

Appendix II: Additional Research and Resources

Theme 1: Clear Learning Goals

Clare, L., Lindon, D. E., Phil, J. D., Woods, R. T., Whitaker, R. M., Evans, S. J., & Rugg, R. D.

(2010). Goal-oriented cognitive rehabilitation for people with disease: A single-blind randomized controlled trial of clinical efficacy. *American Journal of Geriatric Psychiatry*, 18(10), 928-939. doi:10.1097/JGP.0b013e3181d5792a

Abstract (quoted from source):

Eight weekly individual sessions of CR [cognitive rehabilitation] consisting of personalized interventions to address individually relevant goals supported by components addressing practical aids and strategies, techniques for learning new information, practice in maintaining attention and concentration, and techniques for stress management. The primary outcomes were goal performance and satisfaction, assessed using the Canadian Occupational Performance Measure. Questionnaires assessing mood, quality of life and career strain, and a brief neuropsychological test battery were also administered. A subset of participants underwent functional magnetic resonance imaging (fMRI). CR produced significant improvement in ratings of goal performance and satisfaction, whereas scores in the other two groups did not change. Behavioral changes in the CR group were supported by fMRI data for a subset of participants. The findings support the clinical efficacy of CR in early-stage AD. CR offers a means of assisting people with early-stage AD and their families in managing the effects of the condition.

Locke, E. A., Shaw, K. N., Saari, L. M., & Latham, G. P. (1981). Goal setting and task

performance: 1969-1980. *Psychological Bulletin*, 90(1), 125-152. doi:10.1037/0033-2909.90.1.125

Abstract (quoted from source):

Results from a review of laboratory and field studies on the effects of goal setting on performance show that in 90% of the studies, specific and challenging goals led to higher performance than easy goals, "do your best" goals, or no goals. Goals affect performance by directing attention, mobilizing effort, increasing persistence, and motivating strategy development. Goal setting is most likely to improve task performance when the goals are specific and sufficiently challenging, Ss have sufficient ability (and ability differences are controlled), feedback is provided to show progress in relation to the goal, rewards such as money are given for goal attainment, the experimenter or manager is supportive, and assigned goals are accepted by the individual. No reliable individual differences have emerged in goal-setting studies,

probably because the goals were typically assigned rather than self-set. Need for achievement and self-esteem may be the most promising individual difference variables.

Page-Voth, V., & Graham, S. (1999). Effects of goal setting and strategy use on the writing performance and self-efficacy of students with writing and learning problems. *Journal of Educational Psychology*, 39(2). doi:10.1037/0022-0663.91.2.230

Abstract (quoted from source):

This study examined the effects of goal setting on the essays of 7th- and 8th-grade students with writing and learning disabilities. Participants wrote 3 essays, responding to a different goal for each. One half of the students used a strategy to facilitate goal attainment. Goals were designed to increase either the number of reasons supporting a paper's premise or the number of counterarguments refuted by the writer, or both. Papers written in response to goals were longer, included more supporting reasons, and were qualitatively better than essays written by students in the control condition. Students were also more likely to refute counterarguments when assigned a goal that focused on this specific element. Strategy use enhanced performance only when students were responding to a goal to refute more counterarguments. Students' writing self-efficacy was not influenced by goal setting or strategy use.

Simon, B., & Taylor, J. (2009). What is the value of course specific learning goals? *Journal of College Science Teaching*, 39(2), 52-57.

Abstract (quoted from source):

This study explored the impact of learning goals on the individual student in a course and, to a lesser degree, on the instructors teaching the courses. The focus was on three courses in which instructors had detailed, course-specific learning goals that were integrated into their classes. To explore the general hypothesis that specific, course-level learning goals improved the student's interaction with the course, the study looked specifically at the following questions:

- Did students perceive learning goals as being valuable in the course?*
- What did students report about how they used learning goals and how was this different across several instructors and courses?*
- Did the instructors perceive the value of learning goals for both themselves and their students?*

The results indicate that explicit learning goals provide a valuable aid to guide students in their learning. These results give instructors a glimpse into how students use learning goals and suggest best practices for the use of learning goals.

Books

- Bloom, B. S. (1956). *Taxonomy of educational objectives: The classification of educational goals; Handbook I: Cognitive domain*. New York, NY: Longmans, Green.
- Kryza, K., Duncan, A., & Stephens, S. J. (2010). *Differentiation for real classrooms: Making it simple, making it work*. Thousand Oaks, CA: Corwin Press.
- Marzano, R. J. (2007). *The art and science of teaching a comprehensive framework for effective instruction*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Marzano, R. J. (2009). *Designing & teaching learning goals & objectives*. Bloomington, IN: Marzano Research Laboratory.
- Moss, C. M., & Brookhart, S. M. (2009). *Advancing formative assessment in every classroom: A guide for instructional leaders*. Alexandria, VA: Association for Supervision and Curriculum Development.

Articles

- Costa, A. L. (2008). The thought-filled curriculum. *Educational Leadership*, 65(5), 20-24.
- Giunta, J. P. (2010). Designing games that really teach. *T + D*, 64(6), 76-77.
- Jones, K. A., Vermette, P. J. & Jones, J. L. (2009). An integration of “backwards planning” unit design with the two-step lesson planning framework. *Education*, 130(2), 357-360.
- Kelly, L. P. (1980). The role of learning objectives under the academic big top. *Journal of Developmental & Remedial Education*, 4(1), 22-23.
- Krathwohl, D. (2002). A revision of bloom’s taxonomy: An overview. *Theory into Practice*, 41(4), 212-18. doi:10.1207/s15430421tip4104_2
- Phelps, M. (2010). Real-time teaching and learning. *Kappa Delta Pi Record*, 46(3), 132-35. doi:10.1080/00228958.2010.10516711
- Pitts, G. S. (1987). Breathe O₂ into your mathematics program - Promote openness and ownership. *Teaching Children Mathematics*, 3(9), 496-98.

Theme 2: Congruency

- Der-Thanq, C., Hung, D., & Wang, Y. (2007). Educational design as a quest for congruence: The need for alternative learning design tools. *British Journal of Educational Technology*, 38(5), 876-884. doi:10.1111/j.1467-8535.2006.00675.x

Abstract (quoted from source):

There is a common predicament faced by educational designers, that is, the lack of learning design tools for nontraditional pedagogies of learning. Because of this lack of alternatives, educational designers often use traditional design tools in contexts where nontraditional learning activities (such as collaborative projects) are desired. Because the learning goals of objectivist and alternative epistemologies differ, the designed instructional/learning activities do not match the original goals or desired learning outcomes. It is argued that learning design should be understood of as a quest for congruence between learning epistemologies and designs. This paper proposes an analytical framework to help identify the congruence or lack thereof of a learning design. The framework consists of: (1) the employed epistemology and desired learning outcome, (2) focus of analysis, (3) focus of design and (4) the design process. It is hoped that this framework will provide a lever for developing design tools that are more congruent with alternative pedagogies.

Rich, H. L., & Bush, A. J. (1978). The effect of congruent teacher-student characteristics on instructional outcomes. *American Education Research Journal*, 15(3), 451-457.

doi:10.3102/00028312015003451

Abstract (quoted from source):

Twenty fourth, fifth and sixth grade teachers with direct and indirect teaching styles were paired with a small group of students who were high or low on social-emotional development to create congruent and incongruent matches. Teachers used their natural style in teaching a series of reading lessons for 20 consecutive school days. Congruency was consistently related to instructional outcome with the effect strongest for student affect, followed by achievement, followed by time at attention to task. It is argued that these findings support Hunt's theory of person-environment congruency for effective teaching.

Thomas, A. K., & McDaniel, M. A. (2007). The negative cascade of incongruent generative study-test processing in memory and metacomprehension. *Memory and Cognition*, 35(4), 668-678.

Abstract (quoted from source):

Previous research suggests that when participants engage in generative study activities, the processing of text is enhanced and improvements in memory and metacomprehension result. However, few studies have investigated the influence of processes required by the testing situation or the interaction between encoding and retrieval processes on metacomprehension accuracy. The present experiments examine whether the congruency of processes generated during study and required at retrieval affect memory, metacomprehension, and control processes. Study orientation and test type were congruent (i.e., letter-reinsertion: detailed test), incongruent (i.e., letter-reinsertion: conceptual test), or neutral (i.e., read: conceptual test).

After generative study, but before testing, participants made metacomprehension predictions for previously studied texts. Controlled strategy selection was measured in Experiment 2. When processes at study and test were congruent, cued recall performance and metacomprehension predictions were more accurate than when study and test were incongruent. For incongruent conditions, metacomprehension predictions were no better than chance; thus, controlled strategy selection was based on inaccurate metacomprehension, thereby further penalizing memory performance relative to congruent conditions. These findings extend a transfer-appropriate processing framework to metacomprehension.

Wetzel, D. K., & Buch, K. (2000). Using a structural model to diagnose organizations and develop congruent interventions. *Organization Development Journal*, 18(4), 9-20.

Abstract (quoted from source):

The purpose of this paper is to describe a change process based on a structural model of differentiation and integration. The process consists of five steps that can be conducted by internal or external change agents and directed at the micro or macro levels. It is designed to focus the diagnostic and intervention phases of organizational development on structural elements of the organization and the sometimes-overlooked impact of interventions on differentiation and integration. We have used the process to help organizational members develop a mental model of structure, to identify recent trends moving organizations toward reduced levels of differentiation and increased levels of integration, and to reveal internal structural gaps. A structural gap analysis reveals interventions that are most congruent with the organization's needs. It is important that the client select the type of intervention best matched to its needs. It is also important that separate initiatives are congruent with one another. The process helps clients become discriminating consumers of the many interventions available today. We have found the process to provide a powerful introduction to organizational structure and its implications.

Books

Baines, L., & Kunkel, A. J. (2010). *Going bohemian: How to teach writing like you mean it*.

Newark, DE: International Reading Association.

Hunter, M. C. (1994). *Enhancing teaching*. New York, NY: Macmillan College Publishing.

Tucker, N. D., & Stronge, J. H. (2005). *Linking teacher evaluation and student learning*.

Alexandria, VA: Association for Supervision and Curriculum Development.

Articles

Ball, A. L., & Washburn, S. G. (2001) Teaching students to think: Practical applications of

Bloom's Taxonomy. *The Agricultural Education Magazine*, 74(3), 16-17.

Drum, R. L., & Petty, W. G. (1999). Teaching the values of coins. *Teaching Children*

Mathematics, 5(5), 264-68.

Kitchen, R. S., & Wilson, L. D. (2004). Lessons learned from students about assessment and

instruction. *Teaching Children Mathematics*, 10(8), 394-399.

Trader, M. C. (1980). A checklist for teaching to an objective. *Educational Technology*, 20, 36-

40.

Theme 3: Task Analysis

Browder, D. M., Trela, K., & Jimenez, B. (2007). Training teachers to follow a task analysis to

engage middle school students with moderate and severe developmental disabilities in

grade-appropriate literature. *Focus on Autism and Other Developmental Disabilities*,

22(4), 206-214. doi:10.1177/10883576070220040301

Abstract (quoted from source):

The purpose of this study was to train teachers to follow a task analysis to teach a story-based literacy lesson using adapted, grade-appropriate middle school literature to students with moderate and severe developmental disabilities. A multiple-probe-across-participants design was used to examine the effects of training teachers to follow a literacy lesson plan task analysis on the number of steps completed by teachers on the literacy lesson plan template and changes

made by students in response to teachers' use of the literacy lesson plan. Results indicated a functional relationship between teacher training and the number of lesson plan steps followed, with a corresponding student increase in both overall and independent correct responses. Implications for practice and future research are discussed.

Fastenmeier, W., & Gstalter, H. (2007). Driving task analysis as a tool in traffic safety research and practice. *Safety Science*, 45(9), 952-979.

Abstract (quoted from source):

The paper explains the need for task analysis in the context of car driving, because the interaction between the car drivers' capabilities and the demands of the actual driving task determines the outcome in terms of a more or less safe driving behavior. After reviewing past approaches, the main focus is on the presentation of a new procedure for driving task analysis and driver requirement assessment. A framework for task analysis is derived both from classifications of road traffic situations and a model of the drivers' information processing. The first step of the procedure is to divide a given driving task into subtasks. These subtasks are appointed to defined stretches of the road and the time structure of the subtasks is determined. For each subtask an analysis format is used, that organizes different requirements into perception, expectation, judgment, memory, decision and driver action. Then, typical driver errors are attached to the subtasks, and all the information together is compressed to ratings of complexity and risk in order to derive the crucial subtasks. Finally, some examples of how the method can be applied are presented and its future usefulness is discussed.

Grote, I., Rosales, J., & Baer, D. M. (1996). A task analysis of the shift from teacher instructions to self-instructions in performing an in-common task. *Journal of Experimental Child Psychology*, 63(2), 339-357. doi:10.1006/jecp.1996.0053

Abstract (quoted from source):

Three preschool children repeatedly did four kinds of sorts with a deck of stimulus cards: a difficult, untaught target sort and three other sorts considered analytic of self-instructing the target performance. The untaught target sort was to find in a deck of cards those matching what two sample cards had in common. Most preschool children must be taught to mediate this problem. The three other kinds of sorts taught skills involved in the target performance or its mediation. As correct self-instructive talk emerged in the target sorts, it was confirmed. The untaught target sorts were interspersed infrequently among the three alternating directly taught skill sorts, to see if accurate target sorts, and accurate self-instructive talk about the target sorts, would emerge as the three skill sorts were mastered. As all the sorts progressed, increasing accuracy was seen first in the skill sorts and then in the untaught target sorts. All three subjects showed subsequent generalization to new target sorts involving other stimulus sets. Correct spontaneous self-instructions about the target sorts increased from near zero at the beginning of the experiment to consistency at its end. Thus, the three skill sorts appeared sufficient for the emergence of a self-instructed solution to the previously insoluble target performance.

Sherman, T. M., & Wildman, T. M. (1980, April). *Linking task analysis with student learning*.

Paper presented at the Annual Convention of the Association for Educational

Communications and Technology, Denver, CO. Retrieved from ERIC database.

(ED195229).

Abstract (quoted from source):

An examination of task analysis from several perspectives in order to identify some of its purposes and advantages reveals that, as the interest in learning theory has shifted from a predominately behavioral perspective to a more cognitive orientation, the purpose of task analysis has also shifted. Formerly the purpose of task analysis was to aid in instructional design by identifying and classifying component behaviors which could accumulate into a terminal performance. However, cognitive and information processing theorists have not been so interested in the component behaviors as in the cognitive activity that occurs between these behaviors. Thus the emphasis on task analysis has shifted from behavioral outcomes to the analysis of cognitive processes. Three cognitive approaches to task analysis are (1) the optimal content structure approach, (2) the learner-content match approach, and (3) the optimal content presentation approach. Although task analysis has been approached from several perspectives, there is agreement among all the theorists on at least one point: Task analysis, at a minimum, assists the instructor or designer to understand the content to be taught. This alone is a sufficient reason for recommending task analysis.

Books

Crandall, B., Klein, G. A. & Hoffman, R. R. (2006). *Working minds: A practitioner's guide to cognitive task analysis*. Cambridge, MA: Massachusetts Institute of Technology.

Downey, C. J. (2009). *50 Ways to close the achievement gap*. Thousand Oaks, CA: Corwin Press.

Ellis, R. (2010). *Task-based language learning and teaching*. New York, NY: Oxford University Press.

Hunter, M. C. (1994). *Enhancing teaching*. New York, NY: Macmillan College Publishing.

Jonassen, D. H., Tessmer, M. & Hannum, W. H. (1999). *Task analysis methods for instructional design*. Mahwah, NJ: L. Erlbaum Associates.

Schraagen, J. M., Chipman, S. F. & Shalin, V. L. (2000). *Cognitive task analysis*. Mahwah, NJ: L. Erlbaum Associates.

Articles

Carter, M. & Kemp, C. (1996). Strategies for task analysis in special education. *Educational Psychology*, 16(2), 155-70. doi:10.1080/0144341960160205

Militello, L. G. & Hutton, R. J. B. (1998). Applied cognitive task analysis (ACTA): A practitioner's toolkit for understanding cognitive task demands. *Ergonomics*, 41(11), 1618-1641.

Newhall, P. W. (2010, February 8). Teaching time management to students with learning disabilities. *LD OnLine*, Retrieved from http://www.ldonline.org/article/Teaching_Time_Management_to_Students_with_Learning_Disabilities

Olsen, J. K. (2009). Being deliberate about concept development: Effectively moving students from experience to understanding. *Science and Children*, 46(6), 51-55.

Theme 4: Diagnosis

Chu, H., Hwang, G., & Huang, Y. (2010). An enhanced learning diagnosis model based on concept-effect relationships with multiple knowledge levels. *Innovations in Education and Teaching International*, 47(1), 53-67. doi:10.1080/14703290903525846

Abstract (quoted from source):

Conventional testing systems usually give students a score as their test result, but do not show them how to improve their learning performance. Researchers have indicated that students would benefit more if individual learning guidance could be provided. However, most of the existing learning diagnosis models ignore the fact that one concept might contain multiple knowledge levels with different degrees of difficulty, and hence students might be guided in an inefficient and ineffective way. In order to provide more precise learning guidance to individual students, the study described in this paper uses an enhanced concept-effect model for diagnosing students' learning problems and providing learning advice. The experimental results from a mathematics course have demonstrated the utility and effectiveness of this innovative approach.

Hailikari, T., Katajavuori, N., & Lindblom-Ylänne, S. (2008). The relevance of prior knowledge in learning and instructional design. *American Journal of Pharmaceutical Education*, 72(5), 113-116. doi:10.5688/aj7205113

Abstract (quoted from source):

This research was designed to determine how different types of prior knowledge (declarative and procedural) impact student achievement and how prior-knowledge assessment can be used as an instructional design tool. A questionnaire was developed based on the prior-knowledge model, which distinguishes between declarative and procedural knowledge. One hundred fifteen pharmacy students were tested prior to beginning 4 successive basic science courses and then prior to beginning a pharmaceutical chemistry course. Regression analysis was used to determine which type of knowledge was the best predictor of student achievement. The four course instructors were interviewed and their comments analyzed. Results showed that prior knowledge from previous courses significantly influenced student achievement. Procedural knowledge was especially related to student achievement. Instructors and students had mainly positive reactions towards the prior-knowledge tests. Students' prior knowledge should be taken into consideration in instructional design and curriculum planning. Furthermore, the results of prior-knowledge assessments may be used as a tool for student support in addressing areas of deficiency.

