The Effects of Innovative Teaching on Student Growth in Knowledge of Economics and the Intentional Use of Their Learning Processes

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Presented at the Annual Meeting of DEBE September 15, 2003 Edinburgh, Scotland The task of the teacher is to stir-up connections between the pupil's (learning) nature and the subject whether in line of theoretic curiosity, of personal interest, or pugnacious impulse. The laws of the mind will then bring enough pulses of effort into play to keep the pupil exercised in the direction of learning. (James, 1910, Talks with Teachers, p83)

Making a Case for Investing in Innovation

American Association for Higher Education (AAHE) Board member, Bernadette Fong of Foothills College, Palo Alto, CA, suggests that innovative instruction in higher education begins with focusing on "teaching the learner to learn." She states, "Each graduate deserves to have a legacy of knowledge and a legacy of self-sufficiency as a learner" (Morgan, 2002, p.1). Senge refers to this as "building human capacity." Few would argue that this is not a compelling goal; however, even as institutions of higher education announce their commitment to being learner-centered, they continue to lag behind in transforming their institutions from a knowledge delivery model to a model of intentional learning (Pearle, 2002).

Those involved in the teaching of economics are confronted with the challenge of "shifting the outcome from teaching and course creation to learning" (Pearle, 2002). In a recent survey of 1700 undergraduate economics students (Economics Centre of the Learning and Teaching Support Network Economics, LTSN, 2002), students reported that the difficulties of completing a degree program in economics included 1) certain aspects of the course content; 2) adjusting to work in a university environment; and 3) knowing the standards of work expected of them (p.2). Students reported that passive "dictative" learning and poor communication between lecturers and students did not help

them learn. Shanahan and Meyer(2003) describe this challenge as one which pits the study of economics against the students' "habitual or preferential approaches to learning" (p.2). More specifically they refer to this conflict as a dissonance in learning engagement which arises when students preferred patterns of learning engagement conflict with the learning environment and its demands(4). Again Pearle suggests that the question to begin with is "not how instruction is delivered, but how learning occurs and how to use our understanding of learning with intention (2002).

Innovative Collaboration in Search of Intentional Learning

In the summer of 2001, Peter Kressler, a professor of economics at Rowan University, with over 33 years of teaching experience contacted Dr. Christine Johnston, Director of the Center for the Advancement of Learning at Rowan University. Primarily, Dr. Kressler was interested in implementing innovative teaching practices that would provide a value-added element to his courses in economics while not violating his department's requirements for a given course. Johnston, who for the past ten years has been actively engaged in studying the effects of individuals' learning processes on performance, persistence, and achievement, agreed to join Dr. Kressler in developing an innovative approach to teaching economics that would enhance his students' learning experience beyond the time frame of the 16 week course.

Over the course of the summer and fall, Kressler and Johnston framed their first study. In the first study, Kressler (2002) explored the effects of heterogeneously grouping teams of American Economic History students based upon their learning processes.

Having met with success in implementing this innovation, Kressler sought Johnston's assistance in expanding students' awareness of themselves as learners and team players.

Using three sections of undergraduate macro-economics, Kressler and Johnston (2003) studied the nature of the communication and understanding which occurred when teams of learners, who understood each other's learning processes and shared a common lexicon of learning, worked together to produce joint responses to macro-economic tasks. The outcome of that study suggested that learners can develop a lexicon of learning and an ability to use their learning processes with intention. What that study clearly showed was that individuals can employ both accumulated learning experiences and real-time meta-awareness to direct the intentional use of their learning processes to meet the expectations of a specific economics assignment. The study here reported was driven by following questions: 1) Can instruction that focuses on learning within the context of an economics course increase the students' ability to understand economics concepts? 2) Will the intentional use of students' learning patterns guided by the development of personal strategy cards result in greater student achievement? 3) Can such an awareness be converted into study behaviors that transfer to other learning contexts outside of the course in Risk and Insurance?

