities has barely been tapped. These new possibilities exist largely as the result of two converging forces, both recent by-products of the general development process. First the quantity of information available in the world-much of it relevant to survival and basic well-being is exponentially greater than that available only a few years ago, and the rate of its growth is accelerating. A synergistic effect occurs when important information is coupled with the second modern advance-the new capacity to communicate among the people of the world. The opportunity exists to harness this force and use it positively, consciously, and with design in order to contribute to meeting defined learning needs (1998 UNESCO World education report p19)

Education is at the confluence of powerful and rapidly shifting educational, technological and political forces that will shape the structure of educational systems across the globe for the remainder of this century. Many countries are engaged in a number of efforts to effect changes in the teaching/learning process to prepare students for an information and technology based society. The UNESCO World Education Report (1998) notes that the new technologies challenge traditional conceptions of both teaching and learning and, by reconfiguring how teachers and learners gain access to knowledge, have the potential to transform teaching and learning processes. Multimedia provide an array of powerful tools that may help in transforming the present isolated, teacher-centered and text-bound classrooms into rich, student-focused, interactive knowledge environments. The schools must embrace the new technologies and appropriate multimedia approach for learning. They must also move toward the goal of transforming the traditional paradigm of learning.

2. Classification of Multimedia

Multimedia uses multiple forms of text, audio, graphics, animation, or video to convey information. As such, multimedia technologies offer today's classroom teachers the opportunity to move from a largely linear learning environment to an increasingly nonlinear environment. Such technologies also allow students a strong degree of choice as they pursue learning with multimedia texts. The multimedia classroom tools offer classroom teachers multiple ways of engaging students in the learning process. Teaching is no longer "chalk and talk", it is supported with various media like books, journals, audio-visual aids, electronic media i.e. radio, TV, computers etc. Media are classified into seven categories such as:

- ***Graphic Media:*** Books, Pictures, Photographs, Maps, Charts, Posters, Graphs, Diagrams etc.
- ***Display Media:*** Chalkboard, Bulletin Board, Flannel Board, Peg Boards etc.
- ***Three Dimensional Media:*** Models, Objects, Specimens, Puppets etc.

- ***Projected Media:*** Slides, Filmstrips ,Transparencies, Films, Video tapes, Gramophones, Records etc.
- ***Audio Media:*** Radio, Audio cassettes, Gramophones, Records etc.
- ***Video Media :*** TV, Videocassettes, CD, Computers etc.
- ***Activity Media:*** Fieldtrips, Dramatisation, Demonstration, Role-playing etc.

Multimedia has been popular in this age of Science and Technology. It means an integration of sound ,still images , animation, video and text along with computing technology. It helps learning, browsing through encyclopedia and reference materials starting from the circulatory system to an automatic explosion in commercial presentation, officials expositions and in creating 3d effects in many ways. It also helps learners in mastering various languages.

The concepts like "the computerised society", "the video civilization" ,"the global village","de-schooling" and "alternative schooling" are the expressions of the modern multimedia era. In this era we have a variety of resources starting from traditional media to the present potential computer ,Internet etc. that are storehouses of multimedia and materials.. Again, today's education is said to be not good enough for the tomorrow's needs. As science and technology develop, societal scenarios change very fast and new problems emerge every now and then. Unless our learning needs are met adequately there would be mismatch, maladjustment and cultural lag.

There are two categories of multimedia—linear and nonlinear.

2.1 Linear Multimedia

Linear Multimedia tools generally progress from one screen to the next and are commonly used by instructors as a supplementary teaching aid. This form of multimedia tends to limit learning potential because it does not require active participation.

2.1 Non-linear Multimedia

Nonlinear multimedia tools (those that include hyperlinks) offer viewers interactivity, control of progress, and choice in their construction of knowledge. When used as active learning tools, nonlinear multimedia engages students in using 21st-century skills which fall into six distinct categories i.e. critical thinking, information and media literacy, creativity, communication skills, collaboration, and contextual learning. Nonlinear multimedia also provides a variety of creative, digital-age reflection opportunities. This honor Dewey's (1938) constructive teaching and learning strategies and support cognitive flexibility in learning. According to cognitive flexibility theory (Spiro & Jehng, 1990), learners benefit from retrieving information in the nonlinear fashion that hypertext allows, as it helps them develop complex and rich schemata and enables them to use their knowledge in a flexible manner . Hypertext learning environments are particularly beneficial for learners who prefer active, problem-based, and self-directed learning . These environments also show potential to foster higher order, complex reasoning skills in students .

