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**CONCEPT MAPPING: AN INSTRUCTIONAL TOOL FOR LEARNING
" ECONOMICS AND A RESEARCH TOOL FOR DETERMINING
STUDENTS' UNDERSTANDING OF ECONOMICS**

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CONCEPT MAPPING: AN INSTRUCTIONAL TOOL FOR LEARNING ECONOMICS AND A RESEARCH TOOL FOR DETERMINING STUDENTS' UNDERSTANDING OF ECONOMICS

ABSTRACT

This study evaluated the concept mapping learning strategy as an aid to the learning of economics and explored the changing knowledge schemata of learners during a two-week course of instruction in economics. Although students using the concept mapping learning strategy did not show significantly greater scores on the economics post-test than those using guided reflective journaling, the pre- to post-test gain was significant for both the experimental and comparison groups, suggesting that all students learned economics during the class. Analysis of covariance suggested the major predictor of a student's post-test score was the pre-test score measuring prior knowledge of economics. It accounted for 30% of the variance indicating that prior knowledge of economics was an important variable contributing to the future learning of economics. Furthermore, the twenty-seven pre- and post-instruction concept maps created by the participants in the two-week economic education course provided a rich source of qualitative data on the students' process of learning economics.

It is suggested that concept mapping, though not proven effective as an instructional aid in this study, be tried in studies of longer duration or that use alternative forms of assessment to measure

knowledge. Concept mapping is a useful tool for discovering students' prior knowledge of economics, observing developing understandings, and identifying misconceptions. These insights are valuable to curriculum planners and teachers. Although not specifically explored in this study, concept mapping has potential as an evaluation tool. The concept map provides a wealth of valuable information about the learning process and students' understandings.

Experts have developed standards for key economic concepts recommended for kindergarten through twelfth grade. This study suggests a need to further refine an organizing framework that recognizes the inter-relatedness of the key economic concepts. This organizing framework would move the focus of instruction toward relationships among and between concepts rather than on isolated bits of information. As students learn this connected-ness of knowledge they will be better able to apply the knowledge in various situations.

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CHAPTER 1

INTRODUCTION

Judith Torney-Purta (1991) notes three types of recent research that document the need for new approaches to social studies education. "First, classroom observational studies have noted the non-meaningful nature of learning during a large proportion of classroom time in social studies. . . . Second, recent national surveys have shown low levels of both subject matter knowledge and interest in social studies and history. . . . Third, the poor quality of some social studies textbooks has been documented, particularly the way in which they present disconnected facts" (Torney-Purta, 1991, p. 190). Walstad and Larsen (1992) found widespread ignorance in the American public, high school seniors, and college seniors of basic economics necessary for understanding economic events and changes in the national economy. Hoz, Tomer, and Tamir (1990) found disciplinary knowledge in teacher educators to be "quite unsatisfactory" (1990).

Adler (1991c) reflects on the challenge facing teacher educators. She states, "The pedagogical problem presented to the

teacher educator is that of finding the stimuli which will open students to asking questions, to taking new perspectives, to examining alternatives. . . The problem of teacher education is . . . how can we emancipate students from mindlessness; how can we free them for the difficult task of making choices” (p. 79). Faced with the pedagogical problem described by Adler, many teacher educators have joined her in the search for pedagogical approaches that will foster critical reflection on the part of prospective teachers. One challenge facing teacher educators of social studies is to design new and innovative approaches to traditional “methods” classes (Dana, 1993). Many teacher educators are presently restructuring programs and classes in order to create opportunities for prospective teachers to reflect on their own experiences as students and teachers as well as their own beliefs about teaching and learning (Tabachnich & Zeichner, 1991).

Within the last decade a substantial change has taken place in the ways educational psychologists and educators have viewed the learning process and the learner. Theories and research in cognitive psychology are at the center of this change (Torney-Purta, 1991; Bransford & Vye, 1989; Carey, 1986). These changes in the

conception of learning “are prompting a quiet revolution in the research on teaching social studies” (Armento, 1991, p. 185).

Torney-Purta (1991, p. 190) defines learning as “giving personal meaning to public knowledge” and notes that in social studies this is usually done through oral discourse or written text. According to her, “application of schema theory and cognitive psychology to social studies would suggest that instruction be structured around a small number of key concepts; that students be encouraged to make connections between new information and existing knowledge; and that students be given explicit training in cognitive strategies for making elaborations and monitoring understanding of oral and written discourse” (Torney-Purta, 1991, p. 206).

One promising strategy teacher educators may employ to help prospective and practicing teachers practice thinking about teaching social studies is concept mapping (Dana, 1993). Novak & Gowin (1984, p. 15) define concept mapping as “... a schematic device for representing a set of concept meanings embedded in a framework of propositions.” A concept map is a schematic drawing consisting of a set of concepts connected by linking words to form

propositions or theories. It represents the knowledge structure formed by the learner based on prior experiences and new information.

Studies are beginning to emerge that address how prospective teachers experience the process of sense making through concept mapping (Adler, 1995; Dana, 1993; Beyerbach & Smith, 1990; Hoz, Tomer, & Tamir, 1990). In a study with prospective elementary school teachers, Dana (1993) used conceptual mapping as a pedagogical tool to foster reflection on social studies education. Beyerbach and Smith (1990) successfully used the concept map with preservice teachers to describe their evolving knowledge schema and to promote reflection on early childhood education. Findings suggested that concept mapping provided the opportunity for reflective thinking and helped students to assign personal meaning to social studies education and early childhood education. Loncaric's (1986), Hoz, Tomer, and Tamir's (1990), and Dana's (1993) successful use of concept mapping with teachers and students in social studies suggests possible uses for teacher education in economics.

The present study tested concept mapping as a learning aid for teachers enrolled in a two-week, intensive summer economics education course. In the remainder of this chapter, the cognitive theory behind concept mapping is reviewed; the techniques of concept mapping are summarized; and implications and uses for research in social studies, more specifically in economics, are addressed. This chapter concludes with a statement of the purpose of the study and a list of operational definitions.

Cognitive Theory

A major quest in modern education is how to help students achieve meaningful learning. In contrast, a prior focus was on hard work and rote learning. According to some educators, this resulted in high school graduates who lacked many of the basic learning skills and study habits needed for success in college (Arnaudin, Mintzes, Dunn & Shafer, 1984). Recent theories on cognitive development view learning as an active and complex process of acquiring knowledge (Glynn, Yeany & Britton, 1991). Meaningful

learning theory originated with the work of David Ausubel who stated:

If I had to reduce all of educational psychology to just one principle, I would say this: The most important single factor influencing learning is what the learner already knows. Ascertain this and teach him accordingly. (Ausubel, 1968 [2nd ed. 1978])

The need to understand a student's prior knowledge is at the root of Ausubel's assimilation theory of meaningful learning. Ausubel (1978) asserts that concepts derive their meanings through connections or relationships with other concepts, and that meaningful learning occurs when new knowledge is consciously linked to relevant concepts or propositions already possessed by the learner. Rote learning, in contrast to meaningful learning, results when the learner stores new concepts in an arbitrary, nonsubstantive way.