Research on Learning: Understanding Each Student's Learning Capital

To study the learning processes of students, the authors chose to use the Interactive Learning Model (ILM) (Johnston, 1996). The ILM is rooted in the theory of patterned processes, and its application is grounded in the practice of the classroom. A key characteristic of the ILM is the fact that that it provides learners with a lexicon to describe the synchronous use of their patterns of mental processing (Flavell, Green & Flavell, 2000; Snow & Jackson, 1992; Johnston, 1996; Johnston, 1998). The Interactive

Learning Model (Johnston, 1994; 1996; 1998; 2000; 2001), is a model which permits learners to become the "conscious experts" of their learning processes.

Chart 1. Summary of Our Interactive Learning Processes adapted from *A Guide to Implementing the Let Me Learn Process* (Johnston, 2001).

	How I think	How I do things	How I feel	What I might say
Sequential Process Precise Process	 I want clear directions Where is the beginning? How does this conclude? What's the plan? I research information I ask lots of questions I always want to know more 	 I make lists I organize I plan first, then act I break tasks down into steps I challenge statements and ideas that I doubt I prove I am right 	 I thrive on consistency and dependability I need things to be tidy and organized I thrive on knowledge I feel good when I am correct 	 Could I see an example? I need more time to double-check my work Could we review those directions? I need more information Let me write up the answer to that Did you know that
Technical Process	 I mentally analyze data I seek concrete relevance – what does this mean in the real world? I only want as much information as I need 	 I get my hands on I tinker I solve the problem I do 	 I enjoy knowing how things work I need real world relevance I do not need to share my knowledge 	 I can do it myself Let me show you how How will I ever use this in the real world? I could use a little space
Confluent Process	 I read between the lines I think outside the box I brainstorm I make obscure connections 	 I take risks I am not afraid to fail I talk about things – a lot I might start things and not finish them 	 I enjoy energy I feel comfortable with failure I feel frustrated by people who are not open to new ideas 	 What do you mean, "that's the way we've always done it"?! The rules don't apply to me I have an idea

The model conceptualizes learning as the mental processes of cognition,

(involving mental acuity, memory, range of experiences); conation (including natural skill, pace, autonomy, use of personal "tools"); and affection (incorporating feelings, values and sense of self) nested within each of our interactive patterns of 1) sequence and organization; 2) specificity and precision; 3) technical performance and reasoning; and 4)

confluence and risk-taking. Chart 1 explains the specific thoughts, actions, feelings and communication which comprise each operational process.

An Innovative Methodology

The five month study, conducted in Spring of 2003, involved 30 students enrolled in an upper level course entitled, Risk & Insurance. Upon entry into the R&I, the students completed a pre-test focused on the subject matter of the course (terms, concepts, and procedures). Following the pre-test of content knowledge, the instructor administered the Learning Combination Inventory (LCI) (Johnston & Dainton, 1997). The LCI is a 28 item self-report instrument by which individuals record the degree to which they simultaneously use each of the four mental processes (patterns). A tallying of an individual's responses to the LCI produces four scores indicate the respondent's degree of "use first" (25-35), "use as needed" (18-24) or "avoidance" (17-07) of each of four learning processes. Responses to the short-answer portion were examined in light of a set of protocols indicating whether the individual's self-generated responses supported or did not support his/her forced-choice answers. Once students were given this information about themselves, they were instructed and coached in how to decode assignments, identifying what patterns they were required to use in order to attain the expected level of performance on the R&I task. Students then were guided in the development of personalized strategy cards using a format that required students to articulate how they planned to reconcile the difference between who they are as learners and what performance skills and knowledge were being asked of them by the assignment. At the conclusion of the course, students completed a post-test that focused on the topics found in the original pre-test.

During the interim, students 1) recorded their responses to the problems of Risk & Insurance in their portfolios; 2) maintained a journal of their learning experiences; and 3) developed, recorded, and reported the use of personalized learning strategies to meet the requirements of each of 16 different economics assignments.

The division of labor for conducting the study operated in the following manner:

The professor of record for the course (Dr. Kressler) developed the syllabus, selected the specific problems, and organized them so that what was required of the student grew progressively more challenging from Week 1 trough Week 16 of the course. The professor of record then set the schedule for materials to be collected and established the criteria for the grading of each assignment. The collaborating professor, who provided expertise and coaching on learning issues, was responsible for developing the criteria for grading the content and applicability of the strategy card to each assignment. At the conclusion of the semester, the numerical scores for each component of the students' work were compiled for analysis.

