Indian Journal of Psychology of Learning and Human Development(IJPLHD)
Vol.2.No.1 2015 pp 1-10
available at: www.goniv.com
Paper Received :08-03-2015
Paper Published:18-04-2015
Paper Reviewed by: 1. John Arhter 2. Hendry Goyal
Editor : Prof. P.Muthukumar

Literature Review: An Examination of Technology in Education

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In the past several years, information technology has become an increasingly integral part of the way people live their lives, influencing such things as communication, artistic endeavors, and methods of teaching and learning. As educators constantly strive to find the best ways for students to learn, new technology and ways to use it have become part of that process. This new emphasis on technological literacy brings up a number of important questions. How can technology be best used to promote important elements of learning such as effective knowledge construction, self-regulated learning skills, and motivation? Does a high level of technology integration in the classroom truly correlate to more effective learning? In the case of online courses, do students become too isolated and are prevented from social interactions that might also benefit their learning? Finally, based on current research about technology in education, how can teachers learn how best to use it in their classrooms to promote effective learning? From my own personal experience as a student I know that elements of computer technology that I used throughout my elementary and secondary school years such as educational games, online research materials, and even word processors helped to make learning and schoolwork easier and more enjoyable at times. Yet did the simple use of computer media help me to become an effective learner, or was that due to other factors and technology was just one mode used to reach that point. My research literature analysis attempts to look into this idea of exactly how technology can be used for effective learning and the role teachers must play in this process.

Article 1

How Teachers Integrate Technology and Their Beliefs About Learning: Is There a Connection?

Eugene Judson, Center for Research on Education in Science, Mathematics, Engineering, and Technology
(CRESMET), Arizona State University
Journal of Technology and Teacher Education, 2006

This study was meant to serve as a way to prove that there is correlation in teaching

methods between the use of technology and the level to which teachers employ a constructivist, or hands-on learning approach that promotes students actively constructing meaning through their classroom experiences. The article also cites that previous studies of technology integration focus more on how much technology is used, not so much the ways in which it is used, quantity is more of a focus than quality. (Judson, 2006, p. 583). This study strove to show a more qualitative view of technology use. Researchers did observations of at least a half hour in length of 32 teachers ranging over all grade levels. Each teacher was asked to take a survey titled Conditions that Support Constructivist Uses of Technology (CSCUT), evaluating his/her own opinion of their own application of both constructivist practices and technology use. The researcher observed the teacher and class and filled out their own evaluation form, the Focusing on Integrating Technology: Classroom Observation Measurement (FIT:COM). Results of the CSCUT surveys showed the previous evidence that teachers who believed in using constructivist practices also believed in integrating technology. However, the dissent came in the fact that this correlation did exist significantly in the FIT:COM results. Teachers who believed that constructivist practices were the most beneficial were not always the teachers who implemented technology effectively into their lessons. The article does say that some of the lack of solid correlation may be partially due to the potential unreliability of the individual teachers' opinions of their own practices. A teacher may believe in taking a hands-on approach in teaching their students, but may not necessarily demonstrate those beliefs, or apply them to technology use for any variety of reasons. A discussion was also made into the different attitudes of experienced teachers versus more novice teachers. According to the article,experienced teachers may have more knowledge in how to apply constructivist beliefs, however they are also likely to be more critical of themselves and the ultimate success of their lessons (Judson, 2006, p. 591). This may also cause a separation between the reports of the teachers and the observations of the researchers, showing that while many teachers profess to certain philosophies, they are not always put into action.

Article 2

Do Enhanced Communication Technologies Inhibit or Facilitate Self-Regulated Learning?

Philip Banyard, Jean Underwood & Alison Twiner

European Journal of Education, 2006

> This article presents a study from the UK analyzing the use of broadband internet technology in schools

and whether or not this technology is beneficial or inhibiting to the learning process, particularly with regard to self- regulated learning. Self-regulated learning is the process in which students set goals, monitor their learning, seek out help where needed, motivate themselves to learn, and evaluate their own learning. One assumption about technology use in schools is that the more computer time students are given the more opportunities they will have to build their self-regulation skills. However, according to recent studies there is not a direct correlation in this assumptions. In fact, students who are given a moderate use of computers show the highest performance (Banyard, Underwood, & Twiner, 2006, p. 474). Other issues concerning broadband technology include the greater opportunities for plagiarism and the fact that lower socio-economic status often correlates to students being less computer literate, thereby preventing them from benefiting from the technology as well as other students. The British Educational