Theories based on Ausubel's work, currently referred to as constructivist theories (Glynn, Yeany & Britton, 1991), view learning as an interactive process between the new information and the prior knowledge of the learner (Carey, 1986). Wittrock's (1986,1991) constructivist theory for teaching, called "generative

teaching,” states that comprehension depends directly on what students generate and do during instruction. Teaching for understanding is the generative process of building relations among the parts of the subject matter and between the subject matter and student knowledge, belief, and experience. For example, Osborn and Wittrock (1983) and Wittrock (1987) applied the generative teaching model in science education. They found teaching meaningful science concepts involved learning about students' preconceptions, knowing how to modify them, and knowing how to induce learners to generate a new model of the phenomena by revising or by transforming their models, often by real-world examples.

Also writing in the context of science education, Carey (1986) and Glynn, Yeany and Britton (1991) state that students are active learners who are selective and subjective in their perceptions. As students struggle with new information and try to integrate it into what they already know, no two students can be expected to learn exactly the same thing from a teaching event. In other words, learning is idiosyncratic. The question for educators becomes how to determine students' prior knowledge and monitor development

of new conceptual frameworks in order to design better instructional techniques and methods (Novak & Gowin, 1984).

Novak and Gowin (1984), following Ausubel's theory, worked to develop techniques to document the learner's cognitive structure. Novak and Musonda (1991) found the cognitive map or concept map to be the most versatile tool to represent the existing knowledge of the learner. By comparing successive maps produced as students gain mastery of a domain, the researcher, teacher, or student can see how knowledge was restructured in the course of its acquisition (Novak, 1992).

Techniques of Concept Mapping

James Wandersee (1990) uses the metaphor of cartography to explain concept mapping. Wandersee (1990) states that

to map is to construct a bounded graphic representation that corresponds to a perceived reality. . . every map reflects both its data and its designer. Map making is a human exercise in "knowledge construction" and "meaning making," . . . Like a map, theories connect knowledge in many directions and are continually updated to incorporate new information. The act of theory building, like map making, exposes doubtful knowledge and calls for its replacement with more reliable knowledge. (pp. 924-927)

Wandersee believes the map metaphor accurately describes the holistic representation of knowledge.

Novak (1990b) ascertains that concept mapping serves as a metalearning strategy, helping students learn how to learn. Concept maps provide two-dimensional representation of the learner's structure of knowledge in a discipline (Novak, 1990b). Novak and others in his research group, claim that by representing both knowledge held by learners before and after instruction and the changes in cognitive structure which occur during instruction, concept maps facilitate meaningful learning and offer an useful instructional and evaluation tool for teachers (Novak & Musonda, 1991; Novak, 1990a; Arnaudin, Mintzes, Dunn & Shafer, 1984).

Novak (1990b) found that concept maps were effective metacognitive tools, that they were useful to represent knowledge in any discipline, and that they aided in organizing and understanding new subject matter.

Implications for Research in Social Studies .

Vosniado & Brewer (1987) state that it is often the case in social studies that students hold serious misconceptions about people, places, and ideologies. The role of the teacher is to diagnose student misconceptions, understand the student's point of view, propose new frameworks, raise questions to illuminate inconsistencies and errors, and guide the learner to the construction of more meaningful schemata. Currently, hypotheses based on new theoretical conceptions of learning in the social studies have not been subjected widely to empirical testing. Loncaric (1986) looked at the effects of concept mapping on the acquisition of social studies concepts by elementary school students and found that the mapping served as a tool to aid in the acquisition of social studies concepts.

Working in the 1970s, Lawrence Senesh, a Purdue economist, developed a conceptual schema of the economics discipline and developed textbooks to teach economics to students beginning in the elementary grades (Senesh, 1978). According to Novak (1977), Senesh mapped an integrated set of concepts

emphasizing interrelationships among economics concepts rather than the hierarchical structure often seen in science.

Statement of Purpose

The purpose of this study was to evaluate concept mapping as a learning aid in economics. Maps provided by K-12 teachers enrolled in an economic education course were used to document change in conceptual knowledge over the two-week course. Effectiveness of concept mapping as a learning strategy was evaluated by comparing post-test scores between an experimental group (using the concept mapping strategy) and a comparison group (using a guided reflective journaling strategy) on a multiple choice test over economics presented. Further, to explore how students' conceptual schema changed while learning economics, the researcher analyzed the concept maps to study patterns of change during the course, noting correct and incorrect conceptions, and comparing these novice maps to maps completed by economists. This analysis provided insights that might assist

the instructor in modifying course methods and content to maximize learning.

The following specific research questions were examined.

1) Did the concept mapping group score significantly higher on the multiple-choice test of economics knowledge than a comparison group using an alternative learning strategy?

2) Did the student's concept maps reflect a progressive increase in depth and breadth of economic understandings as illustrated by a larger number of concepts, examples, correct propositions, and cross links?

3) Did student produced concept maps of economic concepts appear similar to those maps produced by experts in the field?

Operational Definitions

The following operational definitions are used in this study:

Meaningful learning - as opposed to rote learning or memorization requires learners to make connections between prior knowledge and the new information being assimilated. Something is understood when it has been integrated in a meaningful way into the learner's existing knowledge structure. This process, referred to by McGilly (1994) as elaboration, moves new learning from short-term to long-term memory and provides the learner with

multiple “hooks” or routes for accessing information. According to Resnick and Klopfer (1989) meaningful learning helps students to interpret new situations, to solve problems, and to think and reason. Meaningful learning occurs when a student judges new information’s consistency with other ideas based on prior experiences and knowledge.

Schemata - cognitive structures existing in long-term memory which organize information about a given topic. (Torney-Purta, 1991) These cognitive structures serve to connect new information with prior knowledge so that it can be meaningful and located in the future.

Concept mapping - a graphic representation of cognitive structure. “A schematic device for representing a set of concept meanings embedded in a framework of propositions” (Novak & Gowin, 1984, p. 15).

Concepts - “a regularity in events or objects designated by some label” (Novak & Gowin, 1984, p.15). A concept label creates an image in a person’s mind that is associated with the meaning established by that person. For example, the image of a flower might include roots, stems, leaves, and several common flowering plants for one person. To a landscaper, it might include the above description with more detail and a specific list of flowering plants categorized by color, season, soil type, and use.

Propositions - “two or more concept labels linked by words in a semantic unit” (Novak and Gowin, 1984, p.15). For example, a flower is a type of plant is a proposition. Imbedded in this proposition are the concepts of flower and plant and the meanings associated with each.

Reflective thinking - defined as “active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends” by Dewey

(1933, p. 9). Reflection holds special meaning for the social studies because without it the subject can become little more than the memorization of information perceived as irrelevant by students. (Thornton, 1994).