Oberg, C. (2010). Guiding classroom instruction through performance assessment. *Online Journal of Case Studies in Accreditation and Assessment*, 1, 1-11. Retrieved from: <http://www.aabri.com/manuscripts/09257.pdf>

Abstract (quoted from source):

Current research indicates that students need authentic, meaningful curriculum to remain involved with the learning process, that this type of learning has positive results on high stakes exams, and that teachers require prior knowledge of students' skills and interests to develop high quality and effective instruction and curriculum. To "front load" the curriculum with authentic performance (pre)assessments offers the teacher as well as the student a way of examining current skills and knowledge prior to instructional decision making, and presents a direct link to authentic instruction. How best to do this within the confines of a school district is a significant dilemma. This paper will provide evidence and examples of the use of performance assessments as alternatives to traditional paper-pencil tests to be used as pre-assessment measures to assist teachers in learning as much as possible about their students as they create lessons prior to instruction. Teachers can use performance assessment to obtain a rich and complete picture of what students know and are able to do (Elliott, 1995). With these data, teachers can enhance the quality of their lessons by create appropriate and engaging lessons, and involve students within the entire learning assessment process.

Wu, Y. (2010). Applying learning diagnosis diagram in computer aided instructions: Research, practice and evaluation. *International Journal of Distance Education Technologies*, 8(2), 28-42. doi:10.4018/jdet.2010040103

Abstract (quoted from source):

In Taiwan, when students learn in experiment-related courses, they are often grouped into several teams. The familiar method of grouping learning is “Cooperative Learning”. A well-organized grouping strategy improves cooperative learning and increases the number of activities. This study proposes a novel pedagogical method by adopting the Learning Diagnosis Diagram to obtain students’ knowledge structure. According to each knowledge structure of the student, this study proposes dynamic grouping to solve problems in the conventional once-and-for-all grouping strategy. The dynamic grouping method achieves the best complementary groups for further learning stages. Two courses were applied to conduct the proposed Two-phase Cooperative Learning. Complementary grouping methods and more interaction among team members are helpful for increasing the effect of learning. Evaluation results indicate that the proposed method significantly improves the learning achievement of all learners.

Zydney, J. M., Deihl, L., Grincewicz, A., Jones, P., & Hasselbring, T. S. (2010). Empowering learners to choose the difficulty level of problems based on their learning needs. *Journal of Systemics, Cybernetics and Informatics*, 8(4), 8-13.

Abstract (quoted from source):

Research has found that increasing learner control offers several benefits, including increased motivation, attitude, and learning. The goal of the present study was to determine how prior math achievement influences students’ selection of the difficulty level of problems within Math Pursuits, a hypermedia learning program. Math Pursuits was designed to help children understand mathematics by discovering how it relates to the world around them. The program presented each learner with an adjustable level of challenge, along with the necessary scaffolding to support success. The researchers hypothesized that students with lower math skills would choose to start with a lower difficulty level; whereas, students with higher math skills would begin the program by choosing a question with a higher level of difficulty. Results supported these hypotheses. This research also examined the motivational framework guiding students’ selection of problem difficulty.

Books

Downey, C. J. (2009). *50 Ways to close the achievement gap*. Thousand Oaks, CA: Corwin Press.

Ellis, A. K. (2001). *Teaching, learning, and assessment together: The reflective classroom*.

Larchmont, NY: Eye on Education.

Kozulin, A., Gindis, B., Ageyev, V. S., & Miller, S. M. (Eds.). (2003) *Vygotsky's educational theory in cultural context*. Cambridge, UK: Cambridge University Press.

Tuttle, H. G (2009). *Formative assessment responding to your students*. Larchmont, NY: Eye on Education.

Articles

Ash, D., & Levitt, K. (2003). Working within the zone of proximal development. *Journal of Science Teacher Education*, 4(1), 1-313.

Buchanan, E. A. (1999). Assessment measures: Pre-tests for successful distance teaching and learning? *Online Journal of Distance Learning Administration*, 2(4). Retrieved from <http://www.westga.edu/~distance/ojdla/winter24/buchanan24.html>
<http://www.westga.edu/~distance/buchanan24.html>

Bunce, G. (2003). *Educational implications of Vygotsky's zone of proximal development on collaborative work in the classroom*. Retrieved from <http://www.guybunce.co.uk/writings/academic/vygotsky-and-the-classroom.pdf>

Theobald, J. T., & Alexander, J. E. (1977). An auditory cloze procedure for assessing the difficulty level of teacher instructional talk in the intermediate grades. *Elementary School Journal*, 77(5), 388-394.

Tomlinson, C. A. (2007). Learning to love assessment. *Educational Leadership*, 65(4), 8-13.

Theme 5: Overt Responses

Barch, D. M., Sabb, F. W., Carter, C. S., Braver, T. S., Noll, D. C., & Cohen, J. D. (1999).

Overt verbal responding during fMRI scanning: Empirical investigations of problems and potential solutions. *NeuroImage*, 10(6), 642-657. doi:10.1006/nimg.1999.0500

Abstract (quoted from source):

This paper presents a pair of studies designed to empirically explore the severity of potential artifacts associated with overt verbal responding during fMRI scanning and to examine several different solutions to these artifacts. In Study One, we compared susceptibility artifacts, signal-to-noise ratios, and activation patterns when overt versus covert verbal responses were elicited during fMRI scanning, using both individual and group analyses. The results indicated that different patterns of brain activation were elicited during covert as compared to overt verbal responses. This suggests that covert responses cannot be used as a simple substitute for overt verbal responses. Further, the results suggested that the use of overt verbal responses during fMRI scanning can produce interpretable results if: (1) the primary comparison is between two conditions that both use overt verbal responses, and (2) analyses are conducted on pooled group data rather than individual participant data. In Study Two, we evaluated the feasibility and validity of a method for acquiring participants' overt responses during fMRI scanning. The results indicated that our method was very accurate in acquiring the content of participant's responses. Further, inspection of the responses demonstrated that participants do not always comply with task instructions and highlighted the importance of obtaining behavioral performance measures during fMRI scanning.

Knapp, F. A., & Desrochers, M. N. (2009). An experimental evaluation of the instructional

effectiveness of a student response system: A comparison with constructed overt

responding. *International Journal of Teaching and Learning in Higher Education*, 21(1), 36-46.

Abstract (quoted from source):

Student response systems (SRSs) are increasingly being used in the classroom. However, there have been few well-controlled experimental evaluations to determine whether students benefit academically from these instructional tools. Additionally, comparisons of SRS with other interactive methods have not often been conducted. We compared SRS, Constructed Overt Response (COR), passive, and control conditions to determine their effects on learning and affect. We found that students performed better in the interactive conditions—SRS and COR—than the other conditions. Participants' gain and retention of gain scores in the SRS condition were lower than those in the COR condition. Participants in the SRS condition perceived their condition as more enjoyable than those in the passive condition and more useful than those in the control condition. Additional research questions are raised about how these interactive methods may best improve student learning.

Miller, M., & Malott, R. W. (1997). The importance of overt responding in programmed instruction even with added incentives for learning. *Journal of Behavioral Education*, 7(4), 497-503. doi:10.1023/A:1022811503326

Abstract (quoted from source):

Among the fundamental tenets of programmed instruction is the requirement of overt responding. Past research has not determined when this tenet holds true. We systematically replicated the work of Tudor (1995) by showing that overt responding in computer-based instruction improves learning, even when there is an incentive that might be thought to improve learning enough to mask the effect of overt responding. Subjects were exposed to both read-only and overt-response materials. One group received course-related, bonus points based on posttest performance, whereas the other group received points simply for participation. Within-subject comparison showed greater performance increases when overt responding was required, regardless of the point incentive.

Salemi, M. K. (2009). Clickenomics: Using a classroom response system to increase student engagement in a large-enrollment, principles of economics course. *Journal of Economic Education*, 40(4), 385-404.

Abstract (quoted from source):

One of the most important challenges facing college instructors of Economics is helping students engage. Engagement is particularly important in the large enrollment Principles of Economics course where it can help students achieve a long-lived understanding of how economists use basic economic ideas to look at the world. In this paper, I report on how instructors can use Classroom Response Systems (clickers) to promote engagement in the Principles course. I draw heavily on my own experience in teaching a one semester Principles course at the University of North Carolina at Chapel Hill but also report on how others have used clickers to promote engagement. I conclude with evidence that students find clickers very beneficial and with an assessment of the costs and benefits of adopting a clicker system.

Books

Barkley, E. F. (2010). *Student engagement techniques: A handbook for college faculty*. San Francisco, CA: Jossey-Bass.

Harris, B. (2011). *Battling boredom: 99 strategies to spark student engagement*. Larchmont, NY: Eye on Education.

Hunter, R., & Hunter, M. C. (2004). *Madeline Hunter's mastery teaching: Increasing instructional effectiveness in elementary and secondary schools*. Thousand Oaks, CA: Corwin Press.

Stolovitch, H. D., & Keeps, E. J. (2005). *Telling ain't training*. Alexandria, VA: American Society for Training and Development Press.

Articles

Adams, S. (2011). Quick before it dries: Setting the pattern for active participation. Retrieved from <http://www1.umn.edu/ohr/teachlearn/tutorials/active/resources/quick/index.html>

Heward, W. L. (2004). Want to improve the effectiveness of your lectures? Try guided notes. *Talking About Teaching*. Retrieved from <http://ucat.osu.edu/dosomethinggreat/heward.html>

Koltz, M. S., & Snyder, W. R. (1982). Student problem solving during general chemistry lectures. *Journal of Chemical Education*, 59(9), 717-719. doi:10.1021/ed059p717

Sime, M., & Boyce, G. (1969). Overt responses, knowledge of results and learning. *Innovations in Education & Training International*, 6(1), 12-19. doi:10.1080/1355800690060103

Wolff, P., & Levin, J. R. (1972). The role of overt activity in children's imagery production. *Child Development*, 43(2), 537-547. doi:10.2307/1127554

Theme 6: Mid Course Corrections

Ruiz-Primo, M. A. (2011). Informal formative assessment: The role of instructional dialogues in assessing students' learning. *Studies in Educational Evaluation*, 37(1), 15-24. doi:10.1016/j.stueduc.2011.04.003

Abstract (quoted from source):

This paper focuses on an unceremonious type of formative assessment--"informal formative assessment"--in which much of what teachers and students do in the classroom can be described as potential assessments that can provide evidence about the students' level of understanding.

More specifically, the paper focuses on assessment conversations, or dialogic interactions or exchanges, which continuously happen in the classroom and that are at the center of informal formative assessment. It is argued that assessment conversations make students' thinking explicit in an unobtrusive manner, and when students' thinking is explicit, it can be examined, questioned, and shaped as an active object of constructive learning. The paper conceptualizes informal formative assessment at the center of effective instructional activities with the use of instructional dialogues as assessment conversations, a typical informal formative assessment practice. The paper then presents a discussion about the evidence on the effect of assessment conversations on student learning.

Yabuki, Y., & MacGregor, J. F. (1997). Product quality control in semibatch reactors using midcourse correction policies. *Industrial Engineering Chemical Research*, 36(4), 1268-1275. doi:10.1021/ie960536m

Abstract (quoted from source):

A practical approach to the control of final product quality in semibatch reactors is proposed. It is based on the use of readily available on-line measurements such as temperatures plus a few off-line analyses obtained from one or more samples taken from the reactor throughout the course of the batch run. These measurements are used either with a theoretically-based model or with simple empirical regression models to predict the final product properties. If the predictions fall outside of a defined no-control region, then a midcourse correction is made to bring the product quality closer to target. The approach is illustrated for the control of molecular weight and cross-link density in the simulated semibatch emulsion polymerization of styrene-butadiene rubber (SBR).

Young, V. M. & Kim, D. H. (2010). Using assessments for instructional improvement: A literature review. *Education Policy Analysis Archives*, 18(19), 1-39.

Abstract (quoted from source):

The current educational reform policy discourse takes for granted the central role of using data to improve instruction. Yet whether and how data inform instruction depends on teachers' assessment practices, the data that are relevant and useful to them, the data they typically have access to, and their content and pedagogical knowledge. Moreover, when one considers teachers' organizational contexts, it is clear that school leadership and support for using data, capacity-building strategies, and the norms of adult learning and collaboration circumscribe opportunities to examine relevant data and to improve instructional practice in response. This literature review examines teacher as well as organizational practices and characteristics as they pertain to formative uses of assessment. We identify opportunities for important research to illuminate how and under what conditions teachers and schools as organizations can use data to inform instruction.

Books

- Davis, B. G. (2009). *Tools for teaching* (2nd ed.). San Francisco, CA: Jossey-Bass.
- Fisher, D., & Frey, N. (2007). *Checking for understanding: Formative assessment techniques for your classroom*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Popham, W. J. (2011). *Transformative assessment in action: An inside look at applying the process*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Reeves, D. B. (2004). *Accountability in action: A blueprint for learning organizations* (2nd ed.). Englewood, CO: Advanced Learning Press.
- Stiggins, R. J., Arter, J. A., Chappuis, J., & Chappius, S. (2009). *Classroom assessment for student learning: Doing it right - using it well*. Portland, OR: Assessment Training Institute.

Articles

- Adams, J. (2011, February 27). Mid-course feedback and corrections. Retrieved from <http://www.montana.edu/teachlearn/Papers/TLC-mid-course-correction.pdf>
- Britton, T. (2011). Using formative and alternative assessments to support instruction and measure student learning. *Science Scope*, 34(5), 6-21.
- Dirksen, D. J. (2011). Hitting the reset button: Using formative assessment to guide instruction. *Phi Delta Kappan*, 92(7), 26-31.
- Rauschenbach, J. (1994). Checking for student understanding - Four techniques. *The Journal of Physical Education, Recreation & Dance*, 65(4), 60-63.
- William, D., Lee, C., Harrison, C. & Black, P. (2004). Teachers developing assessment for learning: Impact on student achievement. *Assessment in Education: Principles, Policy & Practice*, 11(1), 49-65. doi:10.1080/0969594042000208994

Theme 7: Conscious Attention

Carrasco, M., & McElree, B. (2001). Covert attention accelerates the rate of visual information processing. *Proceedings of the National Academy of Sciences of the United States of America*, 98(9), 5363-5367. doi:10.1073/pnas.081074098

Abstract (quoted from source):

Whenever we open our eyes, we are confronted with an overwhelming amount of visual information. Covert attention allows us to select visual information at a cued location, without eye movements, and to grant such information priority in processing. Covert attention can be voluntarily allocated, to a given location according to goals, or involuntarily allocated, in a reflexive manner, to a cue that appears suddenly in the visual field. Covert attention improves discriminability in a wide variety of visual tasks. An important unresolved issue is whether covert attention can also speed the rate at which information is processed. To address this issue, it is necessary to obtain conjoint measures of the effects of covert attention on discriminability and rate of information processing. We used the response-signal speed-accuracy tradeoff (SAT) procedure to derive measures of how cueing a target location affects speed and accuracy in a visual search task. Here, we show that covert attention not only improves discriminability but also accelerates the rate of information processing.

Dye, M. W. G., Green, C. S., & Bavelier, D. (2009). The development of attention skills in action video game players. *Neuropsychologia*, 47(8-9), 1780-1789.
doi:10.1016/j.neuropsychologia.2009.02.002

Abstract (quoted from source):

Previous research suggests that action video game play improves attentional resources, allowing gamers to better allocate their attention across both space and time. In order to further characterize the plastic changes resulting from playing these video games, we administered the Attentional Network Test (ANT) to action game players and non-playing controls aged between 7 and 22 years. By employing a mixture of cues and flankers, the ANT provides measures of how well attention is allocated to targets as a function of alerting and orienting cues, and to what extent observers are able to filter out the influence of task irrelevant information flanking those targets. The data suggest that action video game players of all ages have enhanced attentional skills that allow them to make faster correct responses to targets, and leaves additional processing resources that spill over to process distractors flanking the targets.

Maljkovic, V., & Martini, P. (2005). Short-term memory for scenes with affective content. *Journal of Vision*, 5(3), 215-229. doi:10.1167/5.3.6

Abstract (quoted from source):

The emotional content of visual images can be parameterized along two dimensions: valence (pleasantness) and arousal (intensity of emotion). In this study, we ask how these distinct emotional dimensions affect the short-term memory of human observers viewing a rapid stream of images and trying to remember their content. We show that valence and arousal modulate short-term memory as independent factors. Arousal influences dramatically the average speed of data accumulation in memory: Higher arousal results in faster accumulation. Valence has a more interesting effect: While a picture is being viewed, information from positive and neutral scenes accumulates in memory at a constant rate, whereas information from negative scenes is encoded slowly at first, then increasingly faster. We provide evidence showing that neither differences in low-level image properties nor differences in the ability to apprehend the meaning of images at short exposures can account for the observed results, and propose that the effects are specific to the short-term memory mechanism. We interpret this pattern of results to mean that information accumulation in short-term memory is a controlled process, whose gain is modulated by valence and arousal acting as endogenous attentional cues.

Maringelli, F., & Umiltà, C. (1998). The control of the attentional focus. *European Journal of Cognitive Psychology*, 10(3), 225-246.

Abstract (quoted from source):

We conducted three experiments to examine the characteristics of focal attention. Experiments 1A, 1B and 1C confirmed previous results showing an inverse relation between size of the attentional focus and efficiency of processing. However, we also found attentional benefits with a comparatively short stimulus onset asynchrony. In addition, our results suggested that focusing attention is an exogenously driven reaction: Given a proper stimulus, the attentional system automatically produces a focusing response. Experiments 2 and 3 suggested that the appearance of new objects is a critical factor to capture attention. When the size of the cue that was used for focusing attention was kept constant across trials, attentional benefits disappeared. These results were interpreted as supporting the hypothesis that attentional capture is contingent on an attentional control setting.