Data

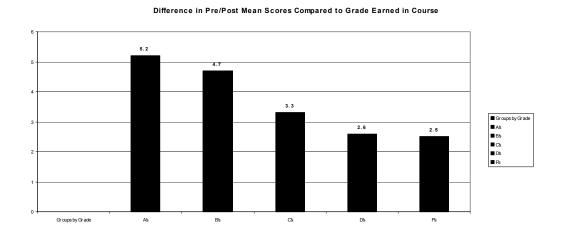
The study yielded a wide range of quantitative and qualitative data. The quantitative data included the pre-post test scores of content knowledge, 16 grades on weekly assignments, 16 grades on strategy cards (one per assignment), the end of semester course grades, and the qualitative data collected by each student and archived in their course portfolios. The pre and post test consisted of having students define twenty-six terms or concepts listed in the departmental syllabus as central to the body of knowledge that individuals were to take from the course.

Additional quantitative data included the number of times individuals made contact with the professor of record or the collaborating professor concerning course content or learning issues, respectively. To enumerate these contacts, a tabulation was made of three types of contact: 1) face to face (either one-on-one or with the individual's learning community team (four other students with whom the student formed a learning support team; 2) e-mail contact; and 3) voice-to-voice contact by telephone. In each instance, the purpose of the contact was to seek clarification concerning the performance expectations of the professor or to gain insights into how to use one's learning processes with greater intention to achieve the desired outcome on the economics task.

Qualitative data collected over the 16 week period included the internal talk of each learner as recorded within their strategy cards and weekly journal entries. This data described students' personal reflections on what type of progress they were making in developing a strategy card that focused them on using their learning processes with intention. Additional qualitative data was derived from the content of student-to-professor e-mails, in classroom discussions, and one-on-one inquiries made by students. The content of the qualitative data allowed the researchers to examine the language students used to explain themselves and explain their learning experience. The following analysis of the data explains what was learn from implementing the innovation of increased learning awareness and the use of personalized strategy cards to an economics course in Risk and Insurance. It reports any differences this approach made and reports what interventions and innovations achieved a measurable difference and which did not.

Examining the Results

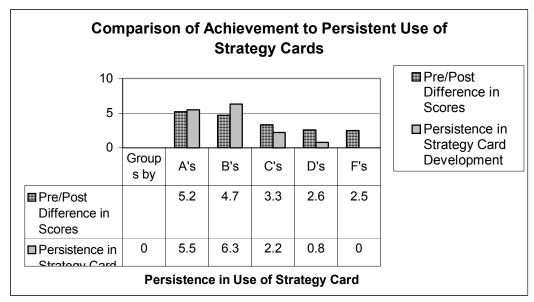
An aggregate of students' pre-post tests scores on twenty-six key concepts and terms used in the Risk and Insurance course showed no statistically significant difference. However, a



Graph 1.0

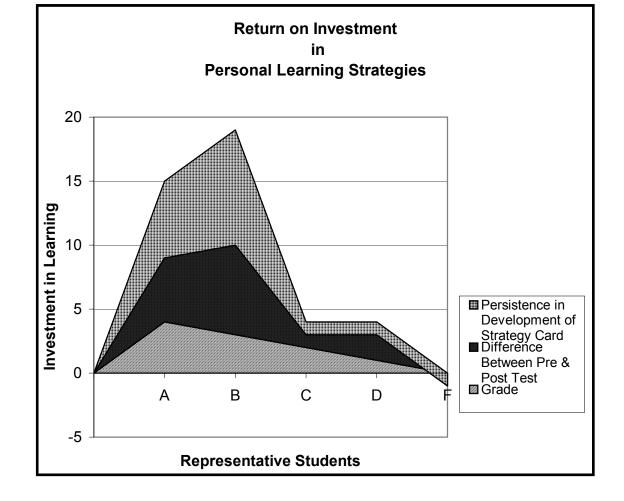
grouping of the same pre-post test scores according to the final course grade revealed that those who earned the highest grades, also increased the most in their number of correct responses between the pre-test administration and the post test 16 weeks later. See Graph 1.0