Communications and Technology Agency (Becta) surveyed classrooms of all grade levels at 37 UK schools, compiling this report based on interviews with teachers, heads of schools, and other faculty, observations of classrooms, and published data about each school pertaining to its level of broadband use. The study presented the results as a series of examples and different observations based on technology's influence on motivation, self- regulated learning, and how it could be potentially inhibiting. Some positive observations include greater enthusiasm for an activity, respect for the computer equipment, students showing ease and skill at gathering research data online, allowing students to work and learn at their own pace in learning material. Negative observations include students who easily gather research data but do so in a way that does not demonstrate meaningful learning, and again the division of computer skills, and plagiarism. The main conclusion drawn is that while this increase in educational technology does have the capabilities to improve students self-regulated learning it is not a guarantee, thereby leaving the task of implementing technology effectively to the teachers who use it.

Article 3

From the University to the Elementary Classroom: Students' Experiences in Learning to Integrate Technology in Instruction

Dina Brown, Argosy University/Orange County Mark Warschauer, University of California, Irvine *Journal of Technology and Teacher Education, 2006*

This case study explores the experiences of 110 intern level, or preservice, teachers in an information technology course that taught methods of using technology in the classroom as part of their teacher preparation program. The study assessed the effectiveness of the class in preparing these teachers to use technology in their classrooms as well as other factors in their preparedness, such as experience during field work. Data for the study was collected through surveys of the teachers, observations, group and individual interviews, and online discussions where the participants could discuss their thoughts on the course. The study reported four important findings with regard to preservice teachers' experiences in this technology integration course. First, technology was often viewed as "peripheral" by many of these teachers and they were more concerned with managing their workload and meeting other curriculum requirements. Technology was often implemented as an afterthought. (Brown & Warschauer, 2006, p. 607). Second, the general consensus on the technology course was that it provided more instruction in how to simply use the technology, not on how to effectively use it as an instruction tool in the classroom. Third, the surveys showed that all of these preservice teachers showed an increase in positive attitudes toward technology and how it could help students and promote higher-level thinking as a result of this course and their field work, regardless of their other thoughts and complaints about it. Fourth, the preservice teachers who demonstrated the most effective use of technology were the ones placed with mentor teachers who demonstrated the same effective technology use (Brown & Warschauer, 2006, p. 613). The study concluded that in the case of these teachers, although they were given adequate exposure to technology for use in the classroom, they were not trained well enough in how to implement it in the most effective ways. Some solutions proposed included integrating technology into more teaching methods courses,

changing some of the content of the technology course these preservice teachers took to emphasize more about effective integration, place more students with mentor teachers who were skilled with technology, and promote more communication and feedback between universities programs and the school districts their students go to teach in.

Article 4

Implementing Web-Based Intelligent Tutoring Systems in K-12 Settings:
A Case Study on Approach and Challenges

K.K. Wijekumar, Pennsylvania State University
Journal of Educational Technology Systems, 2007

This article explores the use of an online intelligent tutoring system in reading comprehension. Intelligent tutoring systems are online programs that provide the students with immediate interactive feedback on their work. Such programs have been used frequently in math and science, but the designers of this particular program wanted to see if such a system could be effectively created to help students learn in reading. This program promoted work with the "Structure Strategy" in order to help students write out their own main idea statements on different pieces of text. The tutoring program was designed with voice instruction, including an animated face, a set of practice exercises, games, progress reports, and interactive capabilities for the students. Based on previous studies the designers believed that the interactive nature of this program would make students less likely to "skip reading passages and not follow instructions" like they might do on other "static web pages." (Wijekumar, 2007, p. 198). The interface was made to look like an open book with the passage on one side of the page and the animated "teacher" and space for answers on the other side. Other challenges the designers faced, besides creating a program that would best motivate students to learn, included the acceptance of school districts for using this kind of technology as well as internet bandwidth availability. The design staff implemented their program at three schools, set to be used by about 300 students. The article described some challenges faced including difficulties in making
the program compatible with the schools' computer networks, varying skill levels for the students using the program which effected how they benefitted from the program. These challenges were "taken in stride" by school districts that frequently used technology, however other school districts were less likely to deal with the challenges as well and perhaps even abondon the system. The conclusion of this study was that this kind of program was capable of improving reading skills in the students who used it, however this improvement varied based on factors in schools such as economic issues and prevalence of technology, factors that would need to be overcome on an individual basis if all schools were to achieve the same improvement.