Books

Cornish, K., Wilding, J., & Grant, C. (2006). Deconstructing working memory in developmental disorders of attention. In S. J. Pickering (Ed.), *Working memory and education* (pp. 157-188). London, UK: Academic Press.

Cowan, N. (1997). *Attention and memory an integrated framework*. New York, NY: Oxford University Press.

Gagne, E. D., Yekovich, C. W., & Yekovich, F. R. (1997). *The cognitive psychology of school learning* (2nd ed.). Boston, MA: Allyn & Bacon.

Loisette, A. (2005). *Assimilative memory or, how to attend and never forget*. New York, NY: Cosimo, Inc.

Rief, S. F. (2008). *The ADD/ADHD checklist: An easy reference for parents and teachers* (2nd ed.). San Francisco, CA: Jossey-Bass.

Styles, E. A. (2006). *The psychology of attention* (2nd ed.). New York, NY: Psychology Press.

Willis, J. (2006). *Research-based strategies to ignite student learning: Insights from a neurologist and classroom teacher*. Alexandria, VA: Association for Supervision & Curriculum Development.

Articles

Becker, M. W. (2009). Panic search, fear produces efficient visual search for nonthreatening objects. *Psychological Science*, 20(4), 435-437. doi:10.1111/j.1467-9280.2009.02303.x

Graham, S., & Golan, S. (1991). Motivational influences on cognition: Task involvement, ego involvement, and depth of information processing. *Journal of Educational Psychology*, 83(2), 187-194. doi:10.1037/0022-0663.83.2.187

Hayden, T. (2001, March 5). Anatomy of a punch line. *U.S. News & World Report*, 53. Retrieved from http://www.usnews.com/usnews/culture/articles/010305/archive_002573.htm

Miller, G. A. (1994). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review*, 63(2), 343-355. doi:10.1037//0033-295X.101.2.343

Posner, M. I., & Petersen, S. E. (2012). The attention system of the human brain: 20 years after. *Annual Review of Neuroscience*, 35, 73-89.

doi:10.1146/annurev-neuro-062111-150525

Sylwester, R., & Cho, J. (1992, December/1993, January). What brain research says about paying attention. *Students at Risk*, 50(4), 71-75.

Willis, J. (2010). Want children to “pay attention”? Make their brains curious! *Psychology Today*. Retrieved from <http://www.psychologytoday.com/blog/radical-teaching/201005/want-children-pay-attention-make-their-brains-curious>

Wyatt, K. (2009, March 7). No chairs: Students ‘get the wiggles out’ on exercise balls. *USAToday.com*. Retrieved from http://www.usatoday.com/news/education/2009-03-07-class-chairs_N.htm

Theme 8: Chunking

Buschke, H., (1976). Learning is organized by chunking. *Journal of Verbal Learning and Verbal Behavior*, 15(3), 313-324. doi:10.1016/0022-5371(76)90028-1

Abstract (quoted from source):

Chunking of items, with further organization of the chunks, has long been supposed to play a significant role in verbal learning. Spontaneous chunking in natural free recall learning is demonstrated directly by identifying clusters of items that recur together in different retrieval attempts, demarcated by different items or clusters. Trial-by-trial delineation of actual chunks and their organization in typical individual learning protocols demonstrates that items are spontaneously clustered into many small recurrent chunks, which remain intact when they are juxtaposed in higher-order organization of the basic chunks. Identification of the actual chunks in each retrieval permits trial-by-trial analysis of organization during verbal learning in terms of both basic clustering and higher-order organization of recurrent, well-defined clusters. Identification of chunking also allows analysis of the increasing rate of retrieval during learning in terms of individual items, items within chunks, and chunks.

Gobet, F., & Simon, H. A. (1988). Expert chess memory: Revisiting the chunking hypothesis. *Memory*, 6(3), 225-255.

Abstract (quoted from source):

After reviewing the relevant theory on chess expertise, this paper re-examines experimentally the finding of Chase and Simon (1973a) that the differences in ability of chess players at different skill levels to copy and to recall positions are attributable to the experts’ storage of thousands of

chunks (patterned clusters of pieces) in long-term memory. Despite important differences in the experimental apparatus, the data of the present experiments regarding latencies and chess relations between successively placed pieces are highly correlated with those of Chase and Simon. We conclude that the two-second inter-chunk interval used to define chunk boundaries is robust, and that chunks have psychological reality. We discuss the possible reasons why Masters in our new study used substantially larger chunks than the Master of the 1973 study, and extend the chunking theory to take account of the evidence for large retrieval structures (templates) in long-term memory.

Godøy, R. I. (2009). Chunking sound for musical analysis. In S. Ystad, R. Kronland-Martinet, & K. Jensen (Eds.), *Computer music modeling and retrieval. Genesis of meaning in sound and music* (pp. 67-80). New York: Springer.

Abstract (quoted from source):

One intriguing issue in music analysis is that of segmentation, or parsing, of continuous auditory streams into some kinds of meaningful and analytically convenient units, a process that can be denoted as chunking. The purpose of this paper is to present a theory of chunking in musical analysis based on perceptual features of sound and on our own research on musical gestures, suggesting that music-related actions are essential in the process of chunking.

Mathy, F., & Feldman, J. (2012). What's magic about magic numbers? Chunking and data compression in short-term memory. *Cognition*, 122(3), 346-362.
doi:10.1016/j.cognition.2011.11.003

Abstract (quoted from source):

Short term memory is famously limited in capacity to magic number 7 ± 2 —or, in many more recent studies, about 4 ± 1 “chunks” of information. But the definition of “chunk” in this context has never been clear, referring only to a set of items that are treated collectively as a single unit. We propose a new more quantitatively precise conception of chunk derived from the notion of Kolmogorov complexity and compressibility: a chunk is a unit in a maximally compressed code. We present a series of experiments in which we manipulated the compressibility of stimulus sequences by introducing sequential patterns of variable length. Our subjects' measured digit span (raw short term memory capacity) consistently depended on the length of the pattern after compression, that is, the number of distinct sequences it contained. The true limit appears to be about 3 or 4 distinct chunks, consistent with many modern studies, but also equivalent to about 7 uncompressed items of typical compressibility, consistent with Miller's famous magical number.

Books

Cowan, N. (2005). *Working memory capacity*. New York, NY: Psychology Press.

- Dehn, M. J. (2008). *Working memory and academic learning: Assessment and intervention*. New York, NY: John Wiley & Sons.
- Jimenez, R. (2009). *3-Minute e-learning: Rapid learning and applications, amazingly lower cost, and faster speed of delivery*. Los Angeles, CA: Monogatari.
- Smith, D. J. (1997). *Chunking and cognitive efficiency: Some lessons from the history of military signalling*. Cardiff, UK: Institute of Higher Education School of Environmental & Human Sciences.
- Smith, R. M. (2008). *Conquering the content: A step-by-step guide to online course design*. San Francisco, CA: Jossey-Bass.
- Terrance, H. S. (2002). The comparative psychology of chunking. In S. B. Fountain, M. D. Bunsey, J. H. Danks & M. K. McBeath (Eds.), *Animal cognition and sequential behavior: Behavioral, biological, and computational perspective* (pp. 23-55). New York, NY: Springer.

Articles

- Buschke, H. (1976). Learning is organized by chunking, *Journal of Verbal Learning and Verbal Behavior*, 15(3), 313-324. doi:10.1016/0022-5371(76)90028-1
- D'Souza, S. (2012). Why chunking down increases your expert status. [Web log post]. Retrieved from <http://www.psychotactics.com/blog/infoproducts-chunking-down-expert-status/>
- Gobet, F., & Simon, H. A. (1998). Pattern recognition makes search possible: Comments on Holding (1992). *Psychological Research*, 61(3), 204-08.
- Johnson, N. F. (1970). The role of chunking and organization in the process of recall. *The Psychology of Learning and Motivation*, 4, 171-247. doi:10.1016/S0079-7421(08)604326
- Scheuer, M. A. (2011). Evaluating book apps for children: pacing and chunking (part 4 in a mini-series). [Web log post]. Retrieved from <http://greatkidbooks.blogspot.com/2011/10/evaluating-book-apps-for-children.html>

Theme 9: Connection

- Connor-Greene, P. A. (2000). Making connections: Evaluating the effectiveness of journal writing in enhancing student learning. *Teaching of Psychology*, 27(1), 44-46.
doi:10.1207/S15328023TOP2701_10

Abstract (quoted from source):

Although journal writing has been extensively described and advocated in the teaching literature, little attention has been given to empirical assessment of its effectiveness in increasing student learning. Previous evaluations typically relied on student and faculty perceptions rather than performance measures. In this article, I describe journal writing as a way to actively engage students in learning about personality theories and include new criteria for instructor evaluation of journal entries. Analysis of student test grades indicated that a journal writing assignment increased student learning, and student evaluations supported the perceived usefulness of this exercise in fostering understanding. Examples from journals illustrate the ways in which students connected the course material to their own observations.

Howe, M., Wimmer, M. C., Gagnon, N., & Plumpton, S. (2009). An associative-activation theory of children's and adults' memory illusions. *Journal of Memory and Language*, 60(2), 229-251. doi:10.1016/j.jml.2008.10.002

Abstract (quoted from source):

The effects of associative strength and gist relations on rates of children's and adults' true and false memories were examined in three experiments. Children aged 5–11 and university-aged adults participated in a standard Deese/Roediger–McDermott false memory task using DRM and category lists in two experiments and in the third, children memorized lists that differed in associative strength and semantic cohesion. In the first two experiments, half of the participants were primed before list presentation with gist-relevant cues and the results showed that: (1) both true and false memories increased with age, (2) true recall was higher than false recall for all ages, (3) at all ages, false memory rates were determined by backward associative strength, and (4) false memories varied predictably with changes in associative strength but were unaffected by gist manipulations (category structure or gist priming). In the third experiment, both gist and associative strength were varied orthogonally and the results showed that regardless of age, children's (5) true recall was affected by gist manipulations (semantic cohesion) and (6) false recall was affected by backward associative strength. These findings are discussed in the context of models of false memory illusions and continuities in memory development more generally.

Kole, J. A., & Healy, A. F. (2007). Using prior knowledge to minimize interference when learning large amounts of information. *Memory Cognition*, 35(1), 124-137.
doi:10.3758/BF03195949

Abstract (quoted from source):

In three experiments, we examined mediated learning in situations involving learning a large amount of information. Participants learned 144 “facts” during a learning phase and were tested on facts during a test phase. In Experiments 1 and 2, participants learned facts about familiar individuals, unfamiliar individuals, or unfamiliar individuals associated with familiar individuals. Prior knowledge reduced interference, even when it played only a mediating role. In Experiment 3, participants learned facts about unfamiliar individuals or unfamiliar countries, with half the participants in each group associating the unfamiliar items with familiar individuals. Again, use of prior knowledge to mediate learning reduced interference even when the new information was conceptually dissimilar to the previously known information. These results are consistent with the mental model account of long-term memory.

Lampinen, J. M., Meier, C. R., Arnal, J. D., & Leding, J. K (2005). Compelling untruths:

Content borrowing and vivid false memories. *Journal of Experimental Psychology:*

Learning, Memory, and Cognition, 31(5), 954-63.

doi:10.1037/0278-7393.31.5.954

Abstract (quoted from source):

False memories are sometimes accompanied by surprisingly vivid experiential detail that makes them difficult to distinguish from actual memories. Such strikingly real false memories may be produced by a process called content borrowing in which details from presented items are errantly borrowed to corroborate the occurrence of the false memory item. In 2 experiments using think-out-loud protocols at both study and test, evidence for content borrowing occurred for more than half of the false remember judgments participants reported. The present study also provides evidence consistent with recollection rejection and distinctiveness playing a role in false-memory editing.

Silverman, L. H. (1997). Personalizing the past: A review of literature with implications for

historical interpretation. *Journal of Interpretation Research*, 2(1), 1-12.

Abstract (quoted from source):

The recent perspective known as meaning-making has advanced the belief that understanding interpretive site visitors' frameworks and past experiences is critical to successful interpretation. How, then, do visitors make meaning of heritage site experiences and of the past in general? This review examines and synthesizes recent studies and considers their contribution to theory and practice of historical interpretation. In sum, research suggests three major realms of experience from which visitors draw schemata that inform meaning-making at heritage sites: (a) associations with knowledge of history, (b) experiences and behavior regarding the past in everyday life, and (c) expectations of and behavior at heritage sites. Using literature as groundwork, three strategies for empirically driven historical interpretation are presented; (a) addressing the nature of history and visitors' associations, (b) incorporating everyday life behaviors, and (c) interpreting for social nature of heritage site visit.

Wisniewski, E. J. (1995). Prior knowledge and functionally relevant features in concept learning.

Journal of Experimental Psychology: Learning, Memory, and Cognition, 21(2), 449–468.

doi:10.1037//0278-7393.21.2.449

Abstract (quoted from source):

Empirical learning models have typically focused on statistical aspects of features (e.g., cue and category validity). In general, these models do not address the contact between people's prior knowledge that lies outside the category and their experiences of the category. Varieties of extensions to these models are examined, which combine prior knowledge with empirical learning. Predictions of these models were compared in 4 experiments. These studies contrasted the cue and category validity of features with people's prior knowledge about the relevance of features to the functions of novel artifacts. The findings suggest that the influences of knowledge and experience are more tightly integrated than some models would predict. Furthermore, relatively straightforward ways of incorporating knowledge into an empirical learning algorithm appear insufficient (e.g., use of knowledge to weight features by general relevance or to individually weight features). Other extensions to these models are suggested that focus on the importance of intermediary features, coherence, and conceptual roles.

Books

Caine, R. N., & Caine, G. (1991) *Making connections: Teaching and the human brain*.

Alexandria, VA: Association for Supervision and Curriculum Development.

Morrell, E. (2004). *Linking literacy and popular culture: Finding connections for lifelong learning*. Norwood, MA: Christopher-Gordon Publishers.

Parks, S., & Black, H. (1992). *Organizing thinking: Book 1: Graphic organizers*. Pacific Grove, CA: Critical Thinking & Software.

Tileston, D. E. W. (2010) *Ten best teaching practices: How brain research, learning styles, and standards define teaching competencies* (3rd ed.). Thousand Oaks, CA: Corwin Press

Articles

Bain, R. (2010). "I gotta learn all that stuff?" "Well, I have to teach it all!": Managing the laments of world history teachers. *Social Studies Review*, 49(1), 30-38.

Chi, M. T. H., & Ceci, S. J. (1987). Content knowledge: Its role, representation, and restructuring in memory development. *Advances in Child Development and Behavior*, 20, 91-141.
doi:10.1016/S0065-2407(08)60401-2

Correia, M. G. & Bleicher, R. E. (2008). Making connections to teach reflection. *Michigan Journal of Community Service Learning*, 14(2), 41-49.

Dilek, D. (2009). The reconstruction of the past through images: An iconographic analysis on the historical imagination usage skills of primary school pupils. *Educational Sciences: Theory and Practice*, 9(2), 665-689.

Kusnick, J. (2002). Growing pebbles and conceptual prisms - Understanding the source of student misconceptions about rock formation. *Journal of Geoscience Education*, 50(1), 31-39.

McLaughling, B. (1992). Myths and misconceptions about second language learning: What every teacher needs to unlearn. Retrieved from <http://www.usc.edu/dept/education/CMMR/FullText/McLaughlinMyths.pdf>

Theme 10: Practice

Holland, G. A. (1953). The effects of a change from distributed to massed responses. *Journal of Comparative and Physiological Psychology*, 46(4), 267-270. doi:10.1037/h0062421

Abstract (quoted from source):

Animals matched on the basis of preliminary training on two lever-pressing responses were trained either by massed or distributed practice on one of the two responses, and both groups were given a final test with a block of massed choices. The massed-practice group "tended toward a decrease in the percentage of rewarded responses at the outset of the final block of trials but recovered in 15 to 20 trials. The second group showed a gradual decrease in percentage of rewarded responses over the first 20 trials of the final massed block, followed by a gradual increase." The results are discussed in terms of the concept of a constant cumulative stimulus trace.

Metalis, S. A. (1985). Effects of massed versus distributed practice on acquisition of video game skill. *Perceptual and Motor Skills*, 61(2), 457-458. doi:10.2466/pms.1985.61.2.457

Abstract (quoted from source):

45 Ss played a video game 10 times in succession. The 22 distributed-practice Ss were given a newspaper to read for 2 min between games. To equate pre-experimental between-S differences in video-game-playing skill, the 1st game's performance scores were subtracted from each of the other 9 scores to yield change scores. The means of both indexes, computed across Ss for each of the 9 game change scores, showed marked improvement for all Ss; however, the distributed-practice group consistently showed more improvement.

Nash, C. S., Sproule, J., & Horton, P. (2011). Excellence in coaching: The art and skill of elite practitioners. *Research Quarterly for Exercise and Sport*, 82(2), 229-238.

doi:10.5641/027013611X13119541883744

Abstract (quoted from source):

During this study, 10 expert coaches were interviewed to examine their views on aspects of their individual coaching practice. Four themes emerged from the interviews: (a) the long-term approach, (b) the authentic coaching environment, (c) creating a learning environment, and (d)

the quality and quantity of training sessions. These coaches were consistent in their attempts to facilitate learning experiences for the athletes, while setting high standards in both training and competition. The study's findings show that expert coaches have to orchestrate a large number of variables when planning and executing a training session, and their success depends on their coaching knowledge and their skill at contextualizing the necessary components for specific situations.

Rohrer, D., & Taylor, K. (2006). The effects of overlearning and distributed practice on the retention of mathematics knowledge. *Applied Cognitive Psychology*, 20(9), 1209-1224.
doi:10.1002/acp.1266

Abstract (quoted from source):

In two experiments, 216 college students learned a mathematical procedure and returned for a test either one or four weeks later. In Experiment 1, performance on the four-week test was virtually doubled when students distributed 10 practice problems across two sessions instead of massing the same 10 problems in one session. This finding suggests that the benefits of distributed practice extend to abstract mathematics problems and not just rote memory cognitive tasks. In Experiment 2, students solved 3 or 9 practice problems in a single session, but this manipulation had no effect on either the one-week or four-week test. This result is at odds with the virtually unchallenged support for the strategy of continuing practice beyond the point of mastery in order to boost long-term retention. The results of both experiments suggest that the organization of practice problems in most mathematics textbooks is one that minimizes long-term retention.