3. Multimedia in Teacher Education

It is commonly stated that teaching is a profession and trained teachers are professionals. Hurst and Reding

(2000) indicate that the noun 'professional' means 'a person who does something with great skill'. Trained teachers should therefore exhibit great skill in teaching. They also state that the adjective 'professional' means 'worthy of high standards of a profession'. This means that for teachers to be professional, they need to learn what those high standards are and then strive to meet them.

Glaser (1993) took these ideas a step further and stated that "getting the job done, even done well, is good enough for nonprofessionals, but continually improving the way the job is done both for themselves and others, is the hall mark of professionals." This should be an apt description for teachers, because as professionals, we should always be looking for better ways to teach. We need to care about doing the best job of teaching our students and making a difference in their lives. If this is the case, then we need to be uncomfortably with two comments that are currently commonly expressed about the students who graduate from our institutions of professional training for teachers. One is that their professional delivery is weak. The other is that, high scores in courses of a professional nature, such as proficiency in teaching, do not reconcile with delivery in teaching. Such comments tell us that we may not be doing the job the best way, and also that we should be looking at a way of improving the way we do the job.

On the relationship between multimedia and pupils in Portugal, see the investigation by Cardoso, Peralta, Costa (2001: 760), which arrives at the conclusion: "Unexpected emphasis is placed by pupils, especially in secondary education, on the use of multimedia materials in work of a specifically school-based nature, ahead of use for recreational purposes, eased skills acquisition and the desire to obtain information."Today's students are immersed in a variety of technologies from a young age. Although the claim that students inhabit a much different world than in times past has been made throughout history, it is particularly true in this century. From a young age, today's children are exposed to computers, the Internet, instant messaging, social networking sites, and cell phones that provide instant communication locally and globally. Today's digital students learn more when engaged in meaningful, relevant, and intellectually stimulating schoolwork and that the use of technology can increase the frequency for this type of learning. Therefore, it becomes necessary that to educate media-competent students, teachers must possess at least basic competencies in handling with modern tools of multimedia . Using technology, teachers can tap into the knowledge of experts; visualize and analyze data with their students; link learning to authentic contexts; and take advantage of opportunities for electronic, shared reflection .

Teacher education institutions may either assume a leadership role in the transformation of education or be left behind in the swirl of rapid technological change. For education to reap the full benefits of multimedia in learning, it is essential that pre-service and in-service teachers have basic skills and competencies to deal with modern multimedia tools. Teacher education institutions and programmes must provide the leadership for pre-service and in-service teachers and model the new pedagogies and tools for learning. They must also provide leadership in determining how the new technologies can best be used in the context of the culture, needs, and economic conditions within their country. To accomplish these goals, teacher education institutions must work closely and effectively with K-12 teachers and administrators, national or state educational agencies, teacher unions, business and community organizations, politicians and other important stakeholders in the educational system. Teacher education institutions also need to develop strategies and plans to enhance the teaching-learning process within teacher education programmes and to assure that all future teachers are well prepared to use the new tools for learning.

Although technology use can facilitate communication, today's students must learn how to think deeply about their learning so that they can realize their place in a rapidly changing, global society. Reflection and critical thinking enable students to learn from their experiences; therefore, time must be built into classroom instruction for both processes to occur (Henniger, 2003). Critical thinking involves in-depth examination of topics from a variety of perspectives and calls for cognitive skills such as comparison, classification, sequencing, patterning, webbing, and planning. Bloom's early taxonomy of cognition included six graduated levels of thinking that move from knowledge to comprehension, application, analysis, synthesis, and finally, evaluation (Bloom, 1956).The higher levels of thinking—analysis, synthesis and evaluation—are key to critical thinking and form the basis for developing all other 21st-century skills (Levy & Murnane, 2004). They must learn to apply technology tools appropriately in order to process multiple perspectives on real-world problems and formulate solutions to these problems (Partnership for 21st Century Skills, 2002). With new demands for meaningful and contextual application of technology in classrooms, teacher preparation becomes both increasingly important and increasingly challenging as teacher educators seek new ways to integrate 21st- century skills, nonlinear thinking skills, and digital-age reflections into coursework.

The concepts reflection and reflective practice are entrenched in teacher education literature with good reason. Reflection is a vehicle for critical analysis and problem solving and is at the heart of purposeful learning. Reflective observation focuses on the knowledge being learned (i.e., curriculum) as well as the experiential practice (i.e., pedagogy); both are important aspects of the learning process. Through meta-cognitive examination of their own experiences, pre-service teachers are encouraged to take a closer look at what they are learning and to explore their own growth in greater depth. Experiencing the power of reflection in their own learning, they are more likely to encourage similar reflection on the part of their students. When reflection has been included in instruction, it allows pre-service teachers to address uncertainties in their own learning, develop new approaches to learning, and document their growth as reflective practitioners. Reflective activities have long included journal entries or narrative writing, but technology can facilitate and enhance the skills of reflection as electronic reflections can be readily archived, revisited, updated, and shared in exciting and creative ways.

