

Annotated Bibliography

By Julio A. Velasco

Note: Article references in **maroon** are about theory. Those in **green** are theory & technology

Ayersman, D and Reed W. (1996), Effects of Learning Styles, Programming and Gender on Computing Anxiety, *Journal of Research on Computing Education*, 28(4), 148-161.

Summary

The purpose of the study was to (a) find out if programming instruction reduced computer anxiety, (b) Examine whether learning style had any bearing on reducing anxiety, (c) determine if learning style had any bearing on programming performance, and (d) find out if anxiety was gender related. The study used a group sample of 58 students. who were taught programming, computer architecture, and the possible uses of computers in education. Four learning styles (Accommodator, Assimilator, Diverger, and Converger) were ascertained using Kolb's Learning Styles Inventory, LSL. Computer anxiety was measured using a modified version of Spielberg's Self-Evaluation Questionnaire. And, Computer proficiency was measured by the results of the CAM written test and hands-on programming

Previous studies have shown that people with no computer experience display high levels of computer anxiety. This study shows that, depending on the amount of training, anxiety is reduced and often followed by significant performance gains. Certain types of learning styles appear to perform better in certain programming environments. The Convergers and Divergers accounted for the lowest and highest levels of computer anxiety prior to the instruction. And Divergers and Convergers scored the lowest overall on written performance. However, the authors found no significant relationship between learning style and initial levels of computer anxiety. They also found that males have lower computer anxiety and higher computer interest than females, but that females significantly outperformed the males on the programming portion of the performance measurements. In closing, the authors acknowledge that additional research is required. Another study should be done with a larger test group with a more balanced distribution of participants.

Analysis

The study may be flawed in that the test group was relatively small. However, there were some interesting conclusions presented. I particularly found this study relevant, as I teach a computer course. But the most interesting piece of information was that females are better programmers!

Bailey, C (1996), Interactive Learning and Technology in the US Science and Mathematics Reform Movement, *British Journal of Educational Technology*, [CD-ROM], 27(May). 123-133. Available: Wilson Education Abstracts, 1/95-10/98.

Summary

The author notes that even though more money is spent on education in the United States than in most other countries, students are not performing as well in the areas of science and mathematics. Further, the need for scientists and mathematicians is increasing rapidly as the old generation retires. Based on these statistics, there will be a dearth of these workers in the future and the schools are not providing replacements fast enough to compensate. At the time of writing, there were no clear statistics on the number needed, but it is clear none the less that schools must improve the students skills and encourage them into careers in the fields of science and mathematics. National committees and researchers have looked at this problem and have agreed that the traditional methodologies for teaching these subjects – lecture – is not providing the incentive for students to take interest in these subjects. The end result is students do not understand the relationship between the sciences, nor the scientific method of experimentation. Researchers, including cognitive educational techniques and the integration of computer technology, have provided specific recommendations. However, empirical data supporting these suggestions is limited. Regardless of this fact, research in the area of teaching and learning of the last century has pointed towards cognitive education as a solution, with emphasis on auditory, visual, and kinesthetic input or all three combined. The results of another well known study implied that the focus of education should be in the understanding of a subject rather than memorizing facts, attempting to interests students in the subject, and involving the student in the learning process are important techniques are of paramount importance.

Research in the use of multimedia technologies as an educational tool has been positive. The applications engage and involve the student creating the proper learning environment for a high level of retention. In addition, the research showed that the time spent learning the subject and the overall cost of providing the materials was less with traditional methods. Unfortunately, budgetary constraints and the increasing overhead have combined to limit expansion and research in this area, forcing educational institutions to seek new ways of teaching including collaboration via the Internet and video conferencing. With the support of the university and some additional funding, the author and her colleagues set up some distance learning classes in science and mathematics. Although the timeframe was too short and the test group too small to offer empirical data, there were some qualitative results that were interesting. First, the students and teachers were uncomfortable using new educational technologies at first, which was exacerbated by faulty technology. However, after they acclimated to the new approach and the technical problems were overcome, everyone enjoyed the experience and the students felt that they learned better than with traditional methodologies.

Analysis

This article showed what the Florida Community College at Jacksonville was doing in terms of incorporating technology and cognitive pedagogy in the classroom. It was an interesting, if somewhat informal, study. I found it to be informative in learning how another institution handled this subject, but I'm not sure if the material is useful in any productive way in this class.

Baylor, A (1999), *Intelligent Agents as Cognitive Tools for Education, Educational Technology, 39(2), 36-40.*

Summary

Intelligent agents are independent computer programs that function within operating systems, databases, and computer networks. They can support a multitude of support services, such as retrieving specific information from the Internet automatically. Ideally, they should simulate a human relationship by combining, reasoning, planning, and natural language processing with a simple human-machine interface. According to theorists, this will be one of the most important computing models of the next ten years. This article, explores extending the reach of intelligent agents to serve as *cognitive tool* in educational contexts.