Seabrook, R., Brown, G. D. A., & Solity, J. E. (2005). Distributed and massed practice: From laboratory to classroom. *Applied Cognitive Psychology*, 19(1), 107-122.
doi:10.1002/acp.1066

Abstract (quoted from source):

The benefit to memory of spacing presentations of material is well established but lacks an adequate explanation and is rarely applied in education. This paper presents three experiments that examined the spacing effect and its application to education. Experiment 1 demonstrated that spacing repeated presentations of items is equally beneficial to memory for a wide range of ages, contrary to some theories. Experiment 2 introduced 'clustered' presentations as a more relevant control than massed, reflecting the fact that massed presentation of material is uncommon in education. The scheduling of clustered presentations was intermediate between massed and distributed, yet recall was no different than for massed. Experiment 3, a classroom-based study, demonstrated the benefit of distributed over clustered teaching of reading through modification of the scheduling of everyday lessons. Thus, the effectiveness of teaching may be improved by increasing the degree to which lessons are distributed.

Topping, K. J., Samuels, J., & Paul, T. (2007). Does practice make perfect? Independent reading quantity, quality, and student achievement. *Learning and Instruction*, 17(3), 253-264.

doi:10.1016/j.learninstruc.2007.02.002

Abstract (quoted from source):

Does reading practice make perfect? Or is reading achievement related to the quality of practice as well as the quantity? To answer these questions, data on 45,670 students in grades 1-12 who read over 3 million books were analyzed. Measures largely of quantity (engaged reading volume) and purely of quality (success in reading comprehension) showed a positive relationship with achievement gain at all levels of achievement. However, both high quantity and high quality in combination were necessary for high achievement gains, especially for older students. Both were weakly associated with student initial reading achievement, but more strongly associated with the classroom in which the student was enrolled, possibly suggesting the properties of teacher intervention in guiding independent reading were important. Implications for theory building, research, and practice are explored.

Books

Browne, S., Clarke, D., Henson, P., Hristofski, F., & Jeffreys, V. (2010). *PDHPE application and inquiry: HSC course*. Sydney, Australia: Oxford University Press.

Hopper, C. H. (2010). *Practicing college learning strategies* (5th ed.). Belmont, CA: Wadsworth, Cengage Learning.

Marzano, R. J., Pickering, D. J., & Pollock, J. E. (2001). *Classroom instruction that works: Research-based strategies for increasing student achievement*. Alexandria, VA: Association for Supervision and Curriculum Development.

Schmidt, R. A. (1991). *Motor learning & performance: From principles to practice*. Champaign, IL: Human Kinetics Publishers.

Sousa, D. A. (2001). *How the brain learns: A classroom teacher's guide*. Thousand Oaks, CA: Corwin Press.

Wong, L. (2008). *Essential study skills* (6th ed.). Boston: Houghton Mifflin Harcourt.

Articles

- Dempster, F. N. (1988) The spacing effect: A case study in the failure to apply the results of psychological research. *American Psychologist*, 43(8), 627-34. doi:10.1037/0003-066X.43.8.627
- Ericsson, K. A. (2004). Deliberate practice and the acquisition and maintenance of expert performance in medicine and related domains. *Academic Medicine*, 79(Supplement), 70-81. doi:10.1097/00001888-200410001-00022
- Hammel, B. (1989). *A compendium of practice methods and their application to the bassoon*. (Doctoral dissertation, Florida State University, Tallahassee, FL). Retrieved from <http://www.people.vcu.edu/~bhammel/main/treatise/Bruce%20Hammel%20treatise.pdf>.
- Murry, S. R., & Udderman, B. E. (2003). Massed versus distributed practice: Which is better? *CAHPERD: California Association for Health, Physical Education, Recreation and Dance Journal*, 28(1), 19-22.
- Roediger III, H. L., & Karpicke, J. D. (2002). The power of testing memory: Basic research and implications for educational practice. *Perspectives on Psychological Science*, 1(3), 181-210.
- Willingham, D. T. (2002). How we learn: Ask the cognitive scientist. *American Educator*, 26(2), 37-39, 47.

Theme 11: Personal Relevance

- Dabbagh, N. (1996). *Creating personal relevance through adapting an educational task, situationally, to a learner's individual interests*. Retrieved from ERIC database. (ED397787)

Abstract (quoted from source):

Mandatory introductory level college courses, or "service courses," tend to be taught in lecture format, in a linear order from the instructor's point of view, and to classes of anywhere from 50 to 600 or more students. Students have individual differences and diverse learning styles which

are difficult to address in a large class. Computer-based instruction can help overcome these constraints by adapting the content of the basic required courses to contexts relevant for the student, and by allowing the student to choose the most personally relevant context at the time of instruction. The learner-controlled format allows learner choice of lesson sequence, pacing, content, and other instructional variables that are adaptive to cognitive styles and prior knowledge. This gives the learner a sense of ownership of content, promoting relevancy and knowledge acquisition. A theoretical framework and foundational research are discussed. A pilot study was conducted of undergraduate students enrolled in a required introductory computer science class. A pre-attitude survey contained questions about demographics and most and least preferred context. The subjects were randomly assigned to three treatment groups, in which subjects were administered the program through: (1) their most preferred choice of context, (2) their least preferred choice of context, and (3) the abstract lesson, with no context. An attitude/motivation survey was conducted before and after the instruction to assess changes in students' attitudes/ motivation towards the subject matter. A no-context achievement post-test testing recall, application, synthesis, and evaluation of the concepts learned in the lesson were also given to all participants.

Liberman, A., & Chaiken, S. (1996). The direct effect of personal relevance on attitudes.

Personality and Social Psychology Bulletin, 22(3), 269-279.

doi:10.1177/0146167296223005

Abstract (quoted from source):

The personal relevance of several academic and public policy proposals was manipulated, in the absence of any persuasive message, in two studies using a survey methodology and in two laboratory studies. Results generally showed that high personal relevance attitudes differed from low personal relevance attitudes. These results seem to indicate that a high-relevance version of a policy proposal is not the same attitude object as the low-relevance version of the same proposal. In expectancy-value terms, relevance manipulations may affect the valued consequences of a policy that come to mind. Framing a question in high-versus low-relevance terms can increase the accessibility of different object attributes. Implications for interpreting personal relevance findings in persuasion research are also discussed.

Lyons, I. M., Mattarella-Micke, A., Cieslak, M., Nusbaum, H. C., Small, S. L., & Beilock, S. L.

(2010) The role of personal experience in the neural processing of action-related

language. *Brain and Language*, 112(3) 214-22. doi:10.1016/j.bandl.2009.05.006

Abstract (quoted from source):

We investigated how auditory language processing is modified by a listener's previous experience with the specific activities mentioned in the speech. In particular, we asked whether neural responses related to language processing depend on one's experience with the action-based content of this language. Ice hockey players and novices passively listened to sentences

about ice hockey and everyday situations during functional magnetic resonance imaging (fMRI). When listening to action-related sentences, neural activation in left inferior frontal gyrus (IFG) and left dorsal premotor cortex (PMd) depended on one's actual (physical) experience with the action described in the sentence: hockey experts showed greater activity in these regions than novices for hockey sentences, but not for everyday-action sentences. Thus, personal experience with linguistic content modulated activity both in regions associated with language comprehension (IFG) and in those related to complex action planning (PMd). Moreover, hockey experts (who have extensive experience with both hockey and everyday situations) showed greater activity in left IFG regions for hockey relative to everyday sentences. This suggests that the degree to which one finds information personally relevant (i.e., over and above one's direct experience with it) also modulates processing in brain regions related to semantic-level processing

Radio Ad Effectiveness Lab, Inc. (2003). *Personal relevance, personal connections; How radio ads affect consumers*. Retrieved from <http://www.radioadlab.org/studyDocs/relevanceFull.pdf>

Abstract (quoted from source):

In this new RAEL study, the most distinctive media perception we saw among consumers 18-54 is that radio's value to listeners comes from its satisfaction of very personal wants and needs, and as a result, radio listening is very connected to a listener's emotions. That carries over to their perceptions and their expectations of radio advertising. Radio ads are perceived as (and expected to be) more relevant to the listener than are those in television or newspapers, and radio ads are therefore fully capable of tapping into emotional responses.

Turk, D. J., van Bussel, K., Brebner, J., Toma, A., Krigolson, O., & Handy, T. (2011). When "It" becomes "Mine": Attentional biases triggered by object ownership. *Journal of Cognitive Neuroscience*, 23(12), 3725-3733. doi:10.1162/jocn_a_00101

Abstract (quoted from source):

Previous research has demonstrated that higher-order cognitive processes associated with the allocation of selective attention are engaged when highly familiar self-relevant items are encountered, such as one's name, face, personal possessions, and the like. The goal of our study was to determine whether these effects on attentional processing are triggered on-line at the moment self-relevance is established. In a pair of experiments, we recorded ERPs as participants viewed common objects (e.g., apple, socks, and ketchup) in the context of an "ownership" paradigm, where the presentation of each object was followed by a cue indicating whether the object nominally belonged either to the participant (a "self" cue) or the experimenter (an "other" cue). In Experiment 1, we found that "self" ownership cues were associated with increased attentional processing, as measured via the P300 component. In Experiment 2, we replicated this effect while demonstrating that at a visual-perceptual level, spatial attention

became more narrowly focused on objects owned by self, as measured via the lateral occipital P1 ERP component. Taken together, our findings indicate that self-relevant attention effects are triggered by the act of taking ownership of objects associated with both perceptual and postperceptual processing in cortex.

Books

Committee on Increasing High School Students' Engagement and Motivation to Learn, National

Research Council. (2003) *Engaging schools: Fostering high school students' motivation to learn*. Washington, DC: The National Academies Press.

Daggett, W. R., & Nussbaum, P. D. (2008). *What brain research teaches about rigor, relevance, and relationships: And what it teaches about keeping your own brain healthy*. Rexford, NY: International Center for Leadership in Education.

Maasz, J., & Schloeglmann, W. (Eds.). (2009). *Beliefs and attitudes in mathematics education: New research results*. Rotterdam, Netherlands: Sense Publishers.

Manners, T. (2008). *Relevance: Making stuff that matters*. New York, NY: Penguin Group.

Willis, J. (2007). *Brain-friendly strategies for the inclusion classroom: Insights from a neurologist and classroom teacher*. Alexandria, VA: Association for Supervision and Curriculum Development.

Articles

Bernard, S. (2010, December 1). Science shows making lessons relevant really matters.

Retrieved from <http://www.edutopia.org/neuroscience-brain-based-learning-relevance-improves-engagement>.

Mandler, D., Mamlok-Naaman, R., Blonder, R., Yayon, M., & Hofstein, A. (2012). High-school chemistry teaching through environmentally oriented curricula. *Chemistry Education Research and Practice*, 13(2), 80-92. doi:10.1039/C1RP90071D.

Rankins-Robertson, S., Cahill, L., Roen, D., & Glau, G. R. (2010). Expanding definitions of academic writing: Family history writing in the basic writing classroom and beyond.

Journal of Basic Writing (CUNY), 29(1), 56-77.

Van Lancker, D. (1991). Personal relevance and the human right hemisphere. *Brain and Cognition*, 17(1), 64-92. doi:10.1016/0278-2626(91)90067-I.

VanSickle, R. L. (1990). The personal relevance of the social studies. *Social Education*, 54(1), 23-27.

Yager, R. E. (1989). A rationale for using personal relevance as a science curriculum focus in schools. *School Science and Mathematics*, 89(2), 144-156. doi:10.1111/j.1949-8594.1989.tb11902.x.

Theme 12: Locale Memory

Barsalou, L. W. (1999). Perceptual symbol systems. *Behavioral and Brain Sciences*, 22(4), 577-660. doi:10.1017/S0140525X99002149

Abstract (quoted from source):

Prior to the twentieth century, theories of knowledge were inherently perceptual. Since then, developments in logic, statistics, and programming languages have inspired amodal theories that rest on principles fundamentally different from those underlying perception. In addition, perceptual approaches have become widely viewed as untenable because they are assumed to implement recording systems, not conceptual systems. A perceptual theory of knowledge is developed here in the context of current cognitive science and neuroscience. During perceptual experience, association areas in the brain capture bottom-up patterns of activation in sensory-motor areas. Later, in a top-down manner, association areas partially reactivate sensory-motor areas to implement perceptual symbols. The storage and reactivation of perceptual symbols operates at the level of perceptual components – not at the level of holistic perceptual experiences. Through the use of selective attention, schematic representations of perceptual components are extracted from experience and stored in memory (e.g., individual memories of green, purr, hot). As memories of the same component become organized around a common frame, they implement a simulator that produces limitless simulations of the component (e.g., simulations of purr). Not only do such simulators develop for aspects of sensory experience, they also develop for aspects of proprioception (e.g., lift, run) and introspection (e.g., compare, memory, happy, hungry). Once established, these simulators implement a basic conceptual system that represents types, supports categorization, and produces categorical inferences. These simulators further support productivity, propositions, and abstract concepts, thereby implementing a fully functional conceptual system. Productivity results from integrating simulators combinatorially and recursively to produce complex simulations. Propositions result from binding simulators to perceived individuals to represent type-token relations. Abstract concepts are grounded in complex simulations of combined physical and introspective events. Thus, a perceptual theory of knowledge can implement a fully functional conceptual system while avoiding problems associated with amodal symbol systems. Implications for cognition, neuroscience, evolution, development, and artificial intelligence are explored.

Dere, E., Kart-Teke, E., Huston, J. P., & De Souza Silva, M. A. (2006). The case for episodic memory in animals. *Neuroscience & Biobehavioral Reviews*, 30(8), 1206-1224.

doi:10.1016/j.neubiorev.2006.09.005

Abstract (quoted from source):

The conscious recollection of unique personal experiences in terms of their details (what), their locale (where) and temporal occurrence (when) is known as episodic memory and is thought to require a 'self-concept', autonoetic awareness/consciousness, and the ability to subjectively sense time. It has long been held that episodic memory is unique to humans, because it was accepted

that animals lack a 'self-concept', 'autonoetic awareness', and the ability to 'subjectively sense time'. These assumptions are now being questioned by behavioral evidence showing that various animal species indeed show behavioral manifestations of different features of episodic memory such as, e.g. 'metacognition', 'conscious recollection' of past events, 'temporal order memory', 'mental time travel' and have the capacity to remember personal experiences in terms of what happened, where and when. The aim of this review is to provide a comprehensive overview on the current progress in attempts to model different prerequisites and features of human episodic memory in animals and to identify possible neural substrates of animal episodic memory. The literature covered includes behavioral and physiological studies performed with different animal species, such as non-human primates, rodents, dolphins and birds. The search for episodic memory in animals has forced researchers to define objective behavioral criteria by which different features of episodic memory can be operationalized experimentally and assessed in both animals and humans. This is especially important because the current definition of episodic memory in terms of mentalistic constructs such as 'self', 'autonoetic awareness/consciousness', and 'subjectively sensed time', not only hinders animal research on the neurobiology of episodic memory but also research with healthy human subjects as well as neuropsychiatric patients with impaired language or in children with less-developed verbal abilities.

Eichenbaum, H. (2010). Memory systems. *Wiley Interdisciplinary Reviews: Cognitive Science*, 1(4), 478-490. doi:10.1002/wcs.49

Abstract (quoted from source):

The idea that there are multiple memory systems can be traced to early philosophical considerations and introspection. However, the early experimental work considered memory a unitary phenomenon and focused on finding the mechanism upon which memory is based. A full reconciliation of debates about that mechanism, and a coincidental rediscovery of the idea of multiple memory systems, emerged from studies in the cognitive neuroscience of memory. This research has identified three major forms of memory that have distinct operating principles and are supported by different brain systems. These include: (1) a cortical-hippocampal circuit that mediates declarative memory, our capacity to recollect facts and events; (2) procedural memory subsystems involving a cortical-striatal circuit that mediates habit formation and a brainstem-cerebellar circuit that mediates sensorimotor adaptations; and (3) a circuit involving subcortical and cortical pathways through the amygdala that mediates the attachment of affective status and emotional responses to previously neutral stimuli.

Eichenbaum, H., Schoenbaum, G., Young, B., & Bunsey, M. (1996). Functional organization of the hippocampal memory system. *PNAS: Proceedings of the National Academy of Sciences*, 93(24), 13500-13507. doi:10.1073/pnas.93.24.13500

Abstract (quoted from source):

In humans declarative or explicit memory is supported by the hippocampus and related structures of the medial temporal lobe working in concert with the cerebral cortex. This paper

reviews our progress in developing an animal model for studies of cortical–hippocampal interactions in memory processing. Our findings support the view that the cortex maintains various forms of memory representation and that hippocampal structures extend the persistence and mediate the organization of these codings. Specifically, the parahippocampal region, through direct and reciprocal interconnections with the cortex, is sufficient to support the convergence and extended persistence of cortical codings. The hippocampus itself is critical to the organization cortical representations in terms of relationships among items in memory and in the flexible memory expression that is the hallmark of declarative memory.

Books

Caine, R. N., & Caine, G. (2011). *Natural learning for a connected world: Education, technology and the human brain*. New York, NY: Teachers College Press.

Foer, J. (2011). *Moonwalking with Einstein: The art and science of remembering everything*. New York, NY: Penguin Group.

Gilbert, A. G. (1976). *Teaching the three Rs through movement experiences: A handbook for teachers*. New York, NY: Macmillan Publishing.

Sousa, D. A. (2006). *How the brain learns*. Thousand Oaks, CA: Corwin Press.