CHAPTER II

LITERATURE REVIEW

The purpose of this study was to evaluate concept mapping as a learning aid in economics. Maps provided by K-12 teachers enrolled in an economic education course were used to document change in conceptual knowledge over the two-week course. Understanding the development of student knowledge schemata enabled the researcher to improve the practice of teacher education. This literature review consists of four parts: 1) cognitive psychology and implications for meaningful learning; 2) models for meaningful learning; 3) research in social studies education and implications for this study; and, finally 4) economic education curricula and research on the learning of economics.

Cognitive Psychology

For many years, mainstream educational practice was informed by a psychology of learning that viewed learning as the accumulation of pieces of knowledge and bits of skills. The

student has been viewed as a retainer of, rather than a processor of, experience and information. This traditional view of learning is usually evidenced by a piece of verbal behavior being emitted to a stimulus such as written or verbal questioning (Strike and Posner, 1985). Since the 1960s, cognitive theories have received acceptance in American theory and research (Andre & Phye, 1986; Novak, 1992). These new theories have caused a rethinking of teaching and learning. Current cognitive theory offers a perspective on learning that is thinking- and meaning-centered. Modern cognitive psychologists share what has become known as the constructivist view of learning, asserting that people are not recorders of information but builders of knowledge structures. To know something is not just to have received information but also to have interpreted it and related it to other knowledge (Torney-Purta, 1991; Bransford & Vye, 1989; Resnick & Klopfer, 1989; Carey, 1986).

Teaching involves helping learners to understand their observations about the world. Students being presented with verbal or written information must gain understanding by relating this new information to what they know. Learning requires active,

constructive work. This is the cognitive rationale for making lessons relevant to students' concerns (Carey, 1986).

Meaningful learning is based on the construction of knowledge theory described above. The next section defines meaningful learning and its implications for teaching.

Ausubel's Theory of Meaningful Learning

Several learning theories are based on cognitive psychology's assertion about the construction of knowledge. This study is based on David Ausubel's theory of meaningful learning and Joseph Novak's subsequent application of meaningful learning using the concept mapping learning strategy.

In the 1960s, David Ausubel developed one of the earliest constructivist theories of learning. Ausubel's theory of learning, commonly referred to as assimilation theory, was based on the primary belief that learning must be meaningful rather than rote. To learn meaningfully requires a deliberate effort on the part of learners to relate new knowledge to relevant concepts and propositions they already possess (Ausubel, 1963, 1968; Ausubel,

Novak, & Hanesian, 1978). To facilitate this process, both teacher and student need to know the conceptual starting place.

According to Ausubel (1965), new meanings are acquired when symbols, concepts, and propositions are related to and incorporated within cognitive structure on a nonarbitrary, substantive basis. Since cognitive structure is hierarchically organized, the emergence of most new meaning reflects the subsumption of potentially meaningful material under more inclusive ideas already existing in a learners cognitive structure. Typically, meanings are learned by a process of extension, elaboration, or qualification of previously learned concepts or propositions. Thus concept meaning is a cognitive process involving the establishment of new representational equivalents. This cognitive process is not a manifestation of conditioning or rote verbal learning.

Additional Constructivist Learning Theories

Subsequent to Ausubel, other educational theorists and cognitive psychologists have stated the need for meaningful learning as opposed to rote learning (Carey, 1986; Royer, 1986;

McGilly, 1994; Resnick & Klopfer, 1989; Strike & Posner, 1985). Although terminology to describe the interaction between prior knowledge and new information varies, these theorists closely parallel or extend the work of Ausubel. Carey (1986) and Royer (1986) ascertain that when learning is not integrated with relevant knowledge that can be used to interpret a message, memorization may occur, but understanding will not. We do not simply “receive” the meaning of a message, we must “construct” a meaning by interpreting a message in light of our own knowledge. Something is understood when it has been integrated in a meaningful way into the learner’s existing knowledge structure. McGilly (1994) defines meaningful learning as the transfer of information from “working-memory” to “long-term memory”. She believes that elaboration, using facts stored in long-term memory to “embellish” on new, “to-be-learned information,” connects new information to existing information, thus, making it more memorable and meaningful. Elaboration provides the learner with multiple “hooks” or routes for accessing information stored in long-term memory. Without elaboration, information is stored in the form of less memorable, isolated pieces. Resnick and Klopfer (1989)

believe that to interpret new situations, to solve problems, to think and reason, and to learn, students must “elaborate” and “question” what they are told. They refer to this process as “generative learning” rather than meaningful learning. They believe learners must examine the new information and build new knowledge structures connected to already existing structures, repeating Carey and Royer’s idea of constructing knowledge. Strike and Posner (1985) suggest that learning is best thought of as a “process of inquiry” involving relating what one has encountered to one’s current ideas. To learn a new concept, a student must judge its consistency with other information based on prior experiences and knowledge.

Whether referred to as construction of knowledge, elaboration, or inquiry, cognitive psychologists and educators are stating a need for new conceptions of learning that will be referred to as meaningful learning in this paper. Current thoughts in cognitive psychology suggest that for those interested in the learning of subject matter, the idea of learning as conceptual change is a “fruitful approach” (Strike & Posner, 1985).

Concept Mapping for Meaningful Learning Theory

Joseph Novak and Bob Gowin (1984) developed models of learning based on Ausubel's premise that concepts and propositions are the central elements in the structure of knowledge and the construction of meaning. As do Carey (1986), Royer (1986), McGilly (1994), and Resnick and Klopfer (1989), Novak and Gowin believe that individuals construct their own idiosyncratic meanings. The Novak and Gowin model, known as cognitive or concept mapping, represents this idiosyncratic nature of learning.

Using assumptions from Ausubel's theory to study student learning, Champagne and Bunce (1991) state that students interpret classroom experiences in terms of what they already know. They actively seek to relate new information, ideas, and experiences to their existing knowledge that seems most relevant. They note that students may associate new information with existing knowledge in a manner different from what the teacher intended. In the constructivist framework, learning is more a process of refining existing knowledge than of simply storing new knowledge. They suggest that learning should be constructed in a

manner to facilitate the addition of this new information. Champagne and Bunce (1991) show that students begin their formal study of science with naïve theories about the natural world already in place. These naive theories¹ persist in the minds of students and influence their interpretation of science instruction. They develop as the result of children's experiences and are unexamined in any formal sense. Champagne and Bunce's emphasis on naïve theories in science is similar to Vosniado and Brewer's (1987) ideas about the role of misconceptions in social studies.

Carey (1986) believes that children have substantial cognitive abilities that should be stimulated and developed at an early age. She notes that knowledge is domain specific. Carey suggests that phenomena that were interpreted in terms of stage theory, developed by theorists such as Piaget, are better interpreted in terms of novice-expert shifts in particular domains. Torney-Purta (1991) reviews studies comparing novices with experts and describes the way each group organizes knowledge. Her findings suggest that the major differences between novices

¹These theories are also referred to as misconceptions or noncanonical theories.

and experts were in the coherence and integration of knowledge, not in the number of discrete bits of knowledge. Younger children have less elaborate or complex schemata for political, social, or economic events, and for geographic structures than older children. They bring less prior knowledge into the classroom. Torney-Purta (1991), as does Carey (1986) emphasizes the importance of prior knowledge in a specific domain.

