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UNLOCKING THE HUMAN POTENTIAL TO LEARN

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EMPOWERING ADULTS TO LEARN: A SELF-DIRECTED APPROACH

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Our society is continuously moving towards a knowledge-based economy: an economy in which the application of knowledge replaces capital, raw materials, and labour as the main means of production. The synergy of combining new information and communication technologies with human skills has dramatically altered job content and skills requirements at the workplace. Good jobs have become technologically complex and are demanding sophisticated work skills. Simple, routine and low-level functions are diminishing. The perception of the role of human interventions in the economic transactions has also changed. The potential contribution that an individual can make in acquiring and applying knowledge for improving processes, products and services is becoming more important than the physical labour. The knowledge embodied in a product has become a key element of production (Kessels, 1998).

As a result of this trend, we are seeing an increased interest for adult education and training. Considerable efforts and resources are being devoted to provide equal educational opportunities to all. However, having equal educational opportunities now means more than having access to training programs and resources. It also means that a person has the cognitive skills needed to learn and to succeed in a learning environment. Many individuals lack these essential "cognitive literacy skills". As adult educators we need to be vigilant of this *cognitive divide*, which contributes to the widening inequalities in income and employment prospects between the highly skilled and less skilled workers. In order to address this need, we conducted a research project for assisting disadvantaged

adults to improve their learning skills. We made extensive use of knowledge and experience gained form our previous work with younger learners to guide the design and development of this project.

Ten years ago we conducted a study for assessing the effectiveness of a cognitive-based instructional system as a dropout prevention strategy for students who were leaving school because they could not cope with the information processing demands imposed upon them by school learning. This system was composed of seven cognitive style dimensions; analytical, focus, reflective, narrow, complex, sharpener and tolerant. Through cognitive augmentation and transfer training we helped the students to enhance their cognitive skills. Results indicated important gains on all seven cognitive styles. Qualitative comments showed that the students felt empowered. As one student said: "Difficult subjects, such as math, became easy." Another said: "I was always told that I am stupid, now I feel much more smarter." These results encouraged us to replicate our work with adult learners through the Project LEARN (**L**earning **E**nhancement for **A**dults **R**etraining **N**eeds).

Conceptual Framework

The conceptual framework that guided the theoretical orientation of Project LEARN included three major elements: individual differences among learners due to cognitive style, adult learning theories and the principles of effective instruction.

Individual differences among learners regarding their preference for various modes of gaining, storing, processing, and using information constitute sources of considerable variation in learning (Witkin, Moore, Goodenough, & Cox, 1977). Some

students are unable to accomplish a cognitive task simply because they lack the necessary information processing skills (Regan, Back, Stansell, Ausburn, Ausburn, Butter, Huckabay, & Burkett, 1979).

Cognitive-based research over the past 15 years has demonstrated that one of the most important factors contributing to achievement differences is the cognitive skills that a student brings to academic tasks (Letteri, 1992). In order to succeed a student, "must possess a repertoire of thinking skills that meet the cognitive demands of learning and performance tasks. Without appropriate cognitive skills information may be rejected, lost, translated incorrectly or stored incorrectly. This is due to the rapidity by which information is processed and the very limited capacity of various parts of the information processing system.

The Aptitude by Treatment Interaction (ATI) research indicates that instructional treatments differ in the information processing demand they place on learners. A learner may fail to master an instructional task simply because s/he lacks the necessary information processing demands imposed by that particular task. There are two fundamental ways to address this need. The first is by applying the deficit model where the environment is adapted to meet the learners' needs (Greenberg, 2001). The ethic of using this approach to meet short-term objectives has been raised. A more appropriate approach is to alter the cognitive style of the learners so that can become more adaptable to the needs of the learning environment (Ausburn & Ausburn, 1978).

Several cognitive skills dimensions have been identified. Seven of these cognitive skills appear to contribute more significantly to effective learning (Chinien,

Boutin and Letteri, 1997). These skills are: analytical, focus, reflective, narrow, complex, sharpener and tolerant. Following is a brief description of each.

Analytical/Global*:* marks a tendency of a learner to either experience items as part of a background (global) or to overcome the influence of an embedded context and view items as separate from the background (analytic). In Project LEARN, analysis has been developed as four components: segmenting, embedded figures, multiple perspectives and synthesis.

Focus/Non-Focus*:* describes an individual's extent and intensity of attention-deployment to a given task. In Project LEARN, focusing has been developed as two components: relevant and irrelevant information and intensity and extent of attention deployment.