Intelligent agents could be used to serve as extensions of a person's intellectual capacity, in effect learning the the student's learning style, inferring the student's needs and advising accordingly. In terms of helping the student learn, the agent can coach, tutor, and/or provide help. They could be used to free a person's mind for more cognitive tasks; effectively reducing information overload by finding and presenting information according to the student's interests and needs. Furthermore, the agent should be easily modifiable and all aspects of it's adaptive logic available for inspection. Consequently, the design of intelligent agents is very difficult and is made even harder considerin that more intelligence is not necessarily better from an instructional perspective. The role of the learner becomes that of a "cognitive apprentice", where the student improves his/her skills working with a "master": the intelligent agent. Ideally, the agent would gradually allow the student to take over as he gains proficiency.

Unfortunately, the authors recognize that current systems do not go far enough into teaching strategies, but some work in being done on this. An example is a proposed agent, called the Personal Intelligent Mentor, that is geared towards improving the learners' metacognitive processing. Specifically, the PIM serves as a metacognitive coach, "encouraging students to think about their cognitive processing and implicitly learn to model the agent's learning strategies."

Analysis

Exploring the development of AI agents is clearly an area that will play a big roll in the future of teaching and learning. What is currently available is just the tip of the iceberg. The current crop of electronic data gatherers will improve and transform into full-blown IA-based knowledge assistants, freeing the user for mind to explore a higher order of cognitive thought. There is so much happening on the electronic frontier that I'm somewhat overwhelmed. This was another fine article and very relevant to the study of Educational Technology.

Blanton, B. (1998), *The Application of the Cognitive Learning Theory to Instructional Design. International Journal of Instructional Media. [CD-ROM], 25(2), 171-7. Available: Wilson Education Abstracts, 1/95-10/98.*

Summary

The article uses Cognitive (Gestalt & Schema) Theory as a framework to developing instruction techniques that is relevant to the learner. The author challenges the teacher to use the "conceptual neighborhood" concepts, whereby related schema is held in close

proximity to each other. These clusters of information help the learner to develop conceptual abstractions, in turn expanding the knowledge matrix.

“The goals... should include learner needs and interest, reflect the concerns of society, and make every effort to insure that goals are focused at least toward the present and, hopefully, toward the future needs of the learner.” The author emphasizes that lesson objectives should cover the three main areas of a learning event: cognitive, psychomotor, and affective domains; and to use a guidance technique, called “scaffolding” to improve overall learning performance in terms of fluency, flexibility, elaboration, and originality.

Analysis

This article is extremely informative in expanding on the cognitive theories examined in class. The generous use of references within the article and the bibliography gives the reader plenty of material for further research. I found this document to be very relevant to the class content and in providing detailed guidelines for teachers using a cognitive approach to learning. Although the goals seem to be lofty and almost unattainable in its scope, it certainly serves as a guidepost to the real world situations encountered by the urban teacher at any level.

Cohen, L. and Kim, Y (1999, Feb/Mar), *Piaget's Equilibration Theory and the Young Gifted Child: A Balancing Act, Roeper Review, 21(3), 201-206.*

Summary

The authors seek to use Piaget's developmental theories as a framework to understanding development of the gifted child. Piaget's studies centered on universal properties that could be ascribed to anyone, so in this light the extrapolations may falter, but there are some conclusions that can be derived from the comparisons. Piaget's four stages of development – Sensorimotor (physical), Pre-Operational (language), Concrete-Operational (logic), and Formal Operational (abstract) – are described, then some history on similar studies presented. Many researchers found that the gifted go through these stages over the same time frame, but the quality and scope of abilities within each stage is noticeable. At best, the gifted are no more than two years ahead of normal stage development and it is improbable for a child to develop broad concrete thinking before the age of five. The author narrows the focus to Piaget's Equilibration Theory, which illuminates many characteristics of the intellectually gifted. One of Piaget's four factors of cognitive growth, this theory stated that new thoughts cause a state of disequilibrium until the idea is assimilated and accommodated by the learner. Once the process is complete, understanding is at a higher level than it was before. The seed of the next disequilibrium is always present, creating an ever-widening spiral of understanding. Equilibration is therefore a major force in the intellectual growth of any child.

The authors develop Piaget's Equilibration concept further by describing its three major components, Simple Equilibration, Reciprocal Equilibration, and Equilibrations of Totalities, and then by reviewing Roberts long-term study of Equilibration in the Conservations. After summarizing Robert's three levels of compensation, Alpha, Beta, and Gamma, which attempt to reconcile the process of Equilibration, he concludes this section with the fact that very smart children think differently from normal children - their conclusions and constructive generalizations are broader in scope. The author then

reviews the Bent-Wick Menorah Metaphor, which states that once a candle is lit, each one in turn ignites from the previous representing increased understanding that leads from a specific fact to general conclusions. Additional studies by Karmiloff-Smith and Inhelder are discussed to illustrate the depth of the gifted child's ability to see a glimpse of potentials before having fully developed conclusions to deal with them. Finally, the author lists characteristics associated with the gifted child: curiosity, the capacity for broad abstraction and generalization, constantly questioning, deep and passionate concentration to tasks and interests, and a preference for novelty and complexity.

Keeping these attributes in mind, the teacher has many opportunities to help the gifted child excel by keeping the active mind occupied with tasks and interests that light new candles and keep the old candles burning brightly.