Article 5

Investigating the Relationship between High School Technology Education and Test Scores for Algebra 1 and Geometry

Richard R. Dyer, Philip A. Reed, and Robert Q. Berry
Journal of Technology Education

This article presents a study on the idea that certain technology education courses can

help students improve their performance and test scores in core academic classes. The theory is that technology education can help students to use their knowledge in a contextual setting, which according to the theories of Piaget and Vygotsky will help them learn more effectively. The study was conducted on a group of high school sophomores, juniors, and seniors in Virginia who had taken a Standards of Learning (SOL) assessment, which was designed in the state of Virginia to meet the requirements of current No Child Left Behind (NCLB) legislation, in either Algebra 1 or Geometry. The study wanted to measure if students who took high school classes in Career and Technology Education (CTE) scored higher on the test than students who didn't and if students who did not score as well after taking the test the first time did score better on a retake after taking a CTE class. Statistical analysis showed both of these hypotheses to be true, concluding that courses such as these can prove to be beneficial to students in terms of helping them to gain practical understanding of general education concepts in core academics. However, as with all instances such as this the important concern should not be with simply having students learn the material so that they can produce a high test score to satisfy NCLB, but with developing the best methods to help students understand these concepts in a contextual manner. The test score should just follow later.

Article 6

Gender-based Preferences toward Technology Education Content, Activities, and Instructional Methods

Katherine Weber and Rodney Custer (Illinois State University)

Journal of Technology Education, 2005

This study presents an examination of gender differences with regard to technology education and how it is used. The basis for this study came in large part from research and general cultural stereotypes that show that females tend to show a great deal less interest in technology education than males do. The study served to find out more about what elements of technology use both male and female students preferred with regard to activities, curriculum topics, and methods of instruction at the middle school and high school level. The researchers prepared two surveys, the Technology Activity Preference (TAP) Inventory and the Technology Topics and Instructional methods Preference (TIP) Inventory, which were presented to a total of 659 middle school and high school students in Wisconsin taking exploratory technology classes (Weber & Custer, 2005, p. 57-58). In completing these surveys the students were asked to rank a set of activities or ideas in terms of how much they interested them, with "the lowest score representing the most preferred method and the highest score being least preferred." (Weber & Custer,2005, p. 59). The findings of the study showed significant differences between males and females with regard to some specific categories of activities, while with others both genders rated them poorly. Top choices for females were design activities, while males preferred utilizing of products activities. Gender differences also existed in students preferences of topics used for technology activities, but these differences were not as great. In terms of methods of instruction students were asked to rank their interest level of ten instructional approaches. Both genders ranked "doing projects" as their most preferred approach with "competitive activities" second and "lecture" last. The rankings for all other methods were also generally similar. The study also looked at these methods with regard to specific activities and factors like working in groups or

working alone. Both genders ranked these factors similarly, preferring projects to learning about how things work and working in small groups to working alone, which showed consistency with accepted ideas about females but not as much with males. The study generally revealed that male and female preferences in technology activities are much more similar than many educators believe, showing that with the right methods and activities females can gain just as great an interest in technology as males. The study also revealed that across all aspects of the survey higher ratings were given by middle school students than high school students, implying that technology programs may be better developed at the middle school level than at the high school level. The article finished with a list of recommendations for educators based on their findings.

Article 7

A Comprehensive Look at Distance Education in the K-12 Context

Kerry Lynn Rice, Boise State University

Journal of Research on Technology in Education, 2006

This article is a detailed review of distance education, the generic term given for a variety of Web-based instructional programs, at the K-12 level. Distance education has been used frequently with adult students, but as it is relatively new at the K-12 level it is yet to be determined if adapting these kinds of programs for elementary and secondary school age children is effective or not. This review and examination was based on a large selection of journals, research studies, and other sources collected by the researchers reviewing this topic. Through this research the writers of the article discerned two general types of online distance education methods, either in the form of supplemental material or as distinct "cyber schools" offering "an alternative to the traditional face-to-face school environment." (Rice, 2006, p. 427). One of the main points of the article was to stress the lack of consistency in reports of effectiveness that could lead to nationwide standards of how distance education should be used. Another important point stressed in the article is the fact that students learning through distance education methods seem to succeed and fail at the same rate as students in traditional learning environments, leading to the assumption that student success is driven by other components than simply the mode in which the material is presented (Rice, 2006, p. 432). Three factors that show a strong correlation for student success in distance learning environments were identified: *learner characteristics*, the level of work ethic and self-motivation possessed by the students, *learner supports*, the involvement and support of the online teacher or adult supervisor in the distance education program, and *affective learning domains*, factors that encourage or discourage students motivation, such as the amount of online peer interaction they have with other students enrolled in the program. Research has shown that student-to- student interaction is important in the traditional classroom environment, so effective distance education programs should have ways for students involved in the program to communicate and share ideas, preventing the possible feelings of isolation that come with programs like these. The conclusion of this review showed a sense that effective learning occurs in certain fundamental ways and all mediums must account for these, whether the learning is achieved through a traditional classroom or an online program.