Reflective/Impulsive*:* marks the degree of consistency in the speed and accuracy with which an individual selects hypotheses and processes information relative to a comparative analysis task. In Project LEARN this cognitive skill is titled Comparative Analysis and the components are establishing a purpose for making a comparison and performing a distinctive feature test.

Narrow/Broad*:* marks a learner's consistent preference for the degree of inclusiveness in establishing the acceptable and appropriate range of specific category parameters. In Project LEARN, narrowing has been developed as two components: creating a concept structure and developing discrimination and making judgments.

Complex/Simple*:* describes individual differences in the variety of highly organized, distinct, and highly specific categories by which information is structured in memory, as

well as the ability to use this information to examine new information from a variety of relevant perspectives. In Project LEARN, simple-complex has been developed as two components: understanding perspective (mindset) and shifting perspective (mindflex).

Sharpener/Leveler*:* describes reliable individual variations in the assimilation of information in memory. In Project LEARN, sharpening has been developed as two components: procedural knowledge and declarative knowledge.

Tolerant/Intolerant*:* represents the skills required to engage and examine apparently ambiguous information for the purpose of modifying existing structures of information and of accommodating new information within these related structures. In Project LEARN, tolerance has been developed as one component, creating balance.

These seven cognitive skill dimensions have been found to determine and predict with high accuracy ($p < .05$ or better) students' level of success in academic learning. (Letteri, 1985). These cognitive skills work in concert rather than separately. In order to succeed a student must possess a repertoire of at least four of those cognitive skills

Adult Learning Principles

When we examined the adult learning principles related to this project goal we concluded that there is no single theory of learning that has been established for adult learners (Merriam and Cafferella, 1991). There seems to be a lack of a comprehensive model to guide the development of instructional materials for adult learners.

The design and development for Project LEARN was based on insights gained from the review (Stites, 1998) of cognitive learning theories (Collins, Brown & Newman, 1987) as well as the work of various adult learning theorists such as Freire (1970), Houle (1984), Knowles (1990) and Mezirow (1995). We identified five guiding principles for

designing training materials for adult learners: These are (a) learning must be relevant to the learners; (b) learners must be motivated to learn; (c) instruction must incorporate varied strategies that tap into the learner's experience base; (d) learners must feel a sense of control over their own learning; instructional strategies must accommodate the cognitive and/or physiological needs of the learners.

Material Development

We conducted in-depth research on each of the seven cognitive style dimensions in order to identify their distinctive features and special attributes. We then used that information for designing and developing the cognitive augmentation and transfer training modules for each of the seven cognitive dimensions.

Cognizant that the material was being developed for self-directed study, specific organizational and learning tactics were adhered to in the overall design of the program. Our objectives in the development of the program included:

- Addressing cognitive skill development versus environmental adjustment.
- Relaying understanding of the complexity of cognitive skills (depth and breadth).
- User friendliness.

We used Gagné's (1965) nine events of learning as a basic framework for developing all seven instructional modules. These events are (1) gaining attention; (2) informing the learner of the objectives; (3) stimulate recall of prior learning; (4) present stimulus material; (5) provide learner guidance; (6) elicit performance; (7) provide feedback; (8) assess performance; (9) enhance retention and transfer. As the learner works through Project LEARN (CD-Rom) this framework is maintained and provides consistency.

Gaining attention, the first event of learning is presented either as a question to stimulate thinking, a scenario or a graphic. *Informing the learner of the objectives* is an up-front synopsis of what the learner can expect. It provides a reference point. *Recall of prerequisite skills* allows the learner to appreciate skills already learned or already known that will support and enhance the dimension being studied. *Present the stimulus* is a textual think aloud strategy used to walk the learner through the cognitive skill. *Provide learner guidance* is a summary of the key points learned in the study of the specific component. *Eliciting performance* generally provides at least five exercises for the learner. Each exercise graduates in difficulty. *Providing feedback* and *assessing performance* is provided as answer keys against which the learner can evaluate their learning. In order to maximize the retention, the *transfer activities* are both physical activities and cognitive activities. The content of the transfer activities is an attempt to compliment the target user (adults) of the program.

To further facilitate the learning goal of each of the seven cognitive skill areas, each cognitive module was developed using distinct components. The intent of this strategy was to guide the learning (see page 5 for the listing of components).