Both the quantitative and qualitative data indicate that students who used the process of developing a personalized strategy card and persisted in refining its content to match each specific assignment, achieved a higher performance rating than those students who did not. The data also indicate (See Graph 1.2) that there is a strong positive correlation between students' persistence in developing personalized strategy cards and student achievement as defined by an improvement in post test scores and the achievement of a course grade of C or above.



Graph 1.2

Of particular note are those students who began at a D or C- level of performance and concluded the 16 week semester achieving a B- or B. These students typified those students who ordinarily would be written off as average students who "just don't get economics." In this study these students made the greater gains in pre-post test means and success in the economics assignments over the 16 week period. When the researchers examined the LCI scores of the learning patterns of the individuals who made up this subset, they found that the mean scale score for precision was 20 (one point below the middle of the LCI pattern scale) explaining why so many of these students found the content of the text "frustratingly unreadable". The students' "Use as Needed" level of precision combined with their other patterns made working through the highly precise set of economics assignments quite daunting. However, once they developed the skill to decode the text and deconstruct the assignment, they were able to complete the assignment achieving an ever increasing degree of success. The experience of using personalized strategy cards

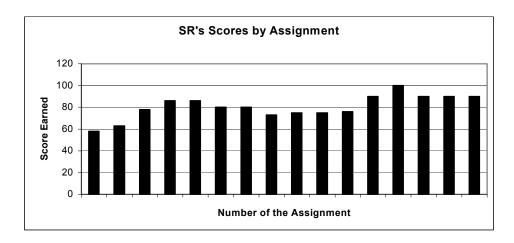


Graph 1.3 gave them the grounding to persist in developing the use of their learning processes with ever greater intention. See Graph 1.3.

The would-have-been-under-other-circumstances "C/D" students explain in their journals how using the strategy cards gave them the confidence to persist because they had already begun to experience the rewards of doing so. Those individuals grew significantly over the course of the semester in the use of their learning processes.

SR is an example of a student who learned to use her patterns with intention. Her scores on the 16 economics assignments indicate her starting point, the point of greatest challenge, and the point at which she forges her learning energies to overcome the challenges she experienced. See Graph 1.4

SR 58 63 78 86 86 80 80 73 75 75 76 90 100 90 90 90



Graph 1.4

She writes in her journal: (April 24)

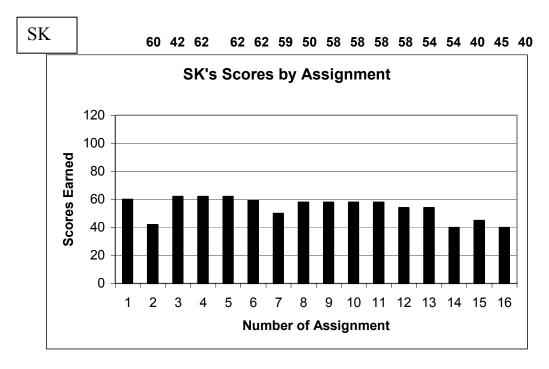
I realized that the problem we were to do in Chapter 14 required us to use our confluent and precision patterns. I knew this was going to be a challenge because our group had lower confluence scores (Q 19; M16; Mg 19; and I'm 20)¹. We started by encouraging each other to take the risk of being completely open with our ideas and opinions of what we were expected to do. I think by doing this and not worrying about having one, correct answer, we were able to be more creative and build unique answers. I can see a change in how we have opened up and took more risks.

SR's Journal Entries cont'd (April 26)

In my past few assignments, I have been trying to stretch my confluence and precision to help me build better answers. I know I have been able to stretch my precision. I found precision has helped me figure out the reading better. I have been analyzing the chapters more and putting effort into analyzing the different terms and definitions. I have noticed a positive difference in how I relate to the readings. I feel I understand the different terms so much better than when I didn't apply this pattern as much. I would repeat bringing out my other patterns when necessary for different assignments.