Articles

Burg, J. J., & Luttringhaus, K. (2006). Entertaining with science, educating with dance. *Computers in Entertainment*, 4(2), 7. doi:10.1145/1129006.1129018

Fahey, J. A., & De Los Santos, G. (2002). Memory improvement and research related to the science of memory. *Education-Indianapolis then Chula Vista*, 123(2), 380-385.

Knapp, C. E. (1992). Thinking in outdoor inquiry. *ERIC Clearinghouse on Rural Education and Small Schools*. Retrieved from ERIC database. (ED348198)

Mathison, C., Wachowiak, S., & Feldman, L. (2007). School in the park: Bridging formal and informal learning environments. *Childhood Education*, 83(4), 206-210.

Randall, C. C. (1996). *Haptic history: Teaching A.P. U.S. history through kinesthetic learning and material culture*. Retrieved from ERIC database. (ED423152)

Smith, G. A. (2002). Place-based education: Learning to be where we are. *Phi Delta Kappan*, 83(8), 584-594.

Theme 13: Mental Models

Algozzine, B., & Douville, P. (2004). Use mental imagery across the curriculum. *Preventing*

School Failure: Alternative Education for Children and Youth. 49(1), 36-39.

doi:10.3200/PSFL.49.1.36

Abstract (quoted from source):

Contemporary trends in education reflect a shift from traditional teacher-centered approaches to more student-centered approaches to learning. Empowering students in their own learning is facilitated by teaching them effective meaning-making strategies that support active participation in their own learning. Making this happen requires using “double-duty” instructional strategies that are effective instructional tools for teachers and effective learning tools for students when they work independently without continuous monitoring, feedback, and support. These approaches are popular because they are also effective when used across the curriculum in multiple content areas or disciplines (e.g., in both reading and mathematics instruction as well as in science and social studies). Mental imagery is an effective double duty instructional strategy. In this article, the authors describe a specific mental imagery strategy, the Sensory Activation Model (SAM), developed to assist students in constructing their own images as problem-solving tools. The SAM strategy has been demonstrated to aid students in the construction of self-generated images that facilitate both the reading and writing processes.

Bartel, C. A., & Garud, R. (2009). The role of narratives in sustaining organizational innovation.

Organization Science, 20(1), 107-117. doi:10.1287/orsc.1080.0372

Abstract (quoted from source):

Sustaining innovation is a vital yet difficult task. Innovation requires the coordinated efforts of many actors to facilitate (1) the recombination of ideas to generate novelty, (2) real-time problem solving, and (3) linkages between present innovation efforts with past experiences and future aspirations. We propose that innovation narratives are cultural mechanisms that address these coordination requirements by enabling translation. Specifically, innovation narratives are powerful mechanisms for translating ideas across the organization so that they are comprehensible and appear legitimate to others. Narratives also enable people to translate emergent situations that are ambiguous or equivocal so as to promote real-time problem solving. With their accumulation, innovation narratives provide a generative memory for organizations that enable people to translate ideas accumulated from particular instances of past innovation to inform current and future efforts.

Dilber, R., & Bahattin, D. (2008). Effectiveness of analogy on students' success and elimination

of misconception. *Latin-American Journal of Physics Education*, 2(3), 174-183.

Abstract (quoted from source):

This study investigated the effects of analogy instruction on students' success and removing misconceptions as compared with traditional instruction. The sample of this study consisted of 78 high school students from two classes enrolled in an introductory physics course. These students are about 15-16 years old. One of the classes was assigned randomly to the control group, and the other class was assigned to the experimental group. During teaching the topic of electric concepts in the physics curriculum, analogical instruction was applied in the experimental group whereas traditional instruction was followed in the control group. The results showed that the students in the experimental group performed better with respect to electric concepts than control groups' students.

Gobert, J., & Clement, J. (1999). Effects of student-generated diagrams versus student-generated summaries on conceptual understanding of causal and dynamic knowledge in plate tectonics. *Journal of Research in Science Teaching*, 36(1), 39-53.

doi:10.1002/(SICI)1098-2736(199901)36:1<39::AID-TEA4>3.3.CO;2-9

Abstract (quoted from source):

This article examines the beneficial effects of student-generated diagrams versus student-generated summaries on conceptual understanding on the topic of plate tectonics. A group of fifth grade students were asked to read text about plate tectonics. One segment of the group was asked to draw diagrams about the material, another was asked to write summaries and the third group simply read the text (control group). While the summaries themselves contained more information than the diagrams, the students who drew the diagrams outperformed both of the other groups on the posttest given to determine understanding of the topic. These results are discussed in the context of how they impact on-line reading comprehension and conceptual understanding of a domain.

Mayer, R. E., & Anderson, R. B. (1992). The instructive animation: Helping students build connections between words and pictures in multimedia learning. *Journal of Educational Psychology*, 84(4), 444-452. doi:10.1037//0022-0663.84.4.444

Abstract (quoted from source):

In 2 experiments, Ss studied an animation depicting the operation of a bicycle tire pump or an automobile braking system, along with concurrent oral narration of the steps in the process (concurrent group), successive presentation of animation and narration (by 4 different methods), animation alone, narration alone, or no instruction (control group). On retention tests, the control group performed more poorly than each of the other groups, which did not differ from one another. On problem-solving tests, the concurrent group performed better than each of the other groups, which did not differ from one another. These results are consistent with a dual-

coding model in which retention requires the construction of representational connections and problem solving requires the construction of representational and referential connections. An instructional implication is that pictures and words are most effective when they occur contiguously in time or space.

Suh, J., & Moyer, P. S. (2007). Developing students' representational fluency using virtual and physical algebra balances. *Journal of Computers in Mathematics and Science Teaching*, 26(2), 155-173.

Abstract (quoted from source):

Both virtual and physical manipulatives are reported as effective learning tools when used with different groups of students in a variety of contexts to learn mathematical content. The use of multiple representations and the flexibility to translate among those representational forms facilitates students' learning and has the potential to deepen their understanding. This classroom project involved two groups of third-grade students in a week-long unit focusing on algebraic relationships. The purpose of the unit was to engage students with different algebraic models and encourage students to use informal strategies to represent their relational thinking. The paper highlights examples of these student representations as evidence of the children's developing algebraic thinking. Result from the pre and posttest measures showed that students in the physical and virtual manipulative environments gained significantly in achievement and showed flexibility in translating and representing their understanding in multiple representations: manipulative model, pictorial, numeric, and word problems. These results show that although the different manipulative models had different features, both the physical and virtual environments were effective in supporting students' learning and encouraging relational thinking and algebraic reasoning.

Books

Baines, L. A. (2008). *Teacher's guide to multisensory learning: Improving literacy by engaging the senses*. Alexandria, VA: Association for Supervision and Curriculum Development.

Johnson-Laird, P. (1983). *Mental models*. Cambridge, MA: Harvard University Press.

Marzano, R. J., Pickering, D., & Pollock, J. E. (2001). *Classroom instruction that works: Research-based strategies for increasing student achievement*. Alexandria, VA: Association for Supervision and Curriculum Development.

Payne, R. K. *Understanding learning: The how, the why, the what*. Highlands, TX: Aha! Process.

Pink, D. H.(2006). *A whole new mind: Why right-brainers will rule the future*. New York, NY: Penguin Group.

Wolfe, P. (2001). *Brain matters: Translating research into classroom practice*. Alexandria, VA: Association for Supervision and Curriculum Development.

Articles

Costa, A. L. (2008). The thought-filled curriculum. *Educational Leadership*, 65(5), 20-24.

Eldon, D. (2012, July 25). Lyrical learning: Why it works. *Lyrical Learning*. Retrieved from <http://www.lyricallearning.com/why.html>

Fahey, J. A., & De Los Santos, G. (2002). Memory improvement and research related to the science of memory. *Education (Chula Vista)*, 123(2), 380-385.

Glynn, S. (2007). The teaching-with-analogies model. *Science and Children*, 44(8), 52-55.

Jones, B. F., Pierce, J., & Hunter, B. (1988). Teaching students to construct graphic representations. *Educational Leadership*, 46(4), 20-25.

Snowden, D. (1999). Story telling: An old skill in a new context. *Business Information Review*, 16(1), 30-37 doi:10.1177/0266382994237045.

Theme 14: First Time Learning

Anderson, N. H., (1965). Primacy effects in personality impression formation using a generalized order effect paradigm. *Journal of Personality and Social Psychology*, 2(1), 1-9. doi:10.1037/h0021966

Abstract (quoted from source):

Ss were read a set of personality trait adjectives, and judged how much they would like a person so described. A generalized order effect paradigm was used. Each set consisted of a sequence of high (or low) value adjectives; into this sequence a block of 3 low (or high) adjectives was interpolated at all possible ordinal positions. The results showed a straight-line primacy effect: the net influence of an adjective decreased linearly with ordinal position in the set. It was shown that the response to a set could be described as a weighted average of the scale values of the

separate adjectives. This model was related to a previously employed linear model for opinion change.

Castro, C. A. & Larsen, T. (1992). Primacy and recency effects in nonhuman primates. *Journal of Experimental Psychology: Animal Behavior Processes*, 18(4), 335-340.

doi:10.1037//0097-7403.18.4.335

Abstract (quoted from source):

The reports of primacy and recency memory effects in nonhuman primates have been criticized because they have all used an initiating response. That is, the presentation of the to-be-remembered list of items was always contingent on a response being initiated by the nonhuman primate. It has been argued that this initiating response improves performance for early items in the list, resulting in the occurrence of the primacy effect, independent of any memory processing mechanism. This criticism was addressed in the present study by not using an initiating response prior to the presentation of the list. Nevertheless, both a primacy and a recency effect were observed in all 6 rhesus monkeys evaluated using a serial probe recognition task. Thus, the results are similar to those for humans, in that both primacy and recency effects can be obtained in nonhuman primates. A brief literature review is included, and it is proposed that the primacy and recency effects observed in humans, nonhuman primates, and infraprimates can be explained within the context of the configural-association theory

Digirolamo, G. J., & Hintzman, D. L. (1997). First impressions are lasting impressions: A primacy effect in memory for repetitions. *Psychonomic Bulletin and Review*, 4(1), 121-124. doi:10.3758/BF03210784

Abstract (quoted from source):

Two experiments demonstrated that the encoding of a repeated object is biased toward the attributes of its first presentation. In Experiment 1, subjects saw objects five times each, but either the first presentation or the fifth presentation was the mirror reverse of the standard orientation seen on the other four trials. When recognition was tested with both orientations simultaneously, subjects reported seeing only the single mirror-reverse orientation more often if it was the first presentation than when it was the fifth presentation, and seeing only the standard orientation more often if it was presentations 1-4 than when it was presentations 2-5. A second experiment demonstrated that this primacy effect generalized to size changes. This pattern of results is consistent with the hypothesis that top-down biases affect what subjects learn: The first representation established for a stimulus is likely to influence the encoding of subsequent repetitions.

Garskof, B. E., Bryan, T. M. (1966). Unlearning as a function of degree of original learning and retention test. *Psychonomic Science*, 6(8), 391-392.

Abstract (quoted from source):

Three degrees of original learning and two retention tests were used to explore the relationship between degree of original learning and resistance to unlearning. It was found that scores on both retention tests varied directly with degree of original learning suggesting that greater original learning practice led to increased resistance to unlearning during interpolated learning.

Simmons, R. (1988). Patterns of misunderstanding: An integrative model for science, math, and programming. *Review of Educational Research*, 58(4), 303-326.

Abstract (quoted from source):

This article examines unifying factors among diverse problems of understanding in several fields. Certain misunderstandings in science, mathematics, and computer programming display strong structural analogies with one another. Even within one of these domains, however, not all misunderstandings are structurally similar. To explain the commonality and variety, four levels of knowledge are posited: (a) content, (b) problem-solving, (c) epistemic, and (d) inquiry. Through analysis of several examples, it is argued that misunderstandings have causes at multiple levels, with highly domain-specific causes predominant at the "content" level and somewhat more general causes at the other levels. The authors note that education characteristically neglects all but the content level, describe successful interventions at all levels, and urge more attention in education to integration across the levels.

Books

Horn, G. (1985). *Memory, imprinting, and the brain: An inquiry into mechanisms*. Oxford, UK: Clarendon Press.

Lorenz, K. (1971). *Studies in animal and human behaviour, Volume 1*. Cambridge, MA: Harvard University Press.

McClelland, J. L., & Siegler, R. S. (2011). *Mechanisms of cognitive development: Behavioral and neural perspectives*. Mahwah, NJ: Lawrence Erlbaum Associates.

Miller, R. M. (2003). *Imprint training of the newborn foal: A swift, effective method for permanently shaping a horse's lifetime behavior*. Colorado Springs, CO: Western Horseman.

Montangero, J., & Maurice-Naville, D. (1997). *Piaget, or the advance of knowledge*. Mahwah, NJ: Lawrence Erlbaum Associates.

Nierenberg, G. I. (1996). *Do it right the first time: A short guide to learning from your most memorable errors, mistakes, and blunders*. New York, NY: John Wiley and Sons.

Sluckin, W. (2007). *Imprinting and early learning* (2nd ed.). Piscataway, NJ: Transaction Publishers.

Articles

Cardoso, S. H., & Sabbatini, R. M. E. (2001, November 4). Learning who is your mother -The behavior of imprinting. *Brain and Mind Electronic Magazine on Neuroscience*, 14. Retrieved from <http://www.cerebromente.org.br/n14/experimento/lorenz/index-lorenz.html>

Eick, C. J., Ware, F. N., & Williams, P. G. (2003). Coteaching in a science methods course: A situated learning model of becoming a teacher. *Journal of Teacher Education*, 54(1), 74-85. doi:10.1177/0022487102238659

Fogleman, S. L. (2012, July 31). Effective training. *AgManager.info*. Retrieved from http://www.agmanager.info/hr/management/Effective_Training.pdf

Grotzer, T. A., & Bell, B. (1999). Negotiating the funnel: Guiding students toward understanding elusive generative concepts. *The Project Zero classroom: Views on understanding*. Cambridge, MA: Fellows and Trustees of Harvard College.

McWilliam, E. L. (2005). Unlearning pedagogy. *Journal of Learning Design*, 1(1), 1-11.

Theme 15: Neural Downshifting

Dickey, M. D. (2005). Engaging by design: How engagement strategies in popular computer and video games can inform instructional design. *Educational Technology Research and Development*, 53(2), 67-83. doi:10.1007/BF02504866

Abstract (quoted from source):

Computer and video games are a prevalent form of entertainment in which the purpose of the design is to engage players. Game designers incorporate a number of strategies and tactics for engaging players in “gameplay.” These strategies and tactics may provide instructional designers with new methods for engaging learners. This investigation presents a review of game design strategies and the implications of appropriating these strategies for instructional design. Specifically, this study presents an overview of the trajectory of player positioning or point of view, the role of narrative, and methods of interactive design. A comparison of engagement strategies in popular games and characteristics of engaged learning is also presented to examine how strategies of game design might be integrated into the existing framework of engaged learning.

Gallagher, M., & Holland, P. C. (1994). The amygdala complex: Multiple roles in associative learning and attention. *Proceedings of the National Academy of Sciences*, 91(25), 11771-11776. doi:10.1073/pnas.91.25.11771

Abstract (quoted from source):

Although certain neurophysiological functions of the amygdala complex in learning seem well established, the purpose of this review is to propose that an additional conceptualization of amygdala function is now needed. The research we review provides evidence that a subsystem within the amygdala provides a coordinated regulation of attentional processes. An important aspect of this additional neuropsychology of the amygdala is that it may aid in understanding the importance of connections between the amygdala and other neural systems in information processing.

Lewis, M., Hitchcock, D. F., & Sullivan, M. W. (2004). Physiological and emotional reactivity to learning and frustration. *Infancy*, 6(1), 121-143. doi:10.1207/s15327078in0601_6

Abstract (quoted from source):

This study examined the behavioral (arm, facial) and autonomic (heart rate, respiratory sinus arrhythmia [RSA], and adrenocortical axis) reactivity of 56 4-month-old infants in response to contingency learning and extinction-induced frustration. During learning, infants displayed increases in operant arm response and positive emotional expressions. Changes in average RSA(VNA) paralleled the observed changes in facial expressions in general and maintained an inverse relation with heart rate throughout most of the session. When frustrated by extinction, infants displayed increases in negative expressions, heart rate, and a brief increase in RSA(VNA) followed by a significant decrease. No significant changes were observed for cortisol. These behavioral and facial responses are consistent with earlier work. The physiological changes, along with the facial expressions and instrumental responses, indicate that the autonomic nervous system functions as a coordinated affect system by 4 months of age.

McGaugh, J. L., Cahill, L., & Roozendaal, B. (1996). Involvement of the amygdala in memory storage: Interaction with other brain systems. *Proceedings of the National Academy of Sciences*, 93(24), 13508-13514. doi:10.1073/pnas.93.24.13508

Abstract (quoted from source):

There is extensive evidence that the amygdala is involved in affectively influenced memory. The central hypothesis guiding the research reviewed in this paper is that emotional arousal activates the amygdala and that such activation results in the modulation of memory storage occurring in other brain regions. Several lines of evidence support this view. First, the effects of stress-related hormones (epinephrine and glucocorticoids) are mediated by influences involving the amygdala. In rats, lesions of the amygdala and the stria terminalis block the effects of posttraining administration of epinephrine and glucocorticoids on memory. Furthermore, memory is enhanced by posttraining intraamygdala infusions of drugs that activate beta-adrenergic and glucocorticoid receptors. Additionally, infusion of beta-adrenergic blockers into the amygdala blocks the memory-modulating effects of epinephrine and glucocorticoids, as well as those of drugs affecting opiate and GABAergic systems. Second, an intact amygdala is not required for expression of retention. Inactivation of the amygdala prior to retention testing (by posttraining lesions or drug infusions) does not block retention performance. Third, findings of studies using human subjects are consistent with those of animal experiments. beta-Blockers and amygdala lesions attenuate the effects of emotional arousal on memory. Additionally, 3-week recall of emotional material is highly correlated with positron emission tomography activation (cerebral glucose metabolism) of the right amygdala during encoding. These findings provide strong evidence supporting the hypothesis that the amygdala is involved in modulating long-term memory storage.