Novak and others in his research group found that primary-grade children are not necessarily limited by developmental stages but rather by experiences to connect to and assimilate new knowledge. Children are capable of developing very thoughtful concept maps that they can explain intelligently to others (Novak, 1990b; Glynn, Yeany, & Britton, 1991).

These perspectives on cognitive psychology view the learner as a constructor of knowledge. In order to learn meaningfully, the student must connect new information to knowledge schema constructed from prior experience and learning.

Origin of Concept Maps

Concept mapping had its origin in research done at Cornell University to study changes in students' understanding of science concepts (Novak, 1990a). Novak and Musonda (1991) conducted a twelve-year longitudinal study to observe how concept meanings of individual students changed over time. They sought to ascertain what students knew both before and after instruction, and how their knowledge changed in subsequent years. They found that, as knowledge was constructed, domain specific schemata became more detailed and differentiated. From Ausubel's (1963, 1968) assimilation theory of cognitive learning, Novak and Gowin (1984) worked with the idea that new concept meanings were acquired through assimilation into existing concept/propositional frameworks. The task for educators and researchers was how to present new frameworks and how to observe changes within existing frameworks. Ausubel's theory stated that cognitive structure is organized hierarchically, and that most new learning occurs through subsumption of new concept meanings under existing concept/propositional schema. Novak, working with others, developed cognitive maps or concept maps to represent the

hierarchical concept/propositional frameworks in science (Novak, 1977; Ausubel, Novak & Hanesian, 1978; Novak & Gowin, 1984). Cognitive mapping originated as a way to summarize interviews with learners. Over time the researchers discovered that the learners could be taught to document their own knowledge schema and that the labeling of lines was essential to represent concept/propositional meanings. Thus, the concept map tool evolved as a way of representing both specific concept/propositional meanings held by learners before and after instruction, and the changes in cognitive structure which occurred over a period of time (Novak, 1990).

In *Learning How to Learn*, Novak and Gowin (1984) explain that concept maps should begin with more general, more inclusive concepts at the top of the map, and with progressively more specific, less inclusive concepts arranged below them. Different learners can construct different but equally valid concept maps. The maps may differ in the organization of the propositions. There are many correct ways to organize the content. A misconception is when a learner constructs an incorrect proposition. Learners constructing concept maps often remark that the process helps

them recognize new relationships and hence new meanings. Educative value is experienced when students recognize that they have grasped a new meaning and feel the emotion that accompanies this realization (Novak, 1990b). Learners need time and some mediating activity to think about ideas that are novel, powerful, or profound and to relate them to existing knowledge. This reflective thinking involves a “pushing and pulling of concepts” resulting in new connections. Novak and Gowin (1984) believe that students need practice in reflective thinking just as athletes need time to practice a sport. They describe the concept mapping learning strategy, the making, remaking and sharing of concept maps, as a team effort in the “sport of thinking”. Construction of a concept map provides a process for reflective thinking.

Concept Maps- A Reflection of Cognitive Structure

The cognitive psychology movement has re-awakened interest in memory. There is a surge in the attention that is being given to the sorts of knowledge people have and how they store it (White, 1985). This interest has resulted in a search for ways of

knowing and understanding cognitive structure - a search for a map of cognition.

James Wandersee's (1990) analogy comparing concept mapping to cartography provides an apt description of the purpose and utility of this tool for understanding cognition.

To map is to construct a bounded graphic representation that corresponds to a perceived reality. Cartography is the science of map making. From early on, humans have ventured forth to explore and then map their world of experience. Thus, 'to map' has always meant 'to know.' First, the map maker must encode the meaning, using appropriate graphic conventions. Second, the map reader must perform detection, recognition, discrimination, and estimation tasks in order to extract the meaning which was encoded. Opportunities for creativity are also present at both transformation points and may serve (a) to challenge one's assumptions, (b) to recognize new patterns, (c) to make new connections, and (d) to visualize the unknown. Every map reflects both its data and its designer. Maps are indicators of change. Changes in maps reflect changes in understanding. Prior knowledge of map makers affects their choice of data and the maps they constructed. Although maps are always somewhat inaccurate, approximate, and incomplete, so are the scientific theories which humans construct. Like a map, theories connect knowledge in many directions and are continually updated to incorporate new information. The act of theory building, like map making, exposes doubtful knowledge and calls for its replacement with more reliable knowledge. Therefore, 'the metaphor of the map' seems quite appropriate for holistic representation of scientific knowledge.

Wandersee, 1990, pp. 923-925.

Based on Wandersee's description of map making "as a human exercise in 'knowledge construction' or 'meaning making,'" concept mapping is an appropriate tool for mapping prior knowledge and changing conceptions, reflecting the interaction between the two. Empirical studies in several curricular areas have proven the efficacy of concept mapping for assessing cognitive structure and change (Novak & Musonda, 1991; Mintzes, Towbridge, Arnaudin & Towbridge, 1991; Stuart, 1985; Tomer, Tomer & Tamir, 1990; Wallace & Mintzes, 1990).

Using Concept Maps in Education

Novak and Gowin (1984) suggest that concept maps can play a role in all four components of education: teaching, learning, curriculum, and governance. Studies using concept mapping to document conceptual structures of students at all levels, adult to first grade, are not only in science but also in math, reading, and social studies are being reported (Mintzes, Towbridge, Arnaudin & Wandersee, 1991; Hoz, Tomer, & Tamir, 1990; McKeown & Beck, 1990; Okebukola & Jegede, 1989; Loncaric, 1986). Tamir (1985)

describes multiple uses of concept maps: learning, teaching and curriculum development, evaluation, and research. Many studies support using concept mapping as instructional, assessment, and research tools (Arnaudin et al., 1984; Glynn et al., 1991; Lehman, Carter, & Kahle, 1985; Novak, 1990a, 1990b; Okebulola, 1990).

Learning. Novak and Gowin (1984) believe that because concept maps are an explicit, overt representation of the concepts and propositions a person holds, they allow teachers and learners to exchange views on why a particular propositional linkage is good or valid, or to recognize missing linkages between concepts that suggest a need for new learning. For the learner, they help to make evident the key concepts or propositions to be learned, to suggest linkages between the new knowledge and what he or she already knows, and to make linkages between new concepts as a new conceptual structure is developed. (Arnaudin et al., 1984). Because they contain externalized expressions of propositions, concept maps are remarkably effective tools for showing misconceptions. Learning is an activity that cannot be shared; it is a matter of individual responsibility. Using concept mapping, meaning can be shared, discussed, negotiated, and agreed upon.