Analysis

The author has made a good case for using Piaget's developmental theories as a framework for understanding the gifted child. However, for a long-winded study, his recommendations seemed obvious to anyone who has been around gifted children. There were a few relevant insights which would help a teacher of gifted children, but I'm not sure of its relevancy to me or to the class work. Still, it was very interesting reading.

Donlevy, J and Donlevy, T (1998), *Adult Education: A Brief Review of Literature Using a Template of Perspectives, International Journal of Instructional Media*, [CD-ROM], 25(1). 1-10. Available: *Wilson Education Abstracts*, 1/95-10/98.

Summary

This article provides a synopsis of the field of adult education literature, which has become a specialized field in recent years. Using the "Donlevy template", they categorize a variety of published works using four major perspectives: technological, psychological, ideological, and sociological. On a technical basis, they define adult education as self-directed and highly structured. In an example by Watkins and Marsick, the term "learning organization" is used to interpret an individual as "one that can master the art of learning to create conditions for adapting continuously to the dynamic forces shaping the global marketplace."

The authors provide samples of psychological factors by sampling works of Nancy Schlossberg, Jack Mezirow, Roger Gould, and Carl Jung. Schlossberg examines the dynamics of the adult transition and suggests specific support to adults going through this difficult period. Mezirow's theory of adult learning centers around the concept of perspective transformation, which represents an adult's altered outlook leading to constructive personal change and the exploration of new attitudes towards learning and understanding. Gould furthers this concept by seeing adult development as a process of losing faulty learning habits that inhibit the acquisition of new knowledge and skills. Finally, Jung proposed that "the main task of adulthood [is] to integrate into one's conscious life the, as yet, unexplored potentialities hidden in the unconscious psyche."

Writers in the ideological perspective critique assumptions that constitute our personal and social frames of reference. The focus is mainly on power: its use, abuse, and how it can be shared more equitably among adults within society. The exemplar of this

perspective was Paolo Freire, who stated that prevailing educational strategies served the economic interests of those in power. This form of education views learners as blanks to be molded by an authoritative body.

Sociological perspective focuses on the communitarian aspect of adult learning, and is especially focused towards the United States. The sample authors advocate for and promote full democratic participation in community life. Specifically, they were referring to the work of Eduard Lindeman, who was adept at getting to the heart of adult education as the primary vehicle for insuring the survival of democracy. He believed “Courageous, informed action, based upon sound, moral decisions would be possible only where freedom permitted intelligence to guide adult thinking.”

In conclusion, the authors “perspectives serve to orient the reader amidst conflicting opinions, voices, and agendas. It remains for future articles to elaborate this thinking, which here provides just a sampling and suggestion of the possibilities for exploring the field of adult education.”

Analysis

This powerful article gives a wonderful overview of adult learning theory in the late twentieth century. This is a great “mini” primer with lots of references to start a research paper or full-blown dissertation of the subject. I found it highly.

Ehrmann, S. (1995), *Asking the Right Questions, Change [CD-ROM], 27(2). 20-7. Available: Wilson Education Abstracts, 1/95-10/98.*

Summary

The author has often been asked, what he considers, ineffectual questions about the use of technology in education, which he doesn't think can be answered in any reliable or valid fashion. The article examines both useless and useful questions on the subject, with the objective of leading the reader to think about questions to ask. In general the author sees useless questions as those that seek a universal answer about comparative teaching effectiveness and costs of technology, with the presumption that it will lead to predictable, acceptable results. He contents that this is not substantiated by research. He uses the term "organized anarchy", made up by Cohen and March to describe any institution whose organizational structure has problematic goals based on inconsistent decision-making on the use of technology.

One of Higher Education's goals is to cultivate students who will succeed in the workplace. Research should indicate that there is a positive correlation between cumulative grade point average and work outcomes, but in actuality the connection is so small that this method of comparison is meaningless. The author suggests the reason for this minimal relationship is that there are important skills the curriculum fails to teach or reward. Institutions are stuck on the horns of a dilemma: “We're probably failing to teach the right stuff, but even if we were trying to teach the right stuff, many instructors wouldn't notice whether their students were learning it or not.” Stated another way, the question of technology use is unsubstantiated in regards to the teaching methodology.

According to Richard Clark, the positive outcome of the use of technology could be attributed to the teaching approach they supported. Another study by Kozma,

recommends that there be more research into this relationship, but budgets typically do not include these studies and therefore there is strong evidence that technology is mishandled. Furthermore, although research shows that individualized computer-assisted instruction shows a significant improvement in learning, the issue is further complicated by findings that indicate such software takes 10 years or more to become widely accepted. The lack of immediate return on investment discourages funders and publishers from investing in upgrading and enhancing the software. The article goes on to evaluate what the author terms as “worldware”, common applications that can be used to promote good learning skills such as word processors, email, collaborative tools, analysis packages, etc. These applications promote a different way of learning by allowing a student to re-think and revise their projects in stages. Instructors, in turn, revise their syllabi to encourage the development of ideas through process of plan, draft, conversation, another draft, and final version. Each step promotes the cognitive process of rethinking and re-learning.

The author finally offers one solution to the dilemma of finding the resources to evaluate technology by introducing a collaborative undertaking called The Flashlight Project. Flashlight is a three-year enterprise devoted to creating and sharing procedures institutions can use to evaluate, monitor, and research the success and failure of those strategies.