Article 8
An Analysis of the Technology Education Curriculum of Six Countries
Aki Rasinen
Journal of Technology Education, 2003

This article presents a study conducted by a group of researchers from Finland analyzing the methods and effectiveness of technology education curriculums in the countries of Australia, England, France, the Netherlands, Sweden, and the United States. The government of Finland examined these countries in order to discern the best methods for technology education that they could attempt to implement in their own country. These six countries were chosen because of the large amount of research already done on their programs and the fact that rapid growth in technology education had taken place in all of these countries in the past ten years (Rasinen, 2003, p. 31). The article presented a systematic analysis for each of these countries, providing an overview with descriptions or bulleted lists of the *rationale and content* of their technology curriculum, their *implementation goals* for technology and other various significant observations (Rasinen, 2003, p. 32-40). This analysis showed a variety of differences in technology curricula, but also some very significant commonalities, for example the fact that technology education should appeal to both genders and the importance of technology's role in society (Rasinen, 2003, p. 40). Taking these commonalities, the researchers drew up a chart for the *objectives*, *methods*, and *content* of technology education and how they should be implemented to be most beneficial to society, the school system, and the individual students. From the breakdown of the technology curriculum beliefs of these six countries as well as the objectives that Finland hopes to implement, a few general conclusions came out. The article stressed the importance of "technological literacy," for all students to be able to effectively use technology for a wide range of purposes in all countries. The best way to achieve this seems to be through a more widespread implementation of technology into everyday classwork in other subject areas. More research will still be needed to determine whether the observations of this study continue to hold true in the future, as the effectiveness of these methods continues to be observed and tested.

Article 9
Raising the Bar on Technology Research in English Language Arts
M.L. McNabb, Learning Gauge, Inc.
Journal of Research on Technology in Education, 2005

This article presents the author's viewpoint on how technology is implemented in the content area of English language arts and the limited research with regard to it. The general belief is that computers and technology have great potential to improve literacy through interactive programs and easily accessible reading and research materials. However, the author also makes the point to hypothesize whether reading online materials requires different cognitive processes than reading print (McNabb, 2005, p. 114). Online reading material often utilizes "hypertext" and "hypermedia," highlighted links to other information sources, pictures, video, and related material which creates a much different reading experience. This format presents a large amount of varied information at once, which could be potentially distracting for children with attention problems, who may spend more time following links and searching out the most information possible than

meticulously discerning the information they actually need to know and use. However, the hypertext format also allows for supplemental material that can help students find definitions and examples needed to help them understand what they are reading much more quickly, which could "support vocabulary building in context and expand students' lexicon" (McNabb, 2005, p. 115). The article states that in spite of drawbacks, hypertext is ultimately helpful because it requires students to actively build skills at interpreting and selecting important information from text. Other questions relating to online text versus printed text are also presented, leading to the author's conclusion that more research is needed in this area to prove if these ideas are indeed valid.

Article 10

Measuring Teachers' Technology Uses: Why Multiple Measures Are More Revealing
Damian Bebell, Michael Russell, and Laura O'Dwyer (Boston College)
Journal of Research on Technology in Education, 2004