Scaffolding, another important and frequent feature of Project *LEARN (recall of prerequisite skills*), reinforces Gagné's framework for instruction. The learner will begin to recognize that often 'thinking events' or 'thinking demands' require the use of more than one cognitive dimension at a time. As the learner moves through the program, the skill development of each cognitive module contributes to an enhanced grasp and understanding of the next cognitive dimension (module).

All seven modules were evaluated for content and technical quality using a Peer Verification and Revision (PVR) strategy (Chinien, 1990). The development team met several times during the development process to conduct the PVR. The process consisted of a review of the work accomplished by each team member to that point with regards to the purpose of the instructional material, the guiding adult learning theories, the events of learning and good practices. All feedback was collected, analyzed and translated into revision decisions for modifying the material.

The revised material was then evaluated for learnability with the assistance of a group of adult learners using the Learner Verification and Revision (LVR) process (Chinien, 1990). The purpose was to identify and correct errors, problems and flaws in the prototype material. Test subjects were requested to read the material aloud and also to think aloud as they were interacting with the program content. All feedback was collected, analyzed and translated into revision decisions for modifying the material.

The revised version of each module was reformatted for delivery in a multimedia environment. It is accompanied by a hard copy workbook that includes:

- the working exercises of the eliciting performance (for each module)
- the physical transfer activities (for each module)
- the cognitive transfer activities (for each module)

We are pleased to share the product with you in CD-Rom format.

References

Ausburn, L. J. & Ausburn, F. B. (1978). Cognitive styles: Some information and implications for instructional design. Educational Communication and Technologt, 26(4), 337-354.

Chinien, C. (1990). Examination of cognitive style FD/FI as a learner selection criterion in formative evaluation. Canadian Journal of Educational Communication, 19 (1), 19-39.

Chinien, C., Boutin, F., & Letteri, C. (1997). Empowering at-risk students to stay in school using a cognitive-based instructional system. Journal of Industrial Teacher Education, 34 (4), 43-64.

Collins, Brown & Newman, (1987). Cognitive apprenticeship: Teaching the craft of reading, writing and mathematics (Technical Report No. 403). Cambridge, MA: Bolt, University of Illinois at Urbana, Champaign, Center for the study of reading. (ERIC Document Reproduction Service No. ED 284 181)

Freire, P. (1970). Pedagogy of the oppressed. New York. Seabury Pres.

Gagné, R. M. (1965). The conditions of learning. New York: Holt, Rinehart, and Winston.

Greenberg, Kathy (2001). Paper presentation at the International Conference "Unlocking the human potential to learn".

Houle, C.O. (1984). Patterns of Learning: New Perspectives on life-span education. San Francisco: Jossey-Bass.

Kessels, Joseph W. M. (1998). Knowledge productivity. Paper presented at the European Society for Research on the Education of Adults (ESREA), Bruxelles..

Knowles, M. (1990). The adult learner: A neglected species (forth edition). Houston: Gulf Publishing.

Letteri, C. A. (1985). Teaching students how to learn. Theory Into Practice, 14 (2), 112-122.

Letteri, C. A. (1992). Diagnosing and augmenting basic cognitive skills. In I. W. Keef & H. J. Walberg (Eds.), Teaching for thinking (pp. 59-71). Reston, VA.

Merriam, S.B. & Cafferella, R.S. (1991). Learning in adulthood. San Francisco: Jossey-Bass.

Mezirow, J. (1995). Transformation theory of adult learning. In M.R. Welton (Ed.), In defense of the lifeworld: Critical perspectives on adult learning (pp. 39-70). Albany, NY: State University of New York Press.

Regan, T. J., Back, K. T., Stansell, V., Ausburn, L. J., Ausburn, F. B., Butter, P. A., Huckabay, K., & Burkett, J. R. (1979). Cognitive styles: A review of literature. Interim Report, Brooks, TX: Lory Airforce Base, Colorado. (ERIC Document Reproduction Service No. ED 174 655).

Sabatini, J.P. (2001). Designing multimedia learning systems for adult learners: Basic skills with a workforce emphasis. NCAL Working Paper WP00-01. University of Pennsylvania.

Stites, R. (1988). Adult learning theory: An argument for technology. In C.E. Hopey (Ed.), Technology, basic skills, and adult education: Getting ready and moving forward (pp. 51-58). Columbus, OH: ERIC Clearinghouse on Adult, Career & Vocational Education.

Witkin, H. A., Moore, C. A., Goodenough, D. R. & Cox, P. W. (1977). Field-dependent and field-independent cognitive styles and their educational implications. Review of Educational Research. 47 (1), 1-64.