Analysis

Clearly, there are many factors involved in selecting and evaluating “learnware” (my term) and worldware. Worldware is easy. There are many commercial reviews of this type of software and several *de facto* standards that have been consistent enough over time to have been thoroughly evaluated. What I found interesting here was that these “every-day” applications are being used for cognitive reasoning. Learnware, on the other hand, is nowhere near this level of evaluation. Furthermore, the article notes that the resources on an institutional basis devoted to evaluation and planning are not enough to overcome some inherent problems with software lifespan. I whole-heartedly agree that the only solution is collaboration. I found this article extremely relevant and will be looking into The Flashlight Project.

Guild, P. (1997), *Where Do the Learning Theories Overlap?*, *Educational Leadership* [EBSCO], 55(1). p30, 2p. Available: Academic Search Elite

Summary

Three theories of learning, multiple intelligence’s, learning styles, and brain-based education are presented using hypothetical schools, where the activities of sample classrooms are described in detail. The author notes the obvious similarities first: students are actively involved in the learning process; the teachers share the decision making process with both the students and their colleagues; the students are learning in diverse ways; parents participate as support personnel; and, regular evaluations are made and used to diagnose individual learning problems. These learning theories may be distinct fields of theoretical study, but the author maintains that, when these theories are applied in the classroom, the outcomes are very much the same.

The author offers six areas of overlap. Each theory is learner-centric and emphasizes the learning process. The teachers are reflective, actively seeking alternative teaching methods and improving their skills. The student is also a reflective practitioner, actively exploring and applying the learning process. All facets of the student's life are incorporated into the learning process, making a more complete learning experience through scaffolding their education. The learning environment is flexible and accommodates the individuals learning capabilities, resulting in more effective learning. Finally, they all promote cultural, societal, and individual diversity.

The writer also notes some commonality in other aspects of these theories. All of the theorists agree that there is more than one solution to learning and that other methodologies should be used where appropriate. Each teacher synthesizes all theories and styles into their own unique method of instruction. The theories themselves are still being revised and refined. None of the theories proscribe to standardization, as this would be the antithesis in theory and practice. Finally, the writer emphasizes these theories are complementary, focusing on the learner and the learning process, and that they offer more students the opportunity to succeed overall.

Analysis

This more of a summary article, rather than a scholarly research paper, with only was a single reference. However, it was very relevant, if brief. It offers a birds-eye view of the features of several prevailing theories of learning that is useful to a wide spectrum of teachers.

Hartrick, G (1999, January), *Trancending Behaviorism in Communication Education, Journal of Nursing Education, 38(1), 17-22.*

Summary

The author suggests that formalizing on one educational techniques which set limits on content are incomplete and may not provide a good solution to specific problems and that this has already happened in the field of communication. This has resulted in the students losing touch with being a caring, empathetic nurse. Current methodologies center on the behavioural perspective which lack creative potential and inhibits the student in developing their own communication styles. The author examines Bevis's four types of curriculum: legitimate, hidden, null, and illegitimate in relation to the current pedagogy. Hidden curriculum is one where the teacher is not aware of but is implied by subliminal messages and priorities. Null educators spend too much time in rhetoric with no substance. In effect, there is no curriculum. The use of descriptors that fall outside of the behavior model would be illegitimate curricula, which the author points out is most disturbing as the concepts of caring, creativity, and insight fall outside the educational theory. Though correct, i.e. legitimate, curricula may be right, it is missing the point of nurse/patient communications and must be modified. The author examines a transformative approach to this transition.

First, communication goals must be clarified, which is to enhance the nurses empathetic nature enabling them to provide a better healing environment. A new learning map must be developed that can guide the teacher and the student in thinking imaginatively and discriminately. The author uses Mezirow's process of personal transformation as the

framework for developing curricula. Transformative learning embraces the development of an enhanced level of awareness of one's beliefs and experiences and produces substantial and long-lasting change. The writer then presents six empirical lessons that serve as guideposts: Experiencing Dilemma, Self-Examination, Critical Assessment of Role Assumptions, Recognizing That Nursing Requires Communion, Exploring Options for Building Competence and Self Confidence, and Planning One's Own Course of Action. These elements constitute the basis for developing a transformative curriculum more in line with the goals of communication, honors the complex patient/nurse relationship.

Analysis

Transformative Theory seems to be much more in line with developing communication skills. Although the article is light on empirical research, the points of the theory are well presented and logical, and the examples serve to further my understanding of the theory. The emphasis on developing critical awareness and understanding of self is very significant and critical in the area of nursing in particular, but the lessons offered could be used in many curricula.

Mezirow, J. (1997), Transformation Theory Out of Context, *Education Quarterly* [EBSCO], 48(1). p60, 3p. Available: Academic Search Elite.

Summary

The author is presenting a short paper in refutation of misinterpretations, reiterated in a recent book by Mike Newman from another of his books, of work Mezirow published 14 years earlier. Not only does he deny that his work suggested that transformation learning could result in a woman reintegrating in an oppressive patriarchal society without focusing on the people in that society, but he substantiates his claim voluminously. He asserts that transformation in response to a perplexing problem takes three steps: critical reflection of one's assumptions of the problem, the validation of insights about the problem, and finally, action. The action required by the hypothetical situation above requires action against the oppressor and therefore the transformation is on the learner's terms, rather than passively as implied by Newman.