¹ "use first"(25-35), "use as needed"(18-24) or "avoidance" (17-07)

Individuals who did not develop authentic strategy cards lost momentum by the 12th week of the semester. Their journals and assignments demonstrated they had not developed either their self-awareness as a learner, nor their skills of using their patterned learning processes with intention. See Graph 1.5 Note the lack of achievement throughout the 16 weeks and the actual decline in performance when students who persisted in the use of their strategy cards continued to progress.



Graph 1.5

In contrast to the performance demonstrated above, by the 12th week, the "persisters" began to record how they had begun to observe the learning behaviors of their learning community members. Some students recorded what we termed informal interviews with their teammates asking them, "What were you thinking when you did that?" or "Why did you go at it this way?" They began to recognize that among their peers there was a tremendous resource available to help them understand different ways of decoding, deconstructing, and approaching the economics assignments.

PP

63 63 83 86 86 88 88 78 78 78 78 100 100 100 100 100

Journal Date: April 14, 2003

Before we even met to discuss what we would do for Chapter 12, I knew that I would end up taking the lead for this problem, and knew that I needed to do so. This was simply because the Chapter 12 assignment is so heavy in both precision and sequence, which are the techniques I tend to use the most, and neither J nor K are particularly high in either category. I felt that J's lack of sequence would have made the whole idea of "preparing" difficult for him, and I felt K's high level in confluence may have given the wrong outcome, plus his low level of precision tends to produce shorter than desired textual responses. Since J is highest in technical, and K is highest in confluence, I knew I would provide the most help for this particular assignment. I also made sure I understood as much as I could about the problem before meeting, as precise people usually tend to be almost obsessed with understanding information and having as much information as possible. I then explained (a precision key word!) to K and J that I would do all the calculating that is heavily required in developing the insurance plan, and they, J in particular, focused on Chapter 13.

So at first I figured that since this problem requires both precision and sequential skills in developing the insurance plan for the Chestnut family, that it would be a cakewalk for me. However, when I came to do the problem, there were times where I had to rely on my confluence that irked me. I had to determine how the expenses would change over time, due to deaths, and etc., and rather than take a leap and pick one, I decided to come up with as many options as I felt were necessary. In the end I picked the one that seemed to me to be the worst case scenario to base my insurance recommendation on it.

After calculating all the necessary information, I explained everything I came up with to both K and J, somewhat surprising in that I'm usually not great at articulating the data (maybe I secretly have a bit more confluence in me). Now I know that we should evaluate the problem beforehand, and take stock of what patterns are required, and then from that determine who would be best suited to lead the rest of our team through the problem, as was done in this case.

Twenty-three students (69%) earned a "C" or better in the course (compared to 45% in previous semesters). Of the 23, 18 demonstrated the clear and consistent intentional use of their learning patterns by submitting their strategy cards and journals denoting the intentional use of their patterns. Yet not all 30 students were successful in completing the course. Four students concluded the class with a "D", and two with "F's". These students' (nine in number) perspective on the course was, "We are 16 weeks from graduating. We have made it this far, and we can make it to graduation without investing ourselves in learning about our learning". Interestingly three students, one senior and two juniors, chose to break ranks with this attitude at the end of the 11th week of the semester and invest themselves in developing strategy cards to improve their performance on the economics assignments. One of the three students later wrote about using his understanding of learning processes to observe and respond to the individual who was interviewing him for an accounting position. Another came for a one-on-one discussion about what patterns would be appropriate to use when comparing and evaluating two different systems. In all three instances, the students improved their performance; one moving from a "D" to a "C" and two moving from low "C's" to "B's".

Insights on Innovative Teaching Methods Gained from this Study

This study looked at whether students, enrolled in an upper level risk and insurance course, are able to adapt their personal learning processes over a 16-week semester to meet the different performance skills required of them. In today's management terminology, students had to plan, organize, coordinate, implement,

monitor, evaluate how they think, and develop strategies to control and monitor their performance.