Pichon, S., de Gelder, B., & Grèzes, J. (2012). Threat prompts defensive brain responses independently of attentional control. *Cerebral Cortex*, 22(2), 274-285.
doi:10.1093/cercor/bhr060

Abstract (quoted from source):

Negative emotional signals are known to influence task performance, but so far, investigations have focused on how emotion interacts with perceptual processes by mobilizing attentional resources. The attention-independent effects of negative emotional signals are less well understood. Here, we show that threat signals trigger defensive responses independently of what observers pay attention to. Participants were scanned using functional magnetic resonance imaging while watching short video clips of threatening actions and performed either color or emotion judgments. Seeing threatening actions interfered with performance in both tasks. Amygdala activation reflected both stimulus and task conditions. In contrast, threat stimuli prompted a constant activity in a network underlying reflexive defensive behavior (periaqueductal gray, hypothalamus, and premotor cortex). Threat stimuli also disrupted ongoing behavior and provoked motor conflict in prefrontal regions during both tasks. The

present results are consistent with the view that emotions trigger adaptive action tendencies independently of task settings.

Shackman, A. J., Maxwell, J. S., McMenamin, B. W., Greischar, L. L., & Davidson, R. J. (2011).

Stress potentiates early and attenuates late stages of visual processing. *The Journal of Neuroscience*, 31(3), 1156-1161. doi:10.1523/JNEUROSCI.3384-10.2011

Abstract (quoted from source):

Stress can fundamentally alter neural responses to incoming information. Recent research suggests that stress and anxiety shift the balance of attention away from a task-directed mode, governed by prefrontal cortex, to a sensory-vigilance mode, governed by the amygdala and other threat-sensitive regions. A key untested prediction of this framework is that stress exerts dissociable effects on different stages of information processing. This study exploited the temporal resolution afforded by event-related potentials to disentangle the impact of stress on vigilance, indexed by early perceptual activity, from its impact on task-directed cognition, indexed by later postperceptual activity in humans. Results indicated that threat of shock amplified stress, measured using retrospective ratings and concurrent facial electromyography. Stress also double-dissociated early sensory-specific processing from later task-directed processing of emotionally neutral stimuli: stress amplified N1 (184–236 ms) and attenuated P3 (316–488 ms) activity. This demonstrates that stress can have strikingly different consequences at different processing stages. Consistent with recent suggestions, stress amplified earlier extrastriate activity in a manner consistent with vigilance for threat (N1), but disrupted later activity associated with the evaluation of task-relevant information (P3). These results provide a novel basis for understanding how stress can modulate information processing in everyday life and stress-sensitive disorders.

Books

Esquith, R. (2007). *Teach like your hair's on fire: The methods and madness inside room 56*.

New York, NY: Viking Press.

Page, R. M., & Page, T. S. (2010). *Promoting health and emotional well-being in your classroom*. Sudbury, MA: Jones and Bartlett Learning.

Sapolsky, R. M. (2004). *Why zebras don't get ulcers: The acclaimed guide to stress, stress-related diseases, and coping - now revised and updated*. New York, NY: Holt Paperbacks.

van den Herik, H. J., Iida, H., & Heinz, E. A. (Eds.). (2003). *Advances in computer games: many games, many challenges* (Vol. 135). New York, NY: Springer.

Articles

Cahill, L. (2003). Similar neural mechanisms for emotion-induced memory impairment and enhancement. *Proceedings of the National Academy of Sciences*, 100(23), 13123-13124.
doi:10.1073/pnas.2335833100

Medina, J. (2012, August 2). Brain rules for meetings. *Brain Rules*. [Web log post]. Retrieved from <http://brainrules.blogspot.com>.

Reynolds, T. M. (2011). Foster children: A hidden group. *International Journal of Business and Social Science*, 2(1), 46-50.

Willis, J. (2012, August 3). Neuroscience insights from video game and drug addiction. *Radical Teaching*. [Web log post]. Retrieved from <http://www.psychologytoday.com/blog/radical-teaching/201110/neuroscience-insights-video-game-drug-addiction>

Theme 16: Enriched Environments

Levykh, M. G. (2008). The affective establishment and maintenance of Vygotsky's zone of proximal development. *Educational Theory*, 58(1), 83-101. doi:10.1111/j.1741-5446.2007.00277.x

Abstract (quoted from source):

Many recent articles, research papers, and conference presentations about Lev Vygotsky's zone of proximal development (ZPD) emphasize the "extended" version of the ZPD that reflects human emotions and desires. In this essay, Michael G. Levykh expands on the extant literature on the ZPD through developing several new ideas. First, he maintains that there is no need to expand ZPD to include emotions, as its more "conservative" dimensions (cognitive, social, cultural, and historical) already encompass affective features. Second, Levykh emphasizes that an emotionally positive collaboration between teachers and students in a caring and nurturing environment must be created from the outset. Finally, he asserts that culturally developed emotions must mediate successful establishment and maintenance of the ZPD in order to be effective. According to Levykh, Vygotsky's notion that learning can lead development represents a crucial contribution to our understanding of teaching and learning by clearly showing that emotions are vital to human learning and development.

Mantzicopoulos, P. (2005). Conflictual relationships between kindergarten children and their teachers: Associations with child and classroom context variables. *Journal of School Psychology*, 43(5), 425-42. doi:[10.1016/j.jsp.2005.09.004](https://doi.org/10.1016/j.jsp.2005.09.004)

Abstract (quoted from source):

The focus of this study was on kindergarten children's reports of teacher-child relational conflict and the associations of the reported conflict with (a) child characteristics (gender, behavior problems, and academic achievement); (b) the quality of classroom practices (teacher instructional practices, transition-to-school activities, and perceptions of support provided by the school); (c) teachers' perceptions of the classroom and school relational climates; and (d) teachers' perceptions of workload stress. These variables were examined with a group of 103 economically disadvantaged children and their kindergarten teachers in 24 public schools. There was evidence that teacher-child conflict was related to problem behaviors, teachers' perceptions of workload stress, as well as classroom instructional practices and the classroom/school relational climate.

Scoffham, S., & Barnes, J. (December 12, 2011). Happiness matters: Towards a pedagogy of happiness and well-being, *Curriculum Journal*, 22(4), 535-548.
doi:10.1080/09585176.2011.627214

Abstract (quoted from source):

The role of the emotions in learning has long been acknowledged but is often overlooked. This article considers the impact one particular emotion, happiness, has on learning and the school curriculum. Recent reports have drawn attention to the importance of happiness (or the lack of it) by highlighting concerns about childhood well-being. At the same time, there is increasing evidence from psychology and neuroscience to suggest that periods of happiness are linked to personal growth, health and development. When we are happy it seems we are more likely to be receptive to outside stimuli than when we are sad or distressed. Happiness also makes us more disposed to engage in creative endeavour, which is itself another source of fulfillment. Positive psychologists argue that rather than being fixed, happiness, optimism and other positive traits can be learnt. We offer evidence from our own professional experience in teaching to corroborate these claims and to extend the debate about the relevance of affective neuroscience to education. In conclusion, we consider how a focus on happiness might underpin a positive approach to curriculum reform.

van Praag, H., Kemermann, G., & Gage, F. H., (December 2000). Neural consequences of environmental enrichment. *Nature Reviews Neuroscience*, 1, 191-198.

doi:10.1038/35044558

Abstract (quoted from source):

Neuronal plasticity is a central theme of modern neurobiology, from cellular and molecular mechanisms of synapse formation in Drosophila to behavioral recovery from strokes in elderly humans. Although the methods used to measure plastic responses differ, the stimuli required to elicit plasticity are thought to be activity-dependent. In this article, we focus on the neuronal changes that occur in response to complex stimulation by an enriched environment. We emphasize the behavioral and neurobiological consequences of specific elements of enrichment, especially exercise and learning.

Books

Clawson, J. G., & Conner, M. (Eds.). (2004). *Creating a learning culture: Strategy, technology, and practice*. New York, NY: Cambridge University Press.

Diamond, M. (1999). *Magic trees of the mind: How to nurture your child's intelligence, creativity, and healthy emotions from birth through adolescence*. New York, NY: Plume Books.

Jensen, E. (2006). *Enriching the brain: How to maximize every learner's potential*. San Francisco, CA: Jossey-Bass.

Zull, J. E. (2002). *The art of changing the brain: Enriching the practice of teaching by exploring the biology of learning*. Sterling, VA: Stylus Publishing, LLC.

Articles

Earle, H. A. (2003). Building a workplace of choice: Using the work environment to attract and retain top talent, *Journal of Facilities Management*, 2(3), 244-257.

doi:[10.1108/14725960410808230](https://doi.org/10.1108/14725960410808230)

Hebert, E. A. (1998). Design matters: How school environment affects children. *Educational Leadership*, 56(1), 69-79.

James, D. (2010). A need for humor in online courses. *College Teaching*, 52(3), 93-120.

doi:10.3200/CTCH.52.3.93-120

Kotler, P. (1973-1974, Winter). *Atmospherics* as a marketing tool. *Journal of Retailing*, 49(4), 48-64.

Sutliff, M., Higginson, J., & Allstot, S. (2008). Building a positive learning environment for students: Advice to beginning teachers. *Strategies: A Journal for Physical and Sport Educators*, 22(1), 31-33.

Theme 17: Success

Cooper, J. E., Horn, S., & Strahan, D. B. (2005). "If only they would do their homework:"

Promoting self-regulation in high school English classes. *High School Journal*, 88(3), 10-26. doi:10.1353/hsj.2005.0001

Abstract (quoted from source):

This study examined ways that seven high school English teachers attempted to promote higher levels of self-regulation and students' responses to their efforts. Researchers met with teachers once a week for three months to design higher-order reasoning questions for assignments and quizzes, review student responses and plan instructional strategies. They functioned as participant observers in these sessions examined student homework logs, and interviewed students and teachers. Teachers' responses emphasized the value of collaboration and asking higher-order reasoning questions. Although students continued to articulate performance goals

that focused on grades and rewards, their responses demonstrated greater awareness of self-regulation and goal setting. Most students were able to use the language of self-regulation to describe relations among goals, effort, and outcomes. Results of this case study suggest that efforts to promote self-regulation more explicitly within the fabric of lessons might be productive, especially if offered for an extended amount of time.

Engin, A. O. (2009). Second language learning success and motivation. *Social Behavior and Personality: An International Journal*, 37(8), 1035-1041.

doi:10.2224/sbp.2009.37.8.1035

Abstract (quoted from source):

The aim of this study was to understand the importance of the types of motivation students need to learn a foreign language successfully. Teaching and learning a foreign language are dependent upon positive motivation. A questionnaire and an achievement test were prepared and administered to a group of 44 students. Results were analyzed and evaluations and comparisons between success and motivation levels were then used to make suggestions for planning activities relating to teaching and learning languages.

Salomon, G. (1984). Television is “easy” and print is “tough”: The differential investment of mental effort in learning as a function of perceptions and attributions. *Journal of Educational Psychology*, 76(4), 647-658. doi:10.1037/0022-0663.76.4.647

Abstract (quoted from source):

Addressed the question of how learners' a priori perceptions of message categories relate to their perceived self-efficacy in handling them, and how perceptions relate to the amount of invested mental effort (AIME) and learning. The AIME was defined as the number of nonautomatic mental elaborations applied to material and measured by learners' self-reports. It was hypothesized that in the absence of instructions, AIME expended in elaborating materials varies as a function of initial perceptions even when the material warrants otherwise. TV and print were considered categories for which children have general perceptions. 124 6th graders were tested for their perceptions of self-efficacy with print and TV, perceived media realism, and attributions of failure and success with each medium. Half the Ss viewed a silent film, while the other half read a comparable text. Measures of AIME and achievement were then taken. As expected, Ss felt more efficacious with TV, and perceived it as more realistic and easy. Print was reported to demand more effort, but led to better inference making. Efficacy correlated positively with AIME in print and negatively in TV. Discussion focuses on the roles of a priori perceptions and AIME in learning

Seifert, T. (2004). Understanding student motivation. *Educational Research*, 46(2), 137-149.

doi:10.1080/0013188042000222421

Abstract (quoted from source):

Contemporary theories of academic motivation seek to explain students' behaviours in academic settings. While each theory seems to possess its own constructs and unique explanations, these theories are actually closely tied together. In this theoretical study of motivation, several theories of motivation were described and an underlying theme of the influence of emotions was used to unify the theories. In these theories, emotions and beliefs are thought to elicit different patterns of behaviour such as pursuit of mastery, failure avoidance, learned helplessness and passive aggression. Implications emerged which focused upon creating classroom contexts that foster feelings of autonomy, competence and meaning as the catalysts for developing adaptive, constructive learning.

Books

Duhigg, C. (2012). *The power of habit: Why we do what we do, and how to change*. New York, NY: Random House.

Dweck, C. S. (2009). *Mindset, The new psychology of success*. New York, NY: Ballantine Books.

Jensen, E. (2005). *Teaching with the brain in mind* (2nd ed.). Alexandria, VA: Association for Supervision & Curriculum Development.

Mendler, A. N. (2000). *Motivating students who don't care: Successful techniques for educators*. Bloomington, IN: National Educational Service.

Purkey, W. W. & Novak, J. M. (1996). *Inviting school success: A self-concept approach to teaching, learning, and democratic practice* (3rd ed.). Belmont, CA: Wadsworth Publishing.

Articles

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology*, 84(3), 261-271. doi:10.1037/0022-0663.84.3.261

Goerg, S. J., Kube, S., & Zultan, R. (2010). Treating equals unequally: Incentives in teams, workers' motivation, and production technology. *Journal of Labor Economics*, 28(4), 747-772. doi:10.1086/653487

- Keller, J. M. (1987). Strategies for stimulating the motivation to learn. *Performance and Instruction*, 26(8), 1-7. doi:10.1002/pfi.4160260802
- Larkin, M. J. (2001). Providing support for student independence through scaffolded instruction. *Teaching Exceptional Children*, 34(1), 30-34.
- Linnenbrink, E. A. & Pintrich, P. R. (2002). Motivation as an enabler for academic success. *School Psychology Review*, 31(3), 313-327.
- Shuell, T. J. (1988). The role of the student in learning from instruction. *Contemporary Educational Psychology*, 13(3), 276-295. doi:10.1016/0361-476X(88)90027-6
- Willis, J. (2010). Inoculate against boredom: The arts in school to prevent dropping out-physically or virtually. *Radical Teaching*. [Web log post]. Retrieved from <http://www.psychologytoday.com/blog/radical-teaching/201012/inoculate-against-boredom>

Theme 18: Performance Feedback

- Bangert-Drowns, R. L., Kulik, C. C., Kulik, J. A., & Morgan, M. T. (1991). The instructional effect of feedback in test-like events. *Review of Educational Research*, 61(2), 213-238. doi:10.3102/00346543061002213

Abstract (quoted from source):

Feedback is an essential construct for many theories of learning and instruction, and an understanding of the conditions for effective feedback should facilitate both theoretical development and instructional practice. In an early review of feedback effects in written instruction, Kulhavy (1977) proposed that feedback's chief instructional significance is to correct errors. This error-correcting action was thought to be a function of presentation timing, response certainty, and whether students could merely copy answers from feedback without having to generate their own. The present meta-analysis reviewed 58 effect sizes from 40 reports. Feedback effects were found to vary with control for presearch availability, type of feedback, use of pretests, and type of instruction and could be quite large under optimal conditions. Mediated intentional feedback for retrieval and application of specific knowledge appears to stimulate the correction of erroneous responses in situations where its mindful (Salomon & Globerson, 1987) reception is encouraged.

Ferguson, P. (2011). Student perceptions of quality feedback in teacher education. *Assessment & Evaluation in Higher Education*, 36(1), 51-62. doi:10.1080/02602930903197883

Abstract (quoted from source):

Many reports have identified a perceived lack of quality in regard to assessment feedback in higher education contexts. One research study in 2007 on undergraduate university students found that less than half of the students (46%) collected their formative feedback, suggesting that from their perspective feedback clearly was not fulfilling the role it should. This is a study of 465 graduate students and 101 undergraduate students studying teacher education at a major Australian university. The study investigated what students perceived to be effective, quality feedback based upon their extensive higher education experiences. Students identified preferences in regard to form, detail and timing of assessment feedback. The data were collected by means of pen and paper survey and identified which strategies the students perceived to be the most effective, particularly within the context of large cohort teaching and written assessment formats. Findings agreed with research elsewhere regarding problems with assessment feedback quality and quantity, but students also provided clear indications of how realistic improvements could be made in terms of assessment feedback processes and strategies.

Finn, B., & Metcalfe, J. (2010). Scaffolding feedback to maximize long-term error correction.

Memory & Cognition, 38(7), 951-961. doi:10.3758/MC.38.7.951

Abstract (quoted from source):

Scaffolded feedback was tested against three other feedback presentation methods (standard corrective feedback, minimal feedback, and answer-until-correct multiple-choice feedback) over both short- and long-term retention intervals in order to assess which method would produce the most robust gains in error correction. Scaffolded feedback was a method designed to take advantage of the benefits of retrieval practice by providing incremental hints until the correct answer could be self-generated. In Experiments 1 and 3, on an immediate test, final memory for the correct answer was lowest for questions given minimal feedback, moderate for the answer-until-correct condition, and equally high in the scaffolded feedback condition and the standard feedback condition. However, tests of the maintenance of the corrections over a 30-min delay (Experiment 2) and over a 1-day delay (Experiment 3) demonstrated that scaffolded feedback gave rise to the best memory for the correct answers at a delay.

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*,

77(1), 181-112. doi:10.3102/003465430298487

Abstract (quoted from source):

Feedback is one of the most powerful influences on learning and achievement, but this impact can be either positive or negative. Its power is frequently mentioned in articles about learning and teaching, but surprisingly few recent studies have systematically investigated its meaning.

This article provides a conceptual analysis of feedback and reviews the evidence related to its impact on learning and achievement. This evidence shows that although feedback is among the major influences, the type of feedback and the way it is given can be differentially effective. A model of feedback is then proposed that identifies the particular properties and circumstances that make it effective, and some typically thorny issues are discussed, including the timing of feedback and the effects of positive and negative feedback. Finally, this analysis is used to suggest ways in which feedback can be used to enhance its effectiveness in classrooms.