The author proceeds to pick apart the book's additional misinterpretations. Newman quotes a Mezirow out of context a second time, regarding how transformative learning contributes to political struggle and implies that this statement is not substantiated or expanded on in the original work. However, Mezirow does just that by refining the statement in subsequent paragraphs. What he meant was transformative education leads to personal transformation, that may, in turn lead to political transformation — then continues with discrete information on how this could happen. He then states that critical reflection includes objective as well as subjective reframing, and that adult educators can include social action education where appropriate. However, the author points out that this is an area requiring special proficiency.

Misquoting Mezirow yet again, Newman then contends that transformation is learner-centric, but Mezirow counters that critical reflective insights require discourse and therefore learning is social in nature. Finally, the author states that Newman wants to belittle transformative learning and its lack of effect on political change, but Mezirow

asserts that political and even corporate exploitation can be moderated through transformative education.

Analysis

Interesting bit of information. I was not expecting this article to go in this direction. However, it was focused dissertation on the effects of transformative learning on political activism by a name that keeps cropping up in more formal studies.

Mezirow, J. (1998), On critical reflection. *Adult-Education-Quarterly*. [CD-ROM], 48(3), 185-98. Available: Wilson Education Abstracts, 1/95-10/98.

Summary

This article discusses teaching adults critical reflection of assumptions (CRA), a cognitive technique for helping the learner understand that reflection is a necessary component in ascertaining the validity of conclusions. The author recognizes that this concept is not fully recognized in literature as a critical part of the adult learning experience and attempt to justify the concept by showing the reader its relationship to Transformation Theory and other current theories concerning how adults think.

The paper covers implicit and explicit reflection and how the learner defines a problem based on fundamental and learned premises, stating the “assessment of reasons as fundamental to the contentious concept of rationality.” Viewing transformation as expression through discourse, the author examines the concept of universal relevance and subtextual assumptions about truthfulness, truth, authenticity, and coherence. Also, the assimilation of cultural imperatives changes the critical assumptions the individual makes. The author then catalogs applications of CRA, including but not limited to Objective Reframing, Subjective Reframing, Epistemic thought, and cognitive therapy.

Analysis

This article is an expansion of Vygotsky’s cognitive theories on thought structures. There is a brief mention of *transformation* on page 127 of our textbook. The author examines critical reflection, starting in childhood and continuing through to adult thinking. The recommended reading and bibliography is extensive. I found these concepts relevant to the class material and especially useful in understanding critical reflection as a learning tool. However, it will take repeated readings and additional background in this area to fully appreciate the implications of the study.

Mikusa, G. and Lewellen, H (1999), Now Here is the Authority on Mathematics Reform, Dr. Constructivist!, *Mathematics Teacher*, 92(2), 158-163.

Summary

The authors believe that constructivism offers the best explanation of how students learn and put together a work done in the form of “Dear. Dr. Constructivist” to inform teachers or the theory and how to implement this pedagogy in Mathematics. They explain Constructivism - whose roots are in cognitive psychology, philosophy, and anthropology - as a theory that defines knowledge as ephemeral, evolutionary, and socially and culturally arbitrated. It is a self-regulated process of resolving inner cognitive conflicts

that are often uncovered through actual experience, collaborative discourse, and reflection. A core belief is universal to all definitions: that students actively construct their own knowledge, that they have to struggle to make sense of it in a personal way.

Dr. Constructivist is a fictional character who has witnessed nearly a hundred years of educational theory. The authors view her “as an intermediary who responds to letters from teachers that represent various stages of acceptance of the ideas of constructivism”. The following are some interesting thoughts and practical ideas on constructivism:

- Why not assess students on their discoveries?
- All students must invent their own understanding.
- Choose questions that are more open-ended.
- Ask them how they know that a procedure is correct.
- Emphasize exploration of problems rather than attainment of answers.
- Try to present another problem that is related to the agreed-on problem and that will cause students to think about the original problem.
- Students should develop a *need* for the procedures and skills that are appropriate for them to learn through careful guidance.
- Collaborative activity should be an activity that takes more than one mind to figure out, not something that you could assign for individual work. It should be relevant to students and thereby motivating in itself.

Analysis

This article was a pleasant break from the weighty journal articles. Yet, it was just as informative from the perspective of understanding Constructivism had in practical application. The good Dr. can be found at:

<http://monster.educ.Kent.edu/~mmikusa/Dr.Constructivist.html>

Pearson, J. (1997), Primary Investigations, Primary Educator, [EBSCO], 3(2). P6, 2p. Available: Academic Search Elite.

Summary

After some consternation, the author accepts a national invitation to join a trail science curriculum modeled on constructivist learning theory. As science coordinator for the school, the lure was new material and equipment, but she had to convince the teachers the extra work hours would be worth it. Ultimately, they decided to join the experiment. The participants were given appropriate background information on the theory, some practical instruction on implementation, and a host of lesson plans and study aids. The author noted that constructivist education was not easy for many teachers who were unfamiliar with the theory and in its practice. This led to some bedlam in the classrooms and frustration from some teachers who needed more structure to teach by. Assessment was measured through a 20 question student survey and testing. Students were also selected randomly for personal interviews.