Whatever students have learned before needs to be used to fuel new learning. Arnaudin et al. (1984) report the value of concept mapping in facilitating meaningful learning. Working with college introductory biology students, they determined that concept mapping 1) helps students understand what meaningful learning is, 2) facilitates meaningful learning, 3) is an effective study technique, 4) provides a useful evaluation tool, and 5) is a useful tool for organizing and sequencing instruction. A twelve year longitudinal study and other studies by Novak (1990a, 1990b) in science education found that concept maps were not only a useful tool to represent changes in the knowledge structure of students over time, but also helped them to "learn how to learn." McKeown and Beck (1990) found that concept maps were useful to represent knowledge in disciplines other than science and aided in organizing and understanding new subject matter. Novak (1990b) and others (Hoz, Tomer & Tamir, 1990; Okebukola, 1990; Starr & Krajcik, 1990; Wallace & Mintzes, 1990) published in the special issue of the *Journal of Research in Science Teaching* believe concept mapping has become a metacognitive tool to help students take charge of their own meaning making.

Curriculum development. For the teacher, concept maps can be used to determine pathways for organizing meanings, for negotiating meanings with students, and to discover students' misconceptions (Novak, 1990; Tomer et al., 1990). In curriculum planning and organization, teacher developed concept maps are useful for separating significant from trivial information. Concept maps help teachers identify overarching concepts and examine the structure of the content to be learned. Instruction is then organized to communicate this structure to the learners (Tomer et al., 1990; Arnaudin et al., 1984). The overarching concepts are taught first, allowing subsuming concepts to be learned and 'connected' to the existing knowledge. The concepts would be presented so that the organization of the content is obvious. Through the organization of the content, the teacher helps the students make appropriate connections between concepts forming correct and meaningful propositions. The teacher reviews student maps and provides feedback regarding the propositions. The teacher has students work in groups to construct a concept map representing the material being learned. In a second instructional approach, the teacher uses a concept map to illustrate the basic

organization of the content before having the students to fill in the details or create linking words that define the propositions.

Communication of ideas through concept maps helps students understand their role as learners and creates a learning atmosphere of mutual respect (Okebukola, 1990; Novak & Gowin, 1984). Concept mapping allows the teacher and students to explore what the learners already know thereby mapping a learning route. The concept mapping technique promises many possibilities for helping the educator communicate with the learner. Learners can develop concept maps to organize concepts in textbooks; extract meaning from laboratory, studio, and/or field studies; read articles in newspapers, magazines, and journals; or plan a paper or exposition (Wallace & Mintzes, 1990; Novak & Gowin, 1984; Arnaudin et al., 1985).

Evaluation. Novak and Gowin (1984) report that research in most fields is limited by the measurement tools available. Once students learn how to prepare concept maps, their maps can be used as powerful evaluation tools (Arnaudin et al., 1984; Stuart, 1985). Concept mapping is a valuable assessment tool for higher order thinking defined by Benjamin Bloom (1956) in his *Taxonomy*

of Educational Objectives since it requires students to perform on all six levels (knowledge, comprehension, application, analysis, synthesis, and evaluation) in one composite effort (Novak & Gowin, 1984). Concept maps reflect the nuances of meaning a student holds for the concepts embedded in his or her map. When concept maps are conscientiously constructed, they are remarkably revealing of students' cognitive organization (Novak & Gowin, 1984; Wallace & Mintzes, 1990; Novak & Musonda, 1991).

Research. Novak and Gowin (1984) describe concept mapping as a metacognitive technique that helps students, teachers and researchers visualize the learners' understanding of concepts. This learning strategy provides a map for communication of learning by charting cognition (Wandersee, 1990). It allows the researcher to 'observe' the learning process and document how understanding changes over time or due to differing learning strategies. Prior and real world experiences can be captured by this holistic representation of knowledge schemata and thus facilitate the theoretical research changes in social studies suggested by Armento (1991). Many researchers are using concept maps to document conceptual change in knowledge

schema in science. Other areas being explored are teacher education (Adler, 1995; Dana, 1993; Tomer & Tamir, 1990; Beyerbach & Smith, 1990) with fewer in social studies education (Loncaric, 1986). These studies are described in more detail later in this chapter. Wallace and Mintzes (1990) suggest more research using concept mapping is needed to study not only overall gains in knowledge, but also explicit changes in the quality and quantity of concept/propositional frameworks. They suggest that any subject matter domain should be amenable to representation with concept maps.

Empirical Studies in Science Education

Novak (1992) and others in his research group (Hoz, Tomer & Tamir, 1990; Mintzes, Towbridge, Arnaudin & Wandersee, 1991) have shown that students bring relevant knowledge frameworks of varying degrees of quantity and quality to new learning tasks in science. The challenge has been not only to help students elaborate the conceptual understanding they already possess, but especially to modify those knowledge structures that contain misconceptions naïve theories.

A twelve-year longitudinal study by Novak and Musonda (1991) showed the lasting impact of early instruction in science education and the value of concept maps as representational tools for cognitive developmental changes. Using audio-tutorial science lessons with 191 first and second grade children and following their conceptual development through grade twelve, interviews that were transcribed into concept maps showed that the students instructed in science in the early grades developed significantly more valid concept understandings and fewer misconceptions than uninstructed students.

Heather (1985) used concept maps as an aid to instruction and as a form of assessment. She scored the map features (branching, general to specific, closed units, terminology, relationships, and hierarchy) separately and compared them with student performance on genetics examination-type questions. She found that the components were not all independent and did not have a strong relationship with performance on the traditional form of assessment.

Okebukola (1990) used concept mapping with 138 college biology students as a tool to aid in meaningful learning in genetics

and ecology. These topics were often “learned” using rote memory. The 63 students in the experimental group (concept mapping) performed significantly better on the *Test of Meaningful Learning in Genetics and Ecology*. Meaningful learning test questions were at the comprehension level or higher on Bloom’s Taxonomy. This test was constructed by experienced science teachers who identified a breadth of questions at the following cognitive levels: 40% comprehension, 30% application, 10% analysis, 5% synthesis, and 5% evaluation.

Okebukola and Jegede (1988) worked with college science students to determine whether cognitive preference and learning mode are determinants of meaningful learning through concept mapping. The results of the study suggest a difference in the attainment of meaningful learning through concept mapping by students with different cognitive preferences. Students who prefer learning strategies that use some type of visualization were predisposed to achieve well in concept mapping. This finding is in agreement with Tamir’s (1985) survey on cognitive preferences and achievement. Furthermore, students working cooperatively on concept mapping were found to attain a higher level of meaningful

learning than students working individually. In both studies, meaningful learning was assessed on a 40-item achievement test with questions identified as being at the comprehension level or above on Bloom's Taxonomy.

Lehman, Carter, Kahle (1985) studied the effectiveness of two learning tools, concept mapping and Vee mapping (experimental group), in helping black, inner-city, high school students learn biology concepts meaningfully. The control group used an outlining strategy. The instructional treatments were used for one semester with 250 students. No significant difference was found on the mean achievement test scores of the experimental or control groups. The researchers suggested this could be due to the lack of familiarity of students and teachers with the experimental heuristics; the relatively short duration of the study; and the extreme difficulty of the achievement instruments.