Teachers in pre-service training are greatly influenced by the way their tutors deliver content. The effect of seeing an example is more powerful than being told what to do when you are teaching a basic school lesson. For this reason, the best way to groom professional teachers is by using professional methods in teaching them. The use of multimedia in teaching teachers under training with make them taste first hands the joy of using the same as a teaching tool. The learning environment created by the new media contributes to transforming the teacher's role into that of a learner, and vice versa: "Today's school tries to establish a real-world environment and make possible an approach in which knowledge does not pass from educational designers and text authors to professors, from professors to teachers, and from teachers to pupils. Rather it comes from all directions, and the roles of student, teacher and professor are interchangeable.

The power of multimedia lies in its ability to electrify the thought and action centers of people's minds with the sensual elements of dazzling pictures, engaging sounds and compelling video alongside textual material. The underlying factors for the growing preference for multimedia include manifest and latent ones. The former include the grand strides made in Technology as well as the physical and emotional attraction that

come with it. The latter include the high fidelity and benefit on creativity that go with these modern sources of teaching. The manifest factors have been highly touted as they apply to all users of technology for both pleasure and learning.

3.1 Benefits of Multimedia in Teacher Education

3.1.1 High Fidelity

Alessi and Trollip (2000) define fidelity as how closely a simulation imitates reality. In teaching student teachers about classroom management skills, the best medium cannot be words, but a power-point presentation,demonstration using LCDs or video footage depicting a well managed classroom.

3.1.2 Skill learning

Teaching students the practice of teaching skills by demonstration, the most efficient and effective means of delivering these skills is by using various available multimedia approaches like computers, LCDs,Video footages etc.. A basic characteristic of such presentation is that it can be shown several times. This gives the teacher the benefit of using it for emphasis and the learner for mastery.

3.1.3 Development of Creativity

"Creativity is the act of bringing something into existence that is genuinely new, original, and of value" (NCREL & the Metiri Group, 2003, p. 33). The amount of acquired knowledge no longer defines intelligence; rather, today's measure of intelligence involves the capacity to create, produce, and apply technology in complex and sustained situations (Committee on Workforce Needs in Information Technology, 2001). This skill is essential to teaching today's children effectively. They are a generation of learners who have continuing technology-enhanced opportunities to create and share new, original, and valuable information with others. Tudor (1972) defines creativity as a process by which a person combines flexibility, originality and sensitivity to ideas, to enable him break away from the usual ways of thinking and doing things to a new and productive way. As teacher professionalism involves a continuous search for new and better ways of teaching and handling school affairs, this means that teachers need to be creative. However psychologists have agreed that creativity is an innate potential which if not developed, will remain latent in the individual. Creativity can only be developed through the use of a teaching process that promotes its development. Such a process includes stimulating thinking, making teaching concrete and full of interaction and discussion. Unfortunately, our current teaching approach in teacher education serves to compel students to be passive as they receive notes and solve problems the way their tutors expect them to. The potential of the video presentation to generate discussion and learning is enormous. It can serve as an effective advance organizer, present vital psycho-motor and cognitive skills and enhance meaning of content in lesson delivery, as well as serve as an effective closure tool. These benefits suggest what we are losing by not using this tool in our attempt to make our teachers more able to be creative in their teaching.

3.1.4 Development of Multimedia Literacy

According to Gutierrez (2009) the primary objective of educational systems include the development of the

individuals ability for self expression and communication in various forms through writing, music, art and the like. However, success in achieving in formal education evidently relies on comprehension or understanding of the messages made available in instruction. Literacy as a concept has overgrown the exclusive use of alphabetic language to its implications for both the individual and the society. It is only by this that literacy can influence the transformation of the social. A literacy process that is based on the mechanical procedures of encoding and decoding texts in the classroom can no longer serve the purpose of our society. Our present Educational system continued to convey an educational delivery process that stifles the prospect of the environment being brought to the classroom for better comprehension and extension of the ability of learners to transform society. This handicap obviously reduces the literacy potential of school leavers. Since the quality and practice of teachers determines the final output of their students, it is prudent that any improvement in this situation begins from teacher education. Thus, one other critical merit of teaching with multimedia is that it trains the student teachers on media literacy. According to Guitierrez (2009) media literacy is that which prepares people to utilize appropriate procedures when critically viewing different kinds of media (different in function or system of symbolic representation) so that they can assess what happens in the world and improve it to the extent that they can. Procedure in teaching is as important as content. To the extent that mulimedia provides a superior procedure than verbal information and text, its use as a teaching tool will surely revolutionize the teaching landscape in.