Overall, the results within this particular school showed an improvement in the mastering the subjects taught. Furthermore, the feedback from the students was enormously positive

and students remembers particular experiments with extraordinary detail. Sixth graders were the least enthusiastic, but the developers were aware the curriculum for this group was not on par so the outcome was predictable. Still, even that group responded positively. The biggest problem was with the teachers, who were uncomfortable using a different mode of instruction. It is also well understood that grade school teachers generally shy away from science instruction. Changing their teaching styles and attitudes would be the hardest part of a change in school pedagogy. These problems however were mitigated by the exceptional quality and quantity of instructional material provided, which made it easy to teach the course. One problem with this however, was the time required to keep these materials together and in order year after year.

The outcome of the trial within that school was far reaching. Because of the quality of the material, the teachers found the experience relatively painless and were able to apply the constructivist theory in other disciplines. The students liked the format as well, and showed significant improvement in their attitude towards learning. Sharing ideas and comments became commonplace and gave the students a sense of control, which led to overall better performance in their grades.

Analysis

The author did give brief details of Constructivist goals and techniques, but it was marginal at best. Also, the results of the national trial itself were not presented, nor, in fact, details of the training materials other than the fact that they used constructivist theory as the framework. Overall, I would consider this to be a reactionary paper discussing the trial's general impact on the teachers and students. None of the facts were supported by empirical data, though the theory was supported by a substantial bibliography for the size of the article. This paper was not very useful, but the bibliography may be!

Rozycki, E. (1997), *The Teacher As Technician: Will Technology Improve Schooling?*, *Educational-Horizons* [CD-ROM], 75(1), 61-3, Available: Wilson Education Abstracts, 1/95-10/98.

Summary

Using a factory concept of teaching by Henry D. Levine, the author examines whether normal school environments can produce the desired output. The teacher is viewed as a technician managing resources in a competitive environment with the goal of maximizing output as effectively as possible. Additionally, there must be a clear indication of success or failure. The resources are the students and the output is achievement. Factors against the teacher include, for example, the capriciousness of the administration who invest in technology without consideration for sustained support. Given the realities of the school environment, the author questions how effective schools really are.

Digging deeper into Levine's construct, the author examines theoretical criteria in detail. Technical prowess isn't the only thing that makes up a good teacher. From the author's perspective there is a certain sense of magic in how a good teacher gets a variety of students to learn. The teacher has no control over who must be taught further limiting a favorable outcome. Competitive incentives, like school vouchers, miss the point entirely as standards for outcomes are highly controversial to begin with. Standard techniques that "teach to the middle" ignore the advanced and the underdeveloped, therefore limiting

output, which is further hampered by moral and legal restrictions. Given these factors, there is no clear measure for success or failure and, under these circumstances, providing computers and high technology will not improve the situation.

Analysis

This article wasn't very insightful, but the intent was clear. The factory concept doesn't work as a framework for education and schools, but there is no concrete solution. The idea that just throwing technology at the problem without a clear understanding of its potential and with limited support is doomed to failure is well taken. I really didn't find this article as interesting as I had hoped.

Sharma, M; Petosa, R; and Heaney (1999), Evaluation of a Brief Intervention Based on Social Cognitive Theory to Develop Problem-Solving Skill, *Health Education and Behavior* [EBSCO], 26(4). p465, 13p. Available: Academic Search Elite.

Summary

Previous research has shown that the effect of emotional stress on the age group from 10 to 14 is highest than at any other time. This case study evaluates mediation of stress based on social cognitive theory (SCT) as compared to standard information transfer methods. Its intent was to measure the difference in the ability for problem-solving to reduce stress. There were two test groups of approximately 130 sixth graders each. One group was taught emotional coping mechanisms using the problem solving skills (PSS) format. SCT-based PSS suggests improved performance in resolving self-worth issues that would improve their self-esteem, thus reducing stress. The other group was instructed on common stress factors, the effects of stress, and ways to deal with it. Three university professors, three health educators, and the researchers monitored the study. Ultimately, the authors hope to improve this age group's academic performance and overall mental health by gaining more awareness of themselves and what is causing them stress, and building the new behaviors based on a belief that problems can be solved through their own abilities.

While there was no difference in problem identification between the two groups, the results showed there was significant improvement over time for the SCT group in problem solution. Furthermore, the study indicates that PSS can be improved among school-age children using SCT techniques in a brief intervention. The study was geared to implementation on a bigger scale, but the authors' point out that it can not be sustained without effort and teamwork between health specialists and teachers. The study also indicates that academic performance improves when self-control is used to reduce stress factors therefore more attention should be given to this component of SCT. Finally, the authors note areas where more research is warranted, specifically in urban environments.

Analysis

This is the second empirical study in the bibliography. I was very much impressed with the detail and statistical analysis of the paper, though much of it was beyond my comprehension. I was very impressed by the author's attention to the negative aspects of the report, where it can be improved, and in what areas the research should be done. The

other statistical study did not go this far. Overall, it gave me some insight into preparing this type of research though I feel that it is currently beyond my capabilities.