Teaching for Understanding

Cognitive learning theory presents a challenge for educators to better organize instructional material to help students learn

meaningfully (Novak & Musonda, 1991; Novak, 1990). McGilly (1994), Gowin (1981), and Wittrock (1987) use different terminology to describe similar approaches to teaching for understanding. All three, based on constructivist theories, stress the importance of connecting new information to students' prior knowledge.

McGilly (1994) states that the information-processing theories of cognitive psychology, when applied to education, shifts attention away from the products or outcomes of learning toward the processes involved in learning and teaching. Teaching methods that stress connecting new information with prior knowledge are necessary in helping learners to construct knowledge. McGilly states three criteria for teachers to use to help students learn meaningfully:

- 1) identify students' prior knowledge;
- 2) create learning situations that overlap with their prior knowledge; and
- 3) provide opportunities to help students see the connections.

Gowin (1981), using Ausubel's assimilation theory of meaningful learning, states that educating does not begin with a

blank slate, a clear page, or undisturbed phenomena. It begins in midstream with persons who are already educated to some extent. Even young students already know a lot when schooling begins. Teaching involves reconstructing what they already know and value into new patterns.

Wittrock (1987), focuses on teaching strategies to produce meaningful learning. He describes education as a “generative” process. His approach to teaching is based on the importance of knowing students’ existing knowledge schema. In Wittrock’s generative approach, the students, their knowledge, beliefs, and attitudes, are at the center of instruction.

1. Teachers should learn the relevant knowledge, beliefs, and models that students bring to the classroom. This background knowledge is critical in learning and in designing effective teaching. . . .

5. Comprehension of concepts, principles, and large units of text can be enhanced by teaching students to generate (a) conceptual relations across the sentences, paragraphs, and sections of the information they are learning, and (b) relations between the information and their knowledge and experience. . . .

(Wittrock, 1987, p. 32)

Wittrock’s generative approach defines teaching as the process of leading students to construct meaning from subject matter by relating its concepts to one another, to different

materials and ideas, and to their background of knowledge and experience.

Concept Mapping Studies in Teacher Education

Teacher educators have begun to use concept mapping as a tool for understanding content or pedagogical knowledge. The following studies documented the change process as learners, pre-service or practicing teachers, attempted to assimilate new knowledge with existing beliefs and experiences.

Hoz, Tomer, and Tamir (1990), using concept mapping with novice and experienced biology and geography teachers, found disciplinary and pedagogical knowledge lacking. Neither type of knowledge improved with experience. Geography knowledge actually deteriorated slightly. Teachers mastered disciplinary knowledge better than pedagogical knowledge but accomplished this by mastering smaller pieces of information. Experts in the disciplinary fields were better able to see content units of larger scope than the novices.

Dana (1993), joining Adler (1991b) in the search for pedagogical approaches that foster critical reflection on the part of

the prospective teacher, reported her findings using concept mapping to understand social studies education. In a paper presented to the Annual Meeting of the College and University Faculty Assembly of the National Council for the Social Studies, Dana described the use of the concept mapping strategy with 90 students in three sections of elementary social studies methods classes at two universities. She began her study by having students use the concept mapping strategy to describe their own personal experiences in elementary social studies classes. At the end of the course, students were again required to use a concept map to represent their conceptualization of social studies education. Students kept a log of their thinking during the map construction process. Dana's findings were "interpretive," meaning that, after data collection, the analysis involved interpreting the emergence of common themes that were not determined before the study. Dana found that, before the class, the students viewed social studies as "lifeless and boring," usually involving the memorization of a list of names and dates. The concept maps constructed upon completion of the course showed that students' had developed a conceptual understanding of social studies

education. Dana found students' feelings about the concept mapping strategy passed through four stages or comfort levels: comfort; trepidation and frustration; resolution; and elation and pride. Students initially expressed comfort with the idea of concept mapping and then frustration as they attempted to relate several concepts. Students then became resolved to the process. By the end of the semester most students reported feeling empowered by the process. She found that concept mapping helped students reflect on social studies education, assigned personal meaning to the subject, and empowered teachers to value their thinking.

Adler (1995) used concept mapping with undergraduate education students to assess the value of using case studies to learn about classroom management. Over a three-week period, the students' conceptual maps of classroom management became more complex. Students used more levels of hierarchies, concepts, and cross-links. According to the concept maps, students began to see classroom management as an issue connected to curriculum and learning rather than simply discipline and order. Adler noted

that although the maps became more complex she could not determine if the conceptualization affected practice.

Beyerbach and Smith (1990) used a computerized concept mapping program to assess changes in the content and organization of 17 pre-service teachers in early childhood education. Pre-service teachers were concerned with classroom management, knowledge, organization, and professionalism. This study found concept mapping useful in promoting reflective thinking and for describing students' evolving constructions of knowledge in a particular subject area.

Wallace and Mintzes (1990) examined the concurrent validity of concept maps as vehicles for documenting and exploring conceptual changes in cognitive structure after instruction intervention. The researchers used content inventories and concept maps to measure learning in 92 elementary education majors in a science education methods course at three universities. Concept maps of the experimental group that received instruction on given topic, showed evidence of significant and substantial changes in the complexity and propositional structure of the knowledge base. No changes were found in the

control group, instruction on another topic. Wallace and Mintzes suggest that concept maps provide a valuable research tool for measuring conceptual change.

Working with sixth grade teachers, Starr and Krajcik (1990) use concept maps as a tool for science curriculum development. Teachers, working in teams of two or three, developed the maps during four sessions, three and one-half hours in length. These sessions were a part of a curriculum development process for teachers of grades four through eight who were developing a concept based science program. Starr and Krajcik found that concept maps helped teachers develop science curriculum that is hierarchically arranged, integrated, and conceptually driven.

Research in Social Studies Education

Armento (1991) argues that social studies researchers need to draw from among the best of new theoretical constructs, new research paradigms, and new methodological tools if they are to address the problems currently facing the teaching and learning of social studies in a more meaningful way. This review now

examines the implications of cognitive psychology theories for social studies teaching, learning, and research.

Armento (1991) states that research on teaching social studies consists of too few studies which are methodologically sound and theoretically grounded, however, she suggests that research in teaching and learning social studies is changing and that debate among scholars is leading to new areas of focus. This section of the literature review discusses changes in social studies research, application of these changes to teaching and learning of social studies, and suggestions for application to the study of learning in economics.

Theoretical Changes in Social Studies Research

Armento (1991) notes that the cognitive psychology movement, which recently prompted changes in the research on teaching reading, mathematics, and science (Lehman, Carter & Kahle, 1985; Hoz, Tomer & Tamir, 1990; Glynn, Yeany & Britton, 1991), is influencing the research on social studies. The emphasis on conceptualizing teaching and learning as integrated, interdependent processes has changed the character of research

on teaching. Social studies researchers are now asking new questions regarding prior knowledge of learners and conceptual change throughout the learning process (Adler, 1995; Dana, 1993; McKeown & Beck, 1990; Kourilsky, 1993; Loncaric, 1986). These studies are described in the following sections.