This article presents a study conducted to discern exactly how teachers use technology in their classrooms. In much research on this topic, the separate ways that teachers use technology have been combined together to develop conclusive ideas about the frequency of technology use and its effectiveness for instruction. In fact, technology use falls into many distinct categories, only some of which involve using the technology for instruction in the classroom. Some of these methods include creating worksheets and materials for their classrooms, keeping records, communicating with parents and other teachers through e-mail, using the internet to learn about optimal educational methods or to plan lessons, and using media for actual class instruction. The study here surveyed 2,894 teachers in grades K-12 from 22 Massachusetts school districts on all of these different uses. The results were tabulated in two different ways – first combining all of these uses into one composite measure, and second separating them into a more "multi-dimensional" analysis. This analysis showed a normal distribution of frequency of technology use in the composite measure, illustrated with a histogram, implying that "most teachers are making moderate use of technology (Bebell, Russell, & O'Dwyer, 2004, p. 50, 53). Once these factors were separated, the results became much more specific. For example, the study reported high technology use for lesson preparation and low technology use for actual instruction. These measures showed strong patterns in one direction while some others such as e-mail or assigned student use of technology showed weaker relationships, revealing distinct variety in all of these uses. The study also showed distinct and varying patterns in how these technology uses are carried out through more experienced versus less experienced teachers, as well as elementary versus middle and high school teachers. The conclusion of this study reveals a need for more research using this multi-dimensional method and the fact that the issue of educational technology will continue to reveal complexities and new information.

Conclusion:

In the process of reading these ten articles, all covering a broad range of sub-topics within the broader issue of the best use of technology in education I discerned two key ideas. First, that most issues in technology education are nowhere near conclusive and that research should continue to develop more solid ideas. Second, that while there is evidence that technology can help promote more effective learning it is more important to focus on how teachers integrate technology into

their classrooms and not just that they do integrate it. Teachers need to take the same measures to promote effective learning skills with their students such as self-regulated learning, study strategies, problem solving, critical thinking, meaningful learning, and development of motivation. The general consensus with regard to technology in education is that schools should continue to make it an integral part of teaching and learning as necessitated by the large role that technology plays in our society, evidenced by Article 8 in which the United States and other countries strive to develop goals and parameters to be met for their country's technology education curriculum. However, close attention must always be paid to exactly what teachers are doing with technology to help their students learn as well as ways to implement it that account for cultural and socio-economic differences and also appeal to both genders. More than one article also emphasized the importance of being able to bring technology into the normal class environment in all subject areas, not just isolating it to specific classes, as well as training new teachers in not just how to use technology in the classroom but how to combine it with other well- established teaching practices that will benefit students the most. Reading these articles has given me a great deal of insight into the technology education field, and I hope to continue to learn more about how techno logy can be used to benefit students and what I can do as a teacher to promote that.

Works Cited

1.Judson, Eugene. (2006). How Teachers Integrate Technology and Their Beliefs About Learning: Is There a Connection?. *Journal of Technology and Teacher Education*. 14(3), 581-597.

2.Banyard, Philip, Underwood, Jean, & Twiner, Alison. (2006). Do Enhanced Communication Technologies Inhibit or Facilitate Self-regulated Learning?. *European Journal of Education*. 41(3/4), 473-489.

3.Brown, Dina, & Warschauer, Mark. (2006). From the University to the Elementary Classroom: Students' Experiences in Learning to Integrate Technology in Instruction. *Journal of Technology and Teacher Education*. 14(3), 599-621.

4. Wijekumar, K.K. (2006). Implementing Web-Based Intelligent Tutoring Systems in K-2 Settings: A Case Study on Approach and Challenges. *Journal of Educational Technology Systems*. 35(2), 193-208.

5.Dyer, Richard R., Reed, Philip A., & Berry, Robert Q. (2006). Investigating the Relationship between High School Technology Education and Test Scores for Algebra 1 and Geometry. *Journal of Technology Education*. 17(2), 7-17.

6. Weber, Katherine, & Custer, Rodney. (2005). Gender-based Preferences toward Technology Education Content, Activities, and Instructional Methods. *Journal of Technology Education*. 16(2), 55-71.

7.Rice, Kerry Lynn. (2006). A Comprehensive Look at Distance Education in the K-12 Context. *Journal of Research on Technology in Education*. 38(4), 425-448.

8.Rasinen, Aki. (2003). An Analysis of the Technology Education Curriculum of Six Countries. *Journal of Technology Education*. 15(1), 31-47.

9.McNabb, M.L. (2005). Raising the Bar on Technology in English Language Arts. *Journal of*

Research on Technology in Education. 38(1), 113-119.

10.Bebell, Damian, Russell, Michael, & O'Dwyer, Laura. (2004). Measuring Teachers' Technology Uses: Why Multiple Measures Are More Revealing. *Journal of Research on Technology in Education*. 37 (1), 45-63.