Stellwagen, J. (1996), *Beyond Rubrics and Performance Standards: Student Learning Profiles and Cognitive Self-Assessment, American Secondary Education*, [CD-ROM], 25(12). 25-31. Available: Wilson Education Abstracts, 1/95-10/98.

Summary

The author states that the synthesis of modern testing technology and cognitive theory has resulted in new techniques for helping the learner improve their achievement level. By sharing current thinking on how skills are measured and providing insight to the diversity of the meaning of achievement, students become a partner in reaching these goals. With the aid of modern technology, complex assessment can be performed and appropriate reinforcement provided to aid the learning process. However, there are some that disagree with this approach, believing it takes too much time and is difficult to measure. The author agrees that this method is not a cure for all problems, but it does have a place in the teacher's repertoire of learning tools.

The author uses medical treatment as an analogy. Doctors start by collecting historical and biological data from the patient, then run general tests of the patient's current condition. After careful preliminary assessment, the patient is further tested in specific areas in question. Finally the results of the testing and assessment are shared with the patient. It is generally agreed in modern practice that patient participation is essential to mediation. In comparison, teachers seldom assess a student individually or know which learning strategies have been applied with previous success or failure. General testing can be performed on a class, but individualized testing is rarely proscribed. Finally, individual students may be told that they have a learning problem, but giving them general information about good performance is not enough to correct the situation.

Focusing on the works of Vermunt and Rewey in the area of meta-cognitive thinking, the author uses software developed by John McConnell, called AMSOFT, which tests groups of students but provides individualized psychometric assessment feedback. The software package includes procedures for subdividing test question into categories, which the author uses to assess the student's learning capabilities in the following areas:

- Instructional Style: Class (oral) vs. Book learning
- Question Format: Multiple choice vs. T/F
- Thinking Style: Various cognitive levels of questions.
- Attention Duration: Where is concentration lost during tests?
- Content Areas: What areas of content are weaknesses/strengths?

Students are given the results along with statistics on how they rank in comparison to their classmates and are asked to devise a personal approach to improving their test scores. Of course, "The assumption is that allowing a student to think about how they are learning will aid the students' performance in future assessment and learning activities." In addition, the teacher can use this data as a tool for diagnosing and treating individual learning problems.

Analysis

The Doctor/Patient analogy and how it compares to existing behavioral and new cognitive teaching techniques is well presented. I found the article straightforward and easy to assimilate. I also enjoyed learning about the AMSOFT software and how it can be used as a feedback and diagnostic tool. I consider this article one of the best in terms of useful information and very relevant to the class material.

Warshauer, M. (1997), *Computer-Mediated Collaborative Learning: Theory and Practice*, *The Modern Languages Journal* [CD-ROM], 81(4). 470-81. Available: *Wilson Education Abstracts*, 1/95-10/98.

Summary

The writer examines the nature of computer-mediated communication (CMC) in collaborative language learning. He notes that this field is relatively new and that not much research has been done specifically on this subject, but significant research and theory related to the subject of learning through language has been explored and is the source for this new branch of study. The five features that distinguish CMC from other communication media are

1. text-based and computer-mediated interaction
2. many-to-many communication
3. time- and place-independence
4. long distance exchanges, and
5. hypermedia links

One theory claimed that the development of a second language (L2) is almost wholly dependent on the amount of understandable input the learner receives, but this view does not explore how students use language-related collaboration for becoming proficient within a speech community or social group, or how they gain cultural knowledge and content, or how literacy and critical thinking skills are developed. The author proposes a sociocultural perspective framework as a unifying principle. Referring to Vygotsky, the author describes language is the basis of human intellect, and that "collaborative learning, either among students or between students and a teacher, is essential in building knowledge and understanding." The zone of proximal development as related to modeling and text-mediation is explored in detail. In modeling, the teacher fashions an approach to the learning. Text-mediational interpretation views texts as "thinking devices" to generate new meanings collaboratively. The process of language as a learning device is individualized through constant interaction and more focused interaction leads to higher forms of learning. In effect, language is a 'cognitive amplifier'. According to the author, a fact that is often missed by teaching institutions.

With this preamble, the writer then does an extensive review of studies related to the five features of CMC and summarizes the study by exploring the similarities of the features. "First, the activities are experiential and goal-oriented, with collaborative projects carried out and shared with classmates and foreign partners via the Internet and other means. Second, issues of linguistic form are not eliminated but are instead subsumed within a meaningful context. Finally, international collaboration is combined with in-class collaboration; students work in groups to decide their research questions, evaluate responses from afar, and report and discuss their findings." The tasks mentioned in the

review are also consistent with another closely related concept later incorporated into sociocultural theory: situated learning. CMC nurtures communications across the physical boundaries of geography and time creating language environments that can be exploited for foster learning. The group is still focused at a microlevel, thus creating a situated environment.

The write concludes, stating that “the ability to access and interpret information gained through communication and collaboration with people from a variety of cultures will be a critical skill for success in the 21st century.” However, he notes that even when there are good reasons for implementing technology-based methodologies, the current climate of organized anarchy and constraining societal beliefs hamper development to the point that it may not be as effective as it could be.