Schema Theory- Applications to Social Studies

After summarizing the changes in cognitive psychology described earlier, Torney-Purta (1991) describes the implications for social studies research given findings in science and social studies. She notes that since cognitive psychology is based on the belief that 1) individuals construct idiosyncratic meaning, 2) knowledge and conceptions brought to the classroom influence student learning, and 3) the process of acquiring and remembering information is related to mental structures, schema theory offers promise for social studies research. According to Torney-Purta, cognitive structures, or *schemata*, exist in long term memory and can be modified. Schemata function to organize information that the students already possess relating to a topic. She refers to schema theories such as concept mapping, semantic networking,

or any other strategy that involves creating a graphic representation of the knowledge structure in one's mind related to a specific domain or content area.

According to Torney-Purta (1991), in the social studies what is presented by the teacher or the textbook as knowledge is received by the student and given meaning in terms of past experience and cognitive structures. The process of acquiring meaning and remembering is related to mental structures. In the social studies, knowledge of the political and social world is often presented to students through discourse directed to them by adults. Students are not able to explore independently as in the physical world. Therefore, learning and remembering is enhanced when the students use effective strategies to encode information. For meaningful learning to occur students must encode oral or written discourse by relating it to existing structures of knowledge or schemata.

Torney-Purta (1991) notes that schema theory strategies such as concept maps could facilitate meaningful learning in social studies by identifying key ideas, improving instruction, and assessing students' prior knowledge. She suggests that in the field

of social studies, educators should use simulations and other strategies to help students develop concrete experiences related to the social and political world. In social studies education, too many concepts explained without appropriate elaborations and connections to prior knowledge can be perceived as a list of information to remember.

In the *Handbook of Research on Social Studies Teaching and Learning*, Adler (1991a) reviews quantitative and qualitative studies that describe events within the social studies classroom. These studies find learners engaging in passive activities such as reading texts, listening quietly, completing worksheets, and taking examinations. Adler then calls for social studies teachers to help students learn reasoning and decision making processes, develop conceptual understanding, draw conclusions from data, and practice skills for participatory citizenship. Adler notes the large gap between social studies practice (what is happening) and the literature (what should be happening).

Implications for Social Studies Research

Vosniado and Brewer (1987) believe that it is often the case in social studies that students hold serious misconceptions about other people, places, and ideologies. They suggest the role of the teacher is to diagnose student misconceptions, understand the students' points of view, propose new frameworks, raise questions to illuminate inconsistencies and errors, and guide the learner to the construction of more meaningful schemata. The use of a learning strategy such as concept mapping could help researchers identify misconceptions; teachers identify key concepts and organize them in a meaningful way; and learners connect new learning with prior knowledge.

Concept Mapping in K-12 Social Studies Education

Loncaric (1986) looked at the effects of concept mapping on the acquisition of social studies concepts in fifth grade students. She used the concept mapping learning strategy with the experimental group. The control group continued with the traditional social studies curriculum. A researcher developed social studies test over the content was used as the measure of

concept acquisition. A two-way analysis of variance indicated that a significant difference exists between the mean social studies test scores of the experimental and control groups. She concluded that the mapping served as a tool to aid in the acquisition of social studies concepts for both low and high achieving students and suggested trial of the concept mapping strategy in other areas of the curriculum.

Economic Education

In the elementary and secondary school curriculum, economics is most commonly considered to be a sub-section of the social studies. It is most frequently integrated into the other areas of social studies. For example, while studying geography the students will learn about the natural resources of a country. The National Council on Economic Education working through university based Centers for Economic Education develops curricula and provides programs that help teachers learn economics and integrate it into the other areas of social studies and other disciplines. Since the focus of this study is economic

education, the literature on the learning of economics that is relevant to this study is reviewed as well as the materials used for the economics instruction produced by the National Council on Economic Education.

A social studies education text by Michaelis (1988) provides an example of the relationship between social studies and economics that is presented to teachers. In *Social Studies for Children: A Guide to Basic Instruction*, Michaelis defines the core disciplines of social studies as “history and six social sciences that study human relationships, problems, and interactions from various perspectives” (Michaelis, 1988, p. 137). Aspects of special importance for the social studies are noted in table 2.1. “The disciplines are linked by concepts and methods of study as well as by the focus on human relationships. . . . All the disciplines have their own historical dimensions, and all are concerned with the study of various aspects of human behavior” He further states that “political science and economics are policy sciences that study processes and decision making in two realms of human activity. Material from these two disciplines may be included in units based primarily on geography or history, or in separate units

on local, state, and national government or economic activities” (Michaelis, 1988, p. 137).

Michaelis (1988) notes that economic education has made many advances in recent years. Newer instructional materials include a clearly defined set of concepts and main ideas drawn from economics. Concepts such as division of labor and opportunity costs are introduced in the beginning grades and taught by using simulations of real-world events to provide concrete examples for the learners. Michaelis refers to materials produced by the National Council on Economic Education.

The National Council on Economic Education, a network of university-based specialists in K-12 economic education define economics as:

. . . the study of how the goods and services we want get produced, and how they are distributed among us. This part we call economic analysis. Economics is also the study of how we can make the system of production and distribution work better. This part we call economic policy. Economic analysis is the necessary foundation for sound economic policy. . . .

(Saunders, Chair with Bach, Calderwood, & Hansen, 1993)

Table 2.1: Social Studies Disciplines and Aspects of Each

Study of human relationships, problems, and behavior.	
Geography	Location, variation, and interaction of human and physical elements.
History	Description and interpretations of significant past events.
Economics	Production, distribution, and consumption of goods and services.
Political Science	Political behavior, and tasks, processes, and services of government.
Anthropology	Ways of living in diverse cultures.
Sociology	Social institutions, processes, and problems.
Psychology	Behavior of individuals and groups.

Adapted from Michaelis (1988)

The authors note another definition, favored by many economists, stating that “Economics is the study of how our scarce productive resources are used to satisfy human wants (p.5).” This definition emphasizes two central points: productive resources are scarce and human wants, if not unlimited, go far beyond our productive capacity (Saunders, et al., 1993).

Saunders and other noted economists and economic educators (1993) state the following regarding the purpose and importance of economic education:

The essence of economic understanding lies in being able to make sense out of the array of economic facts, events, observations, and issues that unfold before us, and in being able to make effective decisions about economic issues. The key elements of that understanding are the following:

- *Mastery of the basic concepts of economics.* Like all other disciplines, economics has its own tools of analysis and “language,” and students should know these well.
- *An appreciation of how the principal concepts of economics relate to each other.* Such an appreciation enables students to deal with the complex “real world” economic problems they will face as adults.
- *Comprehension of the structure of the economy.* This comprehension should also include a knowledge of how the various components and sectors of the economy interact.
- *Knowledge about major economic concerns—both public and personal.* Such knowledge and some understanding of how public and personal economic issues relate to each other provide a basis for grasping how individual actions shape and are shaped by economic forces.
- *Exercise of a reasoned approach to economic decisions.* Economic decisions can be reached more effectively if an objective, orderly, and reasoned approach replaces emotional, unreasoned judgments.