Lieberman, D .A., Vogel, A. C., & Nisbet J. (2008). Why do the effects of delaying reinforcement in animals and delaying feedback in humans differ? A working-memory analysis. *Quarterly Journal of Experimental Psychology*, 61(2), 194-202.

doi:10.1080/17470210701557506

Abstract (quoted from source):

Animal research has shown that reinforcement is substantially less effective when it is delayed, but in studies of human motor learning delays in providing feedback typically have much less effect. One possible explanation is that in human research participants know the response to be learned and can thus focus on it during the delay; that is not the case in experiments on animals. We tested this hypothesis using a task in which participants had minimal information on what movement was correct and found that, as in animal experiments, participants learned only when feedback was immediate. A second experiment confirmed that the effects of the delay depended on how many responses had to be held in working memory: the greater the memory load, the poorer the learning. The results point to the importance of activity during a delay on learning; implications for the teaching of motor skills are discussed.

Books

Brookhart, S. M. (2009). *How to give effective feedback to your students*. Alexandria, VA:

Association for Supervision and Curriculum Development.

Chappuis, J. (2009). *Seven strategies of assessment for learning*. Boston, MA: Allyn & Bacon.

Marzano, R. J., Pickering, D., & Pollock, J. E. (2004). *Classroom instruction that works,*

Research-based strategies for increasing student achievement. Alexandria, VA:

Association for Supervision and Curriculum Development.

Schmidt, R. A., & Lee, T. D. (2007). *Motor control and learning, a behavioral emphasis*. (4th ed.). Champaign, IL: Human Kinetics Publishers.

Weitzel, S. (2000). *Feedback that works; How to build and deliver your message*. Greensboro, NC: Center for Creative Leadership.

Articles

Bowman, Jr., R. F. (1982). A 'Pac-Man' theory of motivation: Tactical implications for classroom instruction. *Educational Technology*, 22 (9), 14-16.

The Highland Curriculum for Excellence. (2001). "How am I doing?" - Assessment and feedback to learners. Retrieved from http://www.hvllc.org.uk/ace/aifl/docs/B1/How_am_I_doing.pdf

Lorenzet, S. J., Cook, R. G., & Ozeki, C. (2006). Improving performance in very small firms through effective assessment and feedback, *Education + Training*, 48(8/9), 568-583. doi:10.1108/00400910610710010

Nawaz1, N., Jahanian, A., & Manzoor, S. W. (2012). Critical elements of the constructive performance. *European Journal of Business and Management*, 4(7), 76-84.

Parson, M. (2001, January 1). Enthusiasm and feedback: A winning combination! *PE Central*. Retrieved from <http://www.pecentral.org/climate/monicaparsonarticle.html>.

Sadler, D. R. (1989). Formative assessment and the design of instructional systems. *Instructional Science*, 18(2), 119-144. doi:10.1007/BF00117714

Theme 19: Stagecraft

Gelula, M. H. (1997). Effective lecture presentation skills. *Surgical Neurology*, 47(2), 201-204. doi:10.1016/S0090-3019(96)00344-8

Abstract (quoted from source):

Lectures are the most popular form of teaching in medical education. As much as preparation and organization are key to the lecture's success, the actual presentation also depends upon the presenter's ability to reach the audience. Teaching is a lively activity. It calls for more than just offering ideas and data to an audience. It calls for direct contact with the audience, effective use of language, capability to use limited time effectively, and the ability to be entertaining. This

article offers a structure to effective lecturing by highlighting the importance of voice clarity and speaking speed, approaches to using audiovisual aids, effectively using the audience to the lecture, and ways to be entertaining.

Javidi, M. M., Downs, V. C., & Nussbaum, J. F. (1988). A comparative analysis of teachers' use of dramatic style behaviors at higher and secondary educational levels. *Communication Education*, 37(4), 278-288.

Abstract (quoted from source):

The present investigation provides comparative data on the use of humor, self-disclosure, and narrative by award-winning teachers at college and secondary levels. The frequency in usage of these three dramatic style behaviors by award-winning and non-award winning teachers at these levels is also compared. Significant differences were found between award-winning college and secondary level teachers in their use of humor. Award-winning college and high school teachers did not differ significantly in their use of self-disclosure and narrative during 50-minutes of lecturing. However, both award-winning college and high school teachers significantly differed from award-winning mid-high teachers in use of both self-disclosure and narrative. The results also indicate that the award-winning teachers consistently utilized humor, self-disclosure, and narrative in order to clarify course content, and this usage was significantly higher than the non-award winning teachers from the same educational levels.

Lance, T. S. (2012). Using cultural products to teach onomatopoeia in Japanese as a foreign language (JFL) classrooms. (Master's thesis, California State University, Long Beach, CA). Retrieved from <http://hdl.handle.net/10211.4/463>

Abstract (quoted from source):

The Japanese language has an abundance of onomatopoeic and mimetic expressions. Native speakers use this unique feature of the language frequently. However, in the reading of Japanese authentic materials, such as literature, newspapers and advertisements, many intermediate to advanced JFL students are unable to understand the meaning of onomatopoeia. The purpose of this project is to provide Japanese as a foreign language (JFL) teachers and students effective and easy-to-use teaching materials focusing on onomatopoeia, presented through the use of authentic cultural products such as literature, music and song, newspapers, and advertisements. Commonly used and highly functional onomatopoeia words, phrases, and expressions are presented with abundant examples of English translations. Useful resources are listed to facilitate selection of materials. This project focuses on teaching Japanese onomatopoeic and mimetic words in JFL classrooms, using Japanese cultural products. Depicting not only various sounds and voices produced by animated beings and inanimate objects, Japanese onomatopoeias and mimesis also describe "non-audible" situations, such as appearance, scenes, and psychological states of living things, including humans and animals. This type of lexicon is not adequately addressed in JFL classrooms, despite its unique and effective functions (mainly as adverbs), and frequent use

in daily life. Japanese onomatopoeia have rich and unique cultural and linguistic elements. By learning onomatopoeia via authentic materials, such as the cultural products introduced in the appendices of this project, JFL learners can more effectively acquire onomatopoeia in a natural way. When JFL students acquire this important linguistic aspect of language, they are able to deepen their understanding of Japanese culture, and develop more native-like, natural expressions and communicative competence.

Nunes, M. A. S., Dihl, L. L., Fraga, L. M., Woszezenki, C. R., Oliveira, L., Francisco, D. J., &

Notargiacomo, M. D. G. (2010). Animated pedagogical agent in the intelligent virtual teaching environment. *Digital Education Review*, 4, 53-61.

Abstract (quoted from source):

This paper presents the evolution description and relevance of IVTE- Intelligent Virtual Teaching Environment project in terms of Artificial Intelligence and Artificial Intelligence in Education field. Furthermore, it describes the importance of Multi-agents modeling used in the IVTE software and also gives emphasis in the Cognitive Agent Model represented by an Animated Pedagogical Agent. The purpose of IVTE software is to educate children to preserve the environment. The IVTE software is implemented with Multi-agent (MAS) and Intelligent Tutoring Systems (ITS) technology, which gives more adaptable information to the teaching process. The adaptable information is promoted by Tutor of ITS or, in other words, by Animated Pedagogical Agent. The Animated Pedagogical Agent monitors, guides and individualizes the learning process using student model and teaching strategies.

Pineau, E. L. (1994). Teaching is performance: Reconceptualizing a problematic metaphor.

American Educational Research Journal, 31(1), 3-25. doi:10.3102/00028312031001003

Abstract (quoted from source):

Analogies between teaching and performance have recently emerged in educational literature, but with a reductive, actor-centered perspective that diminishes the complexity of both performative and instructional phenomena. This article reconceptualizes performance as a generative metaphor for educational research based on theoretical and methodological points of contact between instructional communication and performance studies. It asks which aspects of educational experience open themselves up to performance-centered research and explores issues around which new research agendas can be developed in both disciplines.

Books

Allen, R. (2008). *Green light classrooms: Teaching techniques that accelerate learning.*

Thousand Oaks, CA: Corwin Press.

Cohen, R. (2007). *Acting one* (5th ed.). New York, NY: McGraw Hill Education.

Gillard, M. (1996). *Storyteller, storyteacher: Discovering the power of storytelling for teaching and living.* York, ME: Stenhouse Publishers.

Hake, H. V. (1958). *Here's how!: A basic stagecraft book.* New York, NY: Samuel French.

Heppner, F. (2007). *Teaching the large college class: A guidebook for instructors with multitudes.* San Francisco, CA: Jossey-Bass.

Johnson, B., & McElroy, T. M. (2010). *The edutainer: Connecting the art and science of teaching.* Lanham, MD: Rowman & Littlefield Education.

Lowman, J. (1995). *Mastering the techniques of teaching* (2nd ed.). San Francisco, CA: Jossey-Bass.

Ready, T. (2000). *Grammar wars: 179 Games and improvs for learning language arts.* Downers Grove, IL: Meriwether Publisher.

Spolin, V. (1986). *Theater games for the classroom: A teacher's handbook.* Evanston, IL: Northwestern University Press.

Tauber, R. T., & Mester, C. S. (2007). *Acting lessons for teachers: Using performance skills in the classroom* (Vol. 38). Westport, CT: Praeger Publishers.

Timpson, W. M., & Burgoyne, S. (2002). *Teaching & performing ideas for energizing your classes*. Madison, WI: Atwood Publishing.

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Astrachan, O. (1998). Concrete teaching: Hooks and props as instructional technology. *ACM SIGCSE Bulletin*, 30(3), 21-24. doi:10.1145/290320.283003

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Engvall, C. (2008, July 13). Stage craft: Taking cues from theater class to help make math and science fun. *Edutopia.org*. Retrieved from <http://www.edutopia.org/math-science-emotional-impact>

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Renée, C. (2011, July 31). Why language teachers should teach with props. [Web log post]. Retrieved from <http://ideasforfrenchclass.blogspot.com/2011/07/why-language-teachers-should-teach-with.html>

Rubin, L. (1983). Artistry in teaching. *Educational Leadership*, 40(4), 44-9.

Speaker, S. L. (1995). Getting engaged: Using the time machine to teach history. *The History Teacher*, 28(4), 513-522. doi:10.2307/494639

Travers, R. M. W. (1979). Training the teacher as a performing artist. *Contemporary Education*, 51(1), 14-18.

Theme 20: Complementary Elements

Badger, R., & White, G. (2000). A process genre approach to teaching writing. *ELT Journal*, 54(2), 153-160. doi:10.1093/elt/54.2.153

Abstract (quoted from source):

This paper analyses the strengths and weaknesses of product, process, and genre approaches to writing in terms of their view of writing and how they see the development of writing. It argues that the three approaches are complementary, and identifies an approach which is informed by each of them.

Kirsh, D. (1995, July). Complementary strategies: Why we use our hands when we think. In J.

Moore, & J. Lehman (Eds.), *Proceedings of the Seventeenth Annual Conference of the*

Cognitive Science Society (pp. 212-217). Mahwah, NJ: Lawrence Erlbaum Associates.

Abstract (quoted from source):

A complementary strategy can be defined as any organizing activity which recruits external elements to reduce cognitive loads. Typical organizing activities include pointing, arranging the position and orientation of nearby objects, writing things down, manipulating counters, rulers or other artifacts that can encode the state of a process or simplify perception. To illustrate the idea of a complementary strategy, a simple experiment was performed in which subjects were asked to determine the dollar value of collections of coins. In the no-hands condition, subjects were not allowed to touch the coin images or to move their hands in any way. In the hands condition, they were allowed to use their hands and fingers however they liked. Significant improvements in time and number of errors were observed when S's used their hands over when they did not. To explain these facts, a brief account of some commonly observed complementary strategies is presented, and an account of their potential benefits to perception, memory and attention.

Van Merriënboer, J. J., Kester, L., & Paas, F. (2006). Teaching complex rather than simple tasks:

Balancing intrinsic and germane load to enhance transfer of learning. *Applied Cognitive*

Psychology, 20(3), 343-352. doi:10.1002/acp.1250

Abstract (quoted from source):

Research indicates that effective instructional methods for practicing simple tasks differ from effective methods for complex tasks. But unfortunately, load-reducing methods that work relatively well to reach high retention performance for complex tasks, such as low variability and complete guidance and feedback, are precisely those methods that hinder transfer of learning. This article presents a training design approach aimed at high transfer performance for complex tasks. The basic idea is that learning tasks should always be combined with methods that induce germane cognitive load, such as high variability and limited guidance or feedback. However, especially for novices, this can only be realized by decreasing intrinsic load early in training by manipulating the element interactivity of the learning tasks.

Vare, P., & Scott, W. (2007). Learning for a change: Exploring the relationship between education and sustainable development. *Journal of Education for Sustainable Development*, 1(2), 191-198. doi:10.1177/097340820700100209

Abstract (quoted from source):

Whether we view sustainable development as our greatest challenge or a subversive litany, every phase of education is now being urged to declare its support for education for sustainable development (ESD). In this paper, we explore the ideas behind ESD and, building on work by Foster and by Scott and Gough, we argue that it is necessary now to think of two complementary approaches: ESD 1 and ESD 2. We see ESD 1 as the promotion of informed, skilled behaviours and ways of thinking, useful in the short-term where the need is clearly identified and agreed, and ESD 2 as building capacity to think critically about what experts say and to test ideas, exploring the dilemmas and contradictions inherent in sustainable living. We note the prevalence of ESD 1 approaches, especially from policy makers; this is a concern because people rarely change their behaviour in response to a rational call to do so, and more importantly, too much successful ESD 1 in isolation would reduce our capacity to manage change ourselves and therefore make us less sustainable. We argue that ESD 2 is a necessary complement to ESD 1, making it meaningful in a learning sense. In this way we avoid an either-or debate in favour of a yes-and approach that constantly challenges us to understand what we are communicating, how we are going about it and, crucially, why we are doing it in the first place.

Wills, S., Ip, A., & Bunnett, A. (2000). Complementary pedagogical strategies for online design. In R. Sims, M. O'Reilly, & S. Sawkins (Eds.), *Learning to choose - Choosing to learning. Proceedings of the 17th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE)* (pp. 405-414). Lismore, NSW Australia: Southern Cross University Press.

Abstract (quoted from source):

The First Fleet Convict Database has had a 20 year journey as an exemplar of educational software, published first on mainframe, then microcomputer, and now the web. We describe how the nature of the web environment has changed the nature of this educational package. Pedagogically, databases of primary source data provide students with a learning experience based on the inquiry learning model however, observations of students and teachers in the past 20 years have indicated that database searching is shallow and investigation perfunctory. Before, we could have blamed unwieldy search engines. Now that this obstacle appears to have been removed, we are evaluating whether we have achieved our educational goal of improving students' research skills. Other pedagogical strategies have been added to that of the database strategy, for example a discussion forum to enable learners to publish and debate their opinions on history. However our statistics show that the forum is the least used part of the site. Although

this in part can be solved via classroom teaching, we have added another pedagogical strategy to complement the others. Online role play engages students in developing an understanding of the lives of others and hopefully encourages discussion about the content of the supporting database.

Books

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- Carlson, J. S., & Levin, J. R. (2011). *Instructional strategies for improving students' learning: Focus on early reading and mathematics*. Charlotte, NC: Information Age Publishing.
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- Doczi, G. (1986). Seen and unseen symmetries: A picture essay. *Computers & Mathematics with Applications*, 12(1), 39-62. doi:10.1016/0898-1221(86)90138-0

Lipton, P. A., & Eichenbaum, H. (2008). Complementary roles of hippocampus and medial entorhinal cortex in episodic memory. *Neural Plasticity*, 2008, 1-8.

doi:10.1155/2008/258467

Purao, S. (1998). Hyper-link teaching and intelligent slides: Complementary strategies to foster active learning. *Journal of Education for MIS*, 5(1), 63-78.

Wei-Ming, W. (n.d.). *Yin Yang and Dao*. Retrieved from

[http://www.butte.edu/~wmwu/Shared%20Thoughts/Yin%20Yang%20and %20Dao.html](http://www.butte.edu/~wmwu/Shared%20Thoughts/Yin%20Yang%20and%20Dao.html)

Theme 21: Time and Timing

Frijda, N. H. (1987). Emotion, cognitive structure, and action tendency. *Cognition and Emotion*, 1(2), 115-143. doi:10.1080/02699938708408043

Abstract (quoted from source):

In current cognitive emotion theory emotional experiences are described as particular types of cognitive structures. Two studies are reported that test an implication of this theory, namely, the prediction that intuitive similarity of emotion or mood states corresponds with similarity between such structures. Cognitive structures of different emotions ("appraisal profiles") were obtained by having subjects rate a number of emotions or mood words as to presence of a number of appraisal components. Intuitive similarity measures consisted of correlations between mood adjective questionnaire items and (in Study 2) outcomes of a word sorting task. High correspondence was found between appraisal profile similarities and intuitive similarities. Exploratory analyses confirmed the importance of several appraisal components discussed in the literature and provided tentative evidence for some additional ones. In a third study, the hypothesis was explored that cognitive structures of emotions also include representations of action readiness. Subjects were presented with 30 of the emotion words used in Study 2. Remembered or imagined experiences of each of the emotions were rated in terms of 16 modes of action readiness. High agreement was obtained in assigning action readiness modes to emotions. Strong correlations existed between particular appraisal patterns and particular forms of action readiness. Similarity in action readiness profiles showed correspondence with appraisal pattern similarity and with the indices of intuitive similarity.

Madsen, C. K., Standley, J. M., & Cassidy, J. W. (1989). Demonstration and recognition of high and low contrasts in teacher intensity. *Journal of Research in Music Education*, 37(2),

85-92. doi:10.2307/3344700

Abstract (quoted from source):

The purpose of this study was to investigate teacher intensity, the global attributes of enthusiasm combined with an astute sense of timing in relation to classroom management and effective subject presentation and delivery. The authors also tried to ascertain whether high and low contrasts in teacher intensity could be taught to and then demonstrated by prospective music education student teachers (n = 20) and whether other music education majors untrained in the concept of intensity could recognize these contrasts (freshmen, n = 23; seniors, n = 22; and graduate students, n = 29). Results of the study indicated that intensity as a concept could be operationally defined, easily taught to prospective student teachers, ably demonstrated, and recognized with an extremely high degree of reliability across levels of sophistication within the music education major.