Analysis

It is hard to find fault with this article. Although it was very long, it was well presented and substantiated with both empirical and lexical research. I know I keep saying this, but I found this article highly relevant to our class. I also find this view of learning to be timely in reading (the next class we discuss Vygotsky!), and pivotal in my understanding of the learning process.

Wild and Quinn, (1998), Implications of Educational Theory for the Design of Instructional Multimedia. *British Journal of Educational Technology*. [CD-ROM], 29(1), p. 73-82 Available: Wilson Education Abstracts, 1/95-10/98.

Summary

The authors reflect on several educational theories to explore the role and design of interactive multimedia. They consider the learner, the learning context and the role of education in terms of cognitive change that includes experiential and academic learning as separate components. They believe that learning primarily comes from reflecting on and abstracting from one's own experience and that three factors influence cognitive change: prior knowledge, learning inclination and approach to learning.

The writers note that “it is important to induce in learners, a conceptualization of the task being tackled that leads them to consider the structure rather than the detail of related knowledge”. They further believe the knowledge gained should be useful in real life and they content that it is unclear whether academic learning can promote appropriate levels of abstraction to this end. The authors state that multiple ways of moving through the instructional material should be provided in support of these factors using assisted discovery mechanisms and “suggest, then, that instructional multimedia needs to provide for problem-based learning in situated practice activities, and further, facilitate the abstraction of commonalties across a range of different examples of problems and contexts.”

The final section of the article discusses the role of Cognitive Constructionism as related to other educational theories. They define Constructionism as understanding that is constructed by the learner and, as such, learning is interpreted rather than acquired. They further note that these theories are at the opposite end of the spectrum from the

behaviorist camp, but that need not be an issue that prevents the creation of multimedia instructional materials.

Analysis

This article introduces the concept of Constructivism as an extension to my limited knowledge of cognitive theory. It also uses the theory of scaffolding, read in the previous article. The references are extensive. I particularly liked this one, as it provides a good framework for developing instructional multimedia programs that bring the learner in on many levels and offers some real world usefulness. From a neophytes standpoint (my own) however, the task still seems daunting.

Willis, J. (2000), *The Maturing of Constructivist Instructional Design: Some Basic Principles That Can Guide Practice*, *Educational Technology*, 40(1). 5-17.

Summary

The author first used the constructivist model for creating software in 1995 for NASA. He used a Recursive and Reflective Design and Development technique that was pioneered at the University of Houston. This article discusses emerging instructional design based on this model and then offers some design guidelines. Previous design was based on behavioral and information processing learning theories. Current design focuses on anchored instruction and problem solving skills. Multiple perspectives, context within a social structure are important features of this type of software. The models are process-based and spiral in nature, meaning that the software builds knowledge in stages, but that previous stages are revisited to further expand and build new concepts based on new discoveries. The incorporation of chaos theory, such that outcomes are dependent on various initial conditions. As stated in another summary, the learner must be engaged and both the teacher and student should play an active role in design. Finally the software must promote some reflection on the part of the learner. The author then suggests and expands on three flexible guidelines. Software should be recursive (iterative) and non-linear, reflective and participatory. Of the three, the author concedes that designing reflectivity in software is the most difficult but should not be ignored.

Analysis

The brief summary belies a very well written and informative article. It is well documented with references in both the philosophy and theories of constructivism and is worth reading again just for the general principles presented. From the perspective of understanding the design of educational software, I found this article to be both elucidating and fascinating. This article may not have been in a journal, but its scope and presentation style was more scholarly than many of the works I scanned through in the course of my bibliographic research – and yet surprisingly accessible. I will be reading this magazine on a regular basis from now on.

Wilson, B (1999), *Adoption of Learning Technologies: Toward New Frameworks for Understanding the Link Between Design and Use*, *Educational Technology*, 39(1). 12-17.

Summary

After witnessing the failure of educational software due to poor or partial implementation, the author takes a look at the adoption of instructional design in terms of cognitive theories. He was also motivated by the disparity of the acceptance of technology by educators and by the myriad of educational facilities over the Internet. He hopes to answer how design relates to use. Several key factors need to be considered in design: objectives, instruction method, content, presentation, and activities. They must also be “use oriented”, or highly interactive in order to hold the interest of the learner. Designers must also participate in using the software to see whether the product achieves the desired goals. The final product should be seen as an enabling tool in the hands of the learner and as an adjunct to the teacher. There must be some relevance to the student and must elicit trust that the product will achieve the appropriate goal, however this concepts are not found in design literature at present. The author also looks at learning from the Internet just from browsing. In this case the student is designing their own course as they go along and in some cases accumulating questionable knowledge due to media illiteracy. Thus the teachers role is changed to that of active participant rather than the class designer, serving as mentor and guide. How do these facts transcribe to the design of educational software? Instructional design must incorporate the practitioners in the design process. Teachers should be considered as co-designers along with the students. The dynamics between the teacher and students should be considered in the design. Teachers must be trained to seek appropriate supplemental resources. Finally, the author feels that new frameworks are needed for adoption and change.

Analysis

The software designer/programmer who wrote the article is also a grade school teacher. There were a number of references provided in support of his suppositions and the creation of educational software. I found this article very relevant to understanding what is required in the creation of this genre of software and can also apply some his ideas directly to the classroom.