The results of this study suggest the following:

- 1) Students can grow in their awareness of themselves as learners and talk about their learning awareness with others using a lexicon of learning terms
- 2) Students can take the awareness of their learning processes and successfully apply that awareness to specific economics assignments.
- 3) Students can interpret (decode) an assignment's wording and analyze(deconstruct) the deep structure of the expectations for student performance, using the interpretation and analysis to guide them in developing a strategy card that posits the key information in such a way that students can see a visual representation of their learning capital (use of learning processes) the amount of learning capital needed to make a profitable investment in the assignment at hand(interpretation and analysis of task), and the means of rectifying the difference between their learning capital and the expenditure of personal learning capital (personalized strategies) required to complete the assignment.
- 4) In the case of this study, there was a strong positive relationship between a student's persistent use of personalized learning strategies and success in the class.
- 5) In the case of this study, there was a strong positive relationship between a student's persistent use of personalized learning strategies and an increase in the student's knowledge of the subject matter (pre-post test scores).

- 6) Students in this study who believed their investment in learning would yield success, strove longer and harder to achieve. (We observed what we believe was persistence in action. In doing so we reaffirmed Bandura's (1996) concept of efficacy, i.e., or, put in simpler terms, when students have the right tools and a clear sense of the task at hand, they can get the job done.
- 7) Learning awareness starts with the learner's willingness to grow in awareness and increases as the learner perceives the need to develop the awareness.

Over the past ten years, research on learning has confirmed that students who monitor and reflect on how they learn, expand their understanding of how to use their learning processes with intention (Scardamalia, Bereiter, & Lamon, 1994; Schoenfeld, 1987). This limited study confirms these earlier findings and adds to the current body of research by suggesting that the use of personalized learning strategies based upon the student's awareness of self as a learner, can make a measurable difference in student performance and outcomes.

Innovations and Implications for Higher Ed Instruction

This study began with a focus on innovation in instruction in higher education. The shift from teaching subject matter to teaching learners is not new to teaching. Interestingly it has been around for a long time. It is simply a grossly under utilized awareness: "Your job is not to fill empty heads with facts for the present but -more important- to excite students about learning for many years to come" (Yellin, D. & Blake, M.(1994, p. 54).

The work of learning *is* the students. Redding was right when she wrote, "The primary cause of learning is the activity of the learner's *own* mind. Why then do we

devote our teaching energies to putting information into the heads of our students. Why not equip them to do the work? Teach them about learning!" (1990, p.48).

Much of the latest information about the motivational processes which affect student learning indicate very clearly that students failure to learn most frequently can be attributed to lack of effort or lack of appropriate strategies for accomplishing the learning rather than ability (Dweck, 1986). When students learn how to use their learning processes, they will persist and persevere much longer at a learning task and will therefore achieve more than if they only are given feedback on their success or failure on a specific task.

Learning how to use learning processes is key to a student's overall success in learning. We now know the deeper meaning of that statement. We understand the interactive processes that learners use to construct knowledge. We have the research basis that tells us that within given subject areas, teaching specific techniques or strategies for using sequence, precision, technical reasoning, and unique solutions *do* make a difference in the student's ability to learn the subject matter. We also know the importance of understanding a learner's *natural strategies* for learning in order to teach a *new strategy* to the learner. (Winne, P & Marx, R. 1980). Finally we have solid evidence that using specific strategies is much more effective than using global "study skills" to teach subject matter. (Peterson. et al. 1982, p.74.) Becoming aware of one's own strengths and weaknesses leads to more personal responsibility for choices in the learning situation and thus more self-regulation. Having information about possible alternatives for behavior, increases the likelihood of more versatile and more effective choices (Schmeck, 1988.)

The study reported here would suggest that being aware of one's own learning processes not only increases choices but enhances achievement.

We would do well to consider this innovation in higher education if we are sincere in our desire to build human capacity. After all, "The idea of student responsibility for learning does not imply a lessened teacher responsibility for teaching.[It implies teaching about] strategies for learning and achievement."