Sanford, J. P., & Evertson, C. M. (1983). Time use and activities in junior high classes. *The Journal of Educational Research*, 76(3), 140-147.

Abstract (quoted from source):

Time use in different activities in junior high school is described, and relationships between class time use and student achievement, behavior and attitude are examined. A total of 102 English and mathematics classes were observed for about 9 hours each. Data included descriptive narratives, time logs, student engagement ratings and observer ratings of student and teacher behavior. Results showed that there is much variation in the way individual junior high school teachers use class time, within a limited number of activity structures. Significant relationships were found between time use and class achievement and attitude in mathematics classes, but not in English classes.

Tong, A. K. Y. (2001). Linking and timing information presentation in multimedia educational systems. *Journal of Educational Multimedia and Hypermedia*, 10(2), 185-203

Abstract (quoted from source):

Linking and timing what is to be presented to the learner is particularly important in multimedia educational environments, especially when the same piece of material can be presented to the learner in different media, often more than once. This article addresses the linking and timing attributes of the presentation of learning material in multimedia educational systems by way of a control in teaching strategy selection. The control mechanism is illustrated through the model for teaching strategy selection. The model is based on factors that affect human teachers in their teaching strategy selection, which in turn governs the decision of which piece of material to present, and the timeliness of such. The benefits of the model are demonstrated through ARISTOTLE, a multimedia education system in which the model is deployed.

Books:

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- Gordon, B. (2005). *Business and sales humor writing and delivery skills guidebook*. Los Angeles, CA: University of Health Care.
- Jensen, E. (Ed.). (2008). *Super teaching: Over 1000 practical strategies*. Thousand Oaks, CA: Corwin Press.
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- Russell, J., & Russell, L. (2006). *Change basics*. Alexandria, VA: American Society for Training and Development.
- Sharma, P. L. (2006). *Learning readiness*. New Delhi, India: Sarup & Sons
- Smith, T. E., & Knapp, C. E. (Eds.). (2011). *Sourcebook of experiential education: Key thinkers and their contributions*. Taylor & Francis e-Library.

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doi:10.1002/tea.3660130304
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- Gundersen, G., & Williams, J. M. (1998). Rehearsal pacing of expert middle school, high school, and university choral and instrumental conductors. *Texas Music Educators Association*, 33-38.
- Horn, B. J. (1990). Facilitating self care practices in the elderly. *Home Health Care Services Quarterly*, 11(1-2), 1-8.
- Milani, M. (n.d.). *Slow and fast dogs: The canine sense of time*. Retrieved from <http://www.mmilani.com/canine-timing.html>
- Morrison, J. E., & Fletcher, J. D. (2002). *Cognitive readiness* (No. IDA-P-3735). Alexandria, VA: Institute for Defense Analyses. Retrieved from Defense Technical Information Center <http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA417618>
- Vacca, R. T. (1977). Readiness to read content area assignments. *Journal of Reading*, 20(5) 387-392.

Theme 22: Personal Presence

- Beebe, S. A. (1980, November). *The role of nonverbal communication in education: Research and theoretical perspectives*. Paper presented at the Annual Meeting of the Speech Communication Association, New York, NY.

Abstract (quoted from source):

This paper reviews several studies that have sought to explain the role of nonverbal communication in education contexts. The specific areas that are explored include kinesics, eye contact, paralanguage, classroom environment, proxemics, and physical appearance. After reviewing research in these areas, the paper examines the research conclusions both in general and for each area. One of the conclusions presented is that teacher education programs should not ignore the impact of teacher-controlled nonverbal communication variables in affecting student achievement and student attitudes toward learning.

- Hart, R. (2007). *Act like a teacher: Teaching as a performing art*. Available from ProQuest Dissertation and Theses database. (UMI No. AAT 3275803)

Abstract (quoted from source):

This study involved the creation and implementation of an acting course for educators, entitled Teaching as a Performing Art. The primary objective of this course was to aid the course participants in their role development by providing them the space and technical support (through arts training) to experiment with different ways of being in the classroom. The nine participants in this experiential learning course performed the work of the actor/performing artist and developed the articulate voices and bodies critical for communication and presentation in the classroom arena. Simultaneously the participants practiced using the new skills to consciously shape and rehearse their emerging teacher selves, the roles they would play when they enter the practicum classroom as a teacher. Additional data was collected on two of the participants as they completed their student teaching practica the following semester. Results indicate that new teachers have several performance obstacles to overcome in the creation of efficient and effective teacher roles including: indecision, terror, assumption, embarrassment, denial, extremism and ennui. The findings catalog a number of arts-based activities that enable new teachers to move toward improved ways of being in the classroom by embodying strategy, courage, awareness, presence, honesty, poise and excellence.

Meijer, P. C., Korthagen, F. A. J., & Vasalos, A. (2009). Supporting presence in teacher education: The connection between the personal and professional aspects of teaching.

Teaching and Teacher Education, 25, 297-308.

Abstract (quoted from source):

This study follows one individual student teacher during a period of one single school year in which she was supported in developing 'presence' while teaching. The notion of 'presence' was formulated by the teacher herself, and coincides with the growing interest in this aspect in psychology, and in theories about becoming a teacher. In her supervision, the so-called core reflection approach was used, which strongly builds on the concept of presence and on positive psychology. Based on analyses of audio taped supervisory sessions, six stages were identified in the teacher's development. These stages are described and related to theories about positive psychology and core reflection. The supervisor's interventions leading to the transitions between the stages were identified, analyzed, and related to key principles of core reflection. It appeared that the teacher's growth not only led to experiencing 'presence' while teaching, but also to a greater use of her personal qualities. Taken together, it appeared that after the supervision the teacher was much more 'in flow', and that she was more effective as a teacher. In this article, both the teacher's growth and the supervisor's interventions are described in detail, and illustrated using quotations from supervisory sessions, logbooks, and interviews. A case is made for connecting professional and personal aspects in supervising student teachers.

Özmen, K. S. (2010). Acting and teacher education: being model for identity development.

Turkish Online Journal of Qualitative Inquiry, 2(2). 36-49.

Abstract (quoted from source):

This study follows three pre-service teachers during three academic semesters in which they took an acting course for teachers and participated in practicum with a special focus on rehearsing and developing their teacher identities. In order to create the necessary context for them, an acting course for pre-service teacher education was designed in parallel with a model which is based on an influential acting theory. This model, namely the BEING (Believe, Experiment, Invent, Navigate, Generate), was also designed by the researcher. The incentive behind designing a model grounded on acting literature was that the relevant literature does not provide trainers with a universal model which can be referred as a manual for running and monitoring acting courses for teachers. In this case study, this model was also tested in terms of its applicability and functionality in practice. Based on analyses of audio taped interviews, session journals and reflections, the five stages of the BEING Model was found to be highly applicable and functional in terms of reflecting the natural development process of teacher identity development. Pre-service teachers displayed a significant development in communication skills and professional identities. Therefore, the BEING model provides a perspective and a philosophy of benefiting from acting literature for teacher educators with little or no knowledge on acting and theatre.

Tartwijk, J. V., Brekelmans, M., Wubbels, T., Fisher, D. L., & Fraser, B. J. (1998). Students' perceptions of teacher interpersonal style: The front of the classroom as the teacher's stage. *Teaching and Teacher Education*, 14(6), 607-617.

Abstract (quoted from source):

In previous research, associations were shown between students' perceptions of teacher interpersonal style and variables such as student outcomes and problems with order in the classroom. In the study described in this paper, associations are investigated between these students' perceptions and judges' ratings of the interpersonal aspect of videotaped teacher behaviour. Judges only saw one minute of videotaped teacher behaviour during either whole class teaching or individual seatwork. Strong correlations were established between students' perceptions and judges' ratings of teacher behaviour during whole class teaching. No significant correlations were found between students' perceptions and judges' ratings of teacher behaviour during individual seatwork. It is argued that students' perceptions of teacher interpersonal style are primarily formed when the teacher is in front of the classroom. At those moments a working climate is created that lasts for the whole lesson and beyond.

Books

- Booher, D. (2011). *Creating personal presence: Look, talk, think, and act like a leader*. San Francisco, CA: Berrett-Koehler Publishers.
- Esquith, R. (2007). *Teach like your hair's on fire: The methods and madness inside room 56*. New York, NY: Viking Press.
- Fairhurst, A. M., & Fairhurst, L. L. (1995). *Effective teaching, effective learning: Making the personality connection in your classroom*. Palo Alto, CA: Davies-Black Publishing.
- Fried, R. L. (2001). *The passionate teacher: A practical guide*. Boston, MA: Beacon Press.
- Grasha, A. F. (1996). *Teaching with style: A practical guide to enhancing learning by understanding teaching and learning styles*. Pittsburgh, PA: Alliance Publishers.
- Gruwell, E. (2007). *Teach with your heart: Lessons I learned from the freedom writers*. New York: Crown Publishing Group.
- Littauer, F. (1992). *Personality plus*. Grand Rapids, MI: Revell.
- Parini, J. (2005). *The art of teaching*. New York, NY: Oxford University Press.
- Rodgers, C., & Scott, K. (2008). The development of the personal self and professional identity in learning to teach. In M. Cochran-Smith, S. Feiman-Nemser, D. J. McIntyre, & K. E. Demers (Eds.), *Handbook of research on teacher education: Enduring questions and changing contexts* (pp. 732–755). New York, NY: Routledge.
- Sjodin, T. L. (2001). *New sales speak: The 9 biggest sales presentation mistakes & how to avoid them*. New York, NY: Wiley.
- Stanislavski, C. (1989). *An actor prepares* (E.R. Hapgood, Trans.). New York, NY: Routledge.

Articles

- Banner Jr., J. M., & Cannon, H. C. (1997). The personal qualities of teaching what teachers do cannot be distinguished from who they are. *Change: The Magazine of Higher Learning*, 29(6), 40-43. doi:10.1080/00091389709602345
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- Brigham, F. J., Scruggs, T. E., & Mastropieri, M. A. (1992). Teacher enthusiasm in learning disabilities classrooms: Effects on learning and behavior. *Learning Disabilities Research and Practice*, 7, 68-73.
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- Nias, J. (1987). Teaching and the self. *Cambridge Journal of Education*, 17(3), 178-185. doi:10.1080/0305764870170313
- Sandoval, V. A., & Adams, S. H. (2001). Subtle skills for building rapport. *FBI Law Enforcement Bulletin*, 70(8), 1-9.
- Slekar, T. D. (2006). Preaching history in a social studies methods course: A portrait of practice. *Theory & Research in Social Education*, 34(2), 241-258. doi:10.1080/00933104.2006.10473306

Strean, W. B. (2008). Evolving toward laughter in learning. *Collected Essays on Learning and Teaching, 1*, 75-79.

Theme 23: Delight

Hamann, S. B., Ely, T. D., Grafton, S. T., & Kilts, C. D. (1999). Amygdala activity related to enhanced memory for pleasant and aversive stimuli. *Nature Neuroscience, 2*(3), 289-293.
doi:10.1038/6404

Abstract (quoted from source):

Pleasant or aversive events are better remembered than neutral events. Emotional enhancement of episodic memory has been linked to the amygdala in animal and neuropsychological studies. Using positron emission tomography, we show that bilateral amygdala activity during memory encoding is correlated with enhanced episodic recognition memory for both pleasant and aversive visual stimuli relative to neutral stimuli, and that this relationship is specific to emotional stimuli. Furthermore, data suggest that the amygdala enhances episodic memory in part through modulation of hippocampal activity. The human amygdala seems to modulate the strength of conscious memory for events according to emotional importance, regardless of whether the emotion is pleasant or aversive.

Jordan, P. W. (1998). Human factors for pleasure in product use. *Applied Ergonomics, 29*(1), 25-33. doi:10.1016/S0003-6870(97)00022-7

Abstract (quoted from source):

Traditionally, human factors have tended to concentrate on making products 'usable'—focusing on utilitarian, functional product benefits. This paper reports an interview-based study looking at the issue of 'pleasure' in product use. The study was a 'first pass' at addressing the hedonic and experiential benefits and penalties associated with product use, and at identifying the properties of a product that influence how pleasurable or displeasurable it is to use. Feelings associated with using pleasurable products included security, confidence, pride, excitement and satisfaction. Displeasurable products, meanwhile, were associated with feelings that included annoyance, anxiety, contempt and frustration. The properties of products that were salient in terms of influencing the level of pleasure/displeasure with a product included features, usability, aesthetics, performance and reliability. Responses to questions investigating behavioural correlates to pleasure in product use suggested that pleasurable products were used more regularly and that future purchase choices would be affected by the level of pleasure in product use. It is concluded that the issue of pleasure in product use involves more than usability alone. As the user's representative in the product creation process, the human factors specialist should consider many other factors in order to ensure that the user's experience of product use is maximized.

Kirchhoff, B. A., Wagner, A. D., Maril, A., & Stern, C. E. (2000). Prefrontal–temporal circuitry for episodic encoding and subsequent memory. *The Journal of Neuroscience*, 20(16), 6173-6180.

Abstract (quoted from source):

Humans encounter and form memories for multiple types of experiences that differ in content, novelty, and memorability. Critical for understanding memory is determining (1) how the brain supports the encoding of events with differing content and (2) whether neural regions that are sensitive to novelty also influence whether stimuli will be subsequently remembered. This event-related functional magnetic resonance imaging (fMRI) study crossed content (picture/word), novelty (novel/repeated), and subsequent memory (remembered/forgotten) to examine prefrontal and temporal lobe contributions to encoding. Results revealed three patterns of encoding-related activation in anatomically connected inferior prefrontal and lateral temporal structures that appeared to vary depending on whether visuospatial/visuo-object, phonological/lexical, or semantic attributes were processed. Event content also modulated medial temporal lobe activity; word encoding predominately activated the left hemisphere, whereas picture encoding activated both hemispheres. Critically, in prefrontal and temporal regions that were modulated by novelty, the magnitude of encoding activation also predicted whether an event would be subsequently remembered. These results suggest that (1) regions that demonstrate a sensitivity to novelty may actively support encoding processes that impact subsequent explicit memory and (2) multiple content-dependent prefrontal–temporal circuits support event encoding. The similarities between prefrontal and lateral temporal encoding responses raise the possibility that prefrontal modulation of posterior cortical representations is central to encoding.

Lepper, M. R., & Cordova, D. I. (1992). A desire to be taught: Instructional consequences of intrinsic motivation. *Motivation and Emotion*, 16(3), 187-208. doi:10.1007/BF00991651

Abstract (quoted from source):

This paper summarizes the results from a series of studies designed to test the hypothesis that making learning more fun will produce corresponding increases both in learning and retention and in subsequent interest in the subject matter itself. Each study examined the effects of two or more versions of an educational activity, each designed to involve identical instructional content, but to differ in motivational appeal. The data from the studies presented provide good general support for the hypothesized cognitive and motivational benefits of appropriately designed motivational embellishments of educational activities. Exceptions to this rule, however, and a more general theoretical analysis of the conditions under which such positive effects are (and are not) expected to occur, are also discussed.

Ludden, G. D., Schifferstein, H. N., & Hekkert, P. (2007). Surprising the senses. *The Senses and Society*, 2(3), 353-359.

Abstract (quoted from source):

We perceive the world around us and the objects in it with all our senses. Designers can therefore influence the way we experience everyday products by paying attention to the multiple sensory aspects of products. When sensory information from two or more senses conflicts, people can be surprised. Currently, more and more product designers are experimenting with designing products that provide incongruent sensory information. Creating such products enables these designers to evoke interest for their products and let people experience something new. In several studies, we have investigated people's reactions to and opinions about products with sensory incongruities. The results of our studies suggest that evoking surprise by incorporating sensory incongruities in products can be seen as a means to create more pleasurable product experiences.

Madrigal, R., Bee, C., Chen, J., & LaBarge, M. (2011). The effect of suspense on enjoyment following a desirable outcome: The mediating role of relief. *Media Psychology, 14*(3), 259-288. doi:10.1080/15213269.2011.596469

Abstract (quoted from source):

Although endemic to many forms of media entertainment, suspense represents a paradox for enjoyment because it is experienced as an aversive state. Three studies are presented across two media contexts demonstrating how outcomes to suspenseful episodes affect viewers' relief. Study 1 shows that relief is elicited only when a film's outcome is unambiguously favorable and under such conditions is positively related to enjoyment. No such relationship was found given an ambiguous outcome. Study 1 provides evidence that relief is distinct from other affective responses (i.e., positive and negative affect, surprise) that may be present following suspense. Studies 2 and 3 use competitive contests as a context and provide evidence that relief mediates the effect of suspense on enjoyment. Study 2 shows that the previously positive effects of suspense and expectation disconfirmation on enjoyment are obviated in the presence of relief. Study 3 varies suspense in real time across 14 simulated races. Also manipulated are affective dispositions toward the racers and race outcome. The results reveal that relief mediates the effect of suspense on enjoyment, but only when the outcome favors a preferred competitor. The research enhances our understanding of the intertwining of cognition and affect in the enjoyment of suspense.

Nagengast, S. L., Baun, M. M., Megel, M., & Michael Leibowitz, J. (1997). The effects of the presence of a companion animal on physiological arousal and behavioral distress in children during a physical examination. *Journal of Pediatric Nursing, 12*(6), 323-330.

Abstract (quoted from source):

The purpose of this study was to examine the effects of the presence of a companion animal on physiological arousal and behavioral distress exhibited by preschool children during a routine physical examination. A within-subject, time-series design was used to study 23 healthy children ages 3 years to 6 years during two physical examinations, with and without a dog. Statistically significant differences were found with greater reductions in subjects' systolic and mean arterial pressure, heart rate, and behavioral distress when the dog was present. Findings support the use of a companion animal in reducing stress experienced by children during a physical examination.

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