3.1.5 Provision of Teachers with Cognitive Tools for Thinking

The human brain is no longer a 'black box' as studies in brain psychology have provided substantial knowledge about what happens in the brain as we learn. The effect of information processing on memory and performance has been highlighted and the factors that support the appropriate encoding, storage and retrieval of information have been exposed, centering highly on the power of cognitive tools in enhancing thinking. Cognitive tools are generalizable computer tools that are intended to engage and facilitate cognitive processing (Kommers, Jonnassen and Mayes, 1992). They are mental devises that support, guide and extend the thinking process of their users. Their main function is to activate appropriate mental models in the brain thereby enhancing the interpretation of new information and assimilating new information back into those models (Jonnassen, 2009). The power of a multimedia to bring reality into the learning environment makes it one of the most useful tools of cognitive processing and memory. This can be testified by the fact that students who watch an interesting movie can remember almost 80% of it after one hour but can remember only about 25% of lecture information after the same time lapse. Indeed, the teacher in the 21st century cannot afford to miss out on this benefit of using the multimedia to enhance lesson delivery.

5. Conclusion

Thus, preparation of tomorrow's teachers does not depend solely on how well emerging technologies are incorporated into college coursework; instead, it rests on how well incoming teachers are taught to leverage the technologies to help their students develop these same skills. Multimedia tools can facilitate and even accelerate learning; however, technology literacy, which includes awareness and competence for application, must be acquired and perfected. Such knowledge and skills are improved over time through

daily practice. Consequently, training for effective use of technology may begin as early as possible during teacher education and in faculty development programs. Motivation to gain competency is as important as the training. Education students and practicing instructors must be given every opportunity to explore, practice, and gain self confidence for using technology tools.

References

Alessi, S.M. & Trollip, S.R. (2001), *Multimedia for learning*, (3rd Edition) Allyn and Bacon.

Bajraktarevic, N., Hall, W., & Fullick, P. (2003), " Incorporating learning styles in hypermedia environment: Empirical evaluation", *Proceedings of AH2003: Workshop on Adaptive Hypermedia and Adaptive Web-Based Systems.* Retrieved from http://wwwis.win.tue.nl/ah2003/proceedings/www-4

Bloom, B. S. (Ed.). (1956), *Taxonomy of educational objectives: Book 1, Cognitive domain.* ,New York: Longman.

Bransford, J., Brown, A., & Cocking, R. (Eds.) (1999), *How people learn: Brain, mind, experience, and school*, Washington, DC: National Academy Press.

Capobianco, B. (2007, June), "A self-study of the role of technology in promoting reflection and inquiry-based science teaching." *Journal of Science Teacher Education*, *18*(2), 271-295. Retrieved July 2, 2007, from Education Research Complete database.

Committee on Workforce Needs in Information Technology. (2001).,*Building a workforce for the information economy,*. Retrieved from the National Academies Press Web site: http://books.nap.edu/html/building_workforce/

Derry, S.J. (1990), "Flexible cognitive tools for problem solving instruction", Paper presented at the annual meeting of the American Educational Research Association, Boston, MA, April 16-20.

Dewey, J. (1938).,*Experience and education*, New York: Simon & Schuster.

Guitierrez, M.A. (2003), " Multimedia authoring as a fundamental principle of literacy and teacher training in the information age",,In Duncan, B., and Tyner, K. (Eds.) Visions/Revisions. Moving forward with Media Education. Madison, WI.(USA); National Telemedia Council, NTC.

Gunter, G. (2007), "Building student data literacy: An essential critical thinking skill for the 21st century", *MultiMedia & Internet@Schools*, *14*(3), 24-28.

Henniger, M. L. (2003), *The teaching experience: An introduction to reflective practices*, Upper Saddle River, NJ: Pearson/Merrill/Prentice Hall.

International Society for Technology in Education. (2007). *National educational technology standards for students.* (2nd ed.).Eugene, OR

Jacobson, M., & Archodidou, A. (2000), "The design of hypermedia tools for learning: Fostering conceptual change and transfer of complex scientific knowledge".,*Journal of the Learning Sciences*, *9*(2), 145-199.

Jacobson, M. J., Maouri, C., Mishra, P., & Kolar, C. (1996). "Leaning with hypertext learning environments: Theory, design, and research". *Journal of Educational Multimedia and Hypermedia*, *5*(3/4), 239-281.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development.* New Jersey: Prentice-Hall.

Kommers, P., Jonnassen, D.H. & Mayes T. (Eds) (1992), *Cognitive tools for learning*, Heidelberg FRG: Springer-Verlag.

Levy, F., & Murnane, R. (2004, October),"Education and the changing job market",. *Educational Leadership, 62*(2), 80-83