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APPENDICES

Sample Student Strategy Card

Sample Blank Strategy Card

Steps to Developing Learner's Personalized Strategy Card

	Sequence	Precision	Technical	Confluent
Score	32	22 (29)	13	20
Ways in which I would "naturally" use each	 make lists organize things take time use examples often double- check work & review directions plan often perhaps a bit too organized try to be consistent and dependable 	- use lots of proof/evidence - take lots of notes - prefer writing things up instead of speaking - want to always be correct or have evidence - like when get things correct - probably write too much at times - want lots of info *(I think my score for precision should be higher)	 avoid using tools & taking things apart prefer using words & thoughts over tools/etc. prefer talking about something instead of doing something hands-on avoid fixing things 	 take some risks when necessary try to be original/different when doesn't interfere with directions sometimes put things in different perspective can take some risks but not too many
	What is required of this nattern	What is required of this nattern	What is required of this nattern	What is required of this nattern
What does the task or assignment	-the words prepare and pattern show that sequence is necessary, as the devised insurance plan for the Chestnuts must be prepared/patterned in some logical order -and also the use of the word plan indicates the requirement of sequence, and in this case the essence of the project is planning a life insurance policy	-the use of the word explain points to the significance of precision because in order to "explain" we must provide detailed information and sufficient evidence on the insurance plan, and at the same time describe the devised insurance plan in a way that would make the most sense to the relatively uninformed parties purchasing it.	-Although no words that deal specifically with the technical skill are mentioned, the words prepare and pattern do show the importance of technical in this assignment, for preparing/patterning involves "putting together" the insurance policy; in addition there is a clear problem that needs to be solved (How much life insurance should be purchased?)	-confluence is not incredibly important in this problem, particularly since a guide to making an insurance plan is given in the book -however confluence can be used in determining how certain accounts will be affected if a death occurs in the family (i.e. will Cindy be driving at 17? Will social security survivor benefits be received?)
	My personal strategy for using this nattern	My personal strategy for using this nattern	My personal strategy for using this nattern	My personal strategy for using this nattern
What I will say to myself. How I will use my patterns to accomplish the task	-Since sequence is the key aspect of this assignment, I will use my sequential skills to take the lead role in this assignment - I will put the majority of my focus on following the insurance planning steps correctly but not allow this to detract from other important techniques necessary in this assignment.	-I will make sure that the life insurance plan given is backed by correct and relevant data - in explaining the particular insurance policy, I will also make sure that not only is evidence provided but that it is also easy to grasp (as it is being presented to people who are not knowledgeable in financial planning	- my dislike of being technical will be made up for/covered by my sequential skills, for the most part in this case (preparing/planning is also sequential) - in addition I will use specifically technical skills when absolutely necessary in this case, as in actually deciding on the amount of insurance that should be purchased by the family	-As I tend to shy away from taking risks, I will be pleased that it is not a focal point of this particular assignment and not worry about it. -But when certain adjustments to accounts are necessary in the problem, I will try to just take the risk (as in determining the answers for the above questions, which don't have clearcut answers) and not be too worried by the risks.

		Sequence	Precision	Technical	Confluent
Sco	ore	PLACE	APPROPRIATE	LCI SCORES	HERE
Ways in which I would "naturally" use	each				
		What is required of this nattern	What is required of this nattern	What is required of this nattern	What is required of this nattern
What does the task or	assignment				
		My personal strategy for using this nattern	My personal strategy for using this nattern	My personal strategy for using this nattern	My personal strategy for using this nattern
What I will say to myself. How I will	use my patterns to accompusatione task				

Developing A Card of Personalized Strategies

- □ Look at assignments and directions. Do you see any words that provide clues to the patterns required to complete the work?
- □ Use your word chart to take the assignment apart pattern by pattern.
- Determine if you used the required patterns in the right places.
- □ Begin to use the language/vocabulary of strategizing (i.e., "tether", "forge", or "intensify" a pattern as needed).
- □ Recognize that assignments may require you to use a pattern to a different degree than you would do "naturally" or comfortably.
- Once you have developed sufficient insights into how to "work" your patterns, create a strategy card of how to complete an assignment successfully.