(Saunders, et al., 1984)

Saunders et al. (1984) recognize “major hurdles that must be overcome in raising the level of economic understanding--

particularly through improved education in the schools. The time allocated to economics in school curricula has always been limited. It may become even more limited as efforts are made to improve the teaching and learning of traditional basic subjects. As a result, whatever knowledge of economics students acquire comes and will come principally through the introduction of economics into other subjects such as social studies, history, home economics, and business education" (Saunders, 1984, p. 6).

Current Understanding of Economics Content

Problems in content knowledge in economics were found by Walstad and Larsen (1992). Their survey, conducted with the Gallup Organization, found low levels of understanding of economics concepts and theories in the American public, high school seniors, and college seniors. Correct answers about fundamental economics concepts were given by 35% of the high school seniors, 51% of college seniors, and 39% of the general public. Eighty-three to 87% of respondents rated their knowledge of economics as fair or poor. The researchers suggest that the actual and perceived low levels of knowledge may be due to a lack

of education in economics in the schools. The group surveyed felt that schools should teach more about our economy.

Teacher Training in Economic Education

Schober (1984) noted that for many years, teacher-training workshops have been a major component in programs designed to improve economic literacy of future citizens, voters, and decision makers. The rationale behind in-service teacher training is based on the notion of a “chain reaction” with an increase in teachers’ knowledge resulting in an increase in students’ knowledge. He found that two- and three-week workshops, offered by the Joint Council on Economic Education (now the National Council on Economic Education) through affiliated State Councils and Centers for Economic Education, have a significant positive impact on the economics achievement of the teacher participants as well as result in a significant increase in students’ economics achievement.

Scope and Sequence of Economics Concepts, K - 12

A review of materials available to teach economics to students in the elementary grades results in a rapidly expanding

list. Many of these materials are published and promoted by the National Council on Economic Education. A holistic interdisciplinary approach combined with real-world based experiences provides relevance and meaning for the learners of economics at all ability and socioeconomic levels (Kourilsky, 1987; Kourilsky & Campbell, 1984). These materials utilize current educational trends and theories such as cooperative learning, creative and critical thinking, thematic units, and experience-based education. The activities build on “students rich firsthand knowledge of the world as a result of their family, neighborhood, and school experiences” (Phipps, 1992, p. vii).

Framework Concepts and Scope and Sequence

A search for empirical literature testifying to the effectiveness of specific materials or supporting the scope and sequence of economics content developmentally appropriate for students at each level is sparse. Materials developed by the National Council on Economic Education (NCEE) and affiliated Centers for Economic Education were based on *A Framework for Teaching the Basic Concepts*, now in the second edition, by Saunders, Bach,

Calderwood and Hansen (1984), *Economics: What and When Scope and Sequence, K-12* by Gilliard et al. (1989), and more recently on the *Voluntary National Content Standards in Economics* (1997).

The *Framework and Scope and Sequence* were combined into one document in 1995. The combined document, the *Master Curriculum Guide in Economics: A Framework for Teaching Basic Economic Concepts with Scope and Sequence Guidelines, K - 12* (Saunders & Gillard, 1995), presents an explanation of the economic concepts selected for emphasis and makes recommendations for sequencing these concepts within the curriculum. It addresses the fundamental concepts and generalizations an economically literate person should know (the scope) and at what grade levels these ideas should be introduced and developed within the curriculum (the sequence) (Gilliard et al., 1989). It suggests the systematic introduction and development of concepts in simple forms at the lower grade levels followed by increasingly sophisticated expositions of the same concepts as students mature intellectually (Saunders & Gillard, 1995).

The content areas of the *Scope and Sequence* were influenced by a conference on the scope of economics conducted at the

Massachusetts Institute of Technology in 1986. Gilliard et al. (1989) reported the placement of content statements was influenced by (1) the structure of the discipline of economics, as previously enumerated in the *Framework*; (2) cognitive development theories and; and (3) current school practices.

The authors of the *Scope and Sequence* noted that wherever possible they used research to guide content placement but that existing research on children's understanding of economic ideas is incomplete, and in many areas fragmentary. They stated that "the guidelines are intended to serve as a basis for further and more systematic research in this area" (Gilliard et al., 1989, p. 6).

Voluntary National Content Standards in Economics

In 1997, the National Council on Economic Education (NCEE) developed and published the *Voluntary National Content Standards in Economics*. The standards are intended to help improve the quality of economic education in America's schools. The standards provide a tool for educators by defining what students in grades kindergarten through twelve should learn about economics. This knowledge will help them to become better informed workers, consumers and producers, savers and investors,

and citizens. The NCEE describes four attributes of these standards.

- 1) The standards have instructional value and are written for teachers.
- 2) The standards outline benchmarks, guides to application, and teaching suggestions and strategies. They are based on the belief that learning principles of economics can be enjoyable.
- 3) The standards help students learn reasoning and decision making skills that will help them to develop into responsible and effective participants in the American economic system.
- 4) The standards are based on insights and critiques of numerous educators and economists across the nation. They are well written and clear.

(NCEE, 1997)

Senesh's Conceptual Structure of Economics

Novak (1977) reviews the work of a noted educator and economist, Lawrence Senesh, from Purdue University. Novak notes that even though Senesh did not refer to Ausubel's work, he devised an economics curricula based on a conceptual schema. To facilitate meaningful learning of economics, Senesh systematically planned for the introduction of overarching concepts, progressive differentiation of concepts, and integration of new content. Novak notes that since Senesh

...found it necessary to show only relationships among these fundamental ideas suggests that a strict hierarchical ordering of concepts does not always characterize the organization of knowledge in a discipline. . . . From the standpoint of Ausubelian learning theory, however, the nonhierarchical form of Senesh's relationships presents no difficulty since efforts to achieve progressive differentiation of major concepts and integrative reconciliation among concepts require explicit instruction on interrelationships among concepts, and not sequential presentation from most elementary to most inclusive concepts. . . . (Novak, 1977, p. 148]

Novak's recognition and analysis of the differing conceptual structures in economics supports the application of concept mapping to the discipline of economics. The interrelationships between concepts replace the importance of the hierarchical presentation common in science.

Current Research in Understanding of Economics

This review of economic education research encompasses three major areas: concept development, learning and retention of economics concepts, and benefits of instructional materials and methods.

Concept Development in Economics

Schug (1983), using student interviews, found that qualities of student reasoning tend to follow a basic pattern of becoming more abstract, other directed, and flexible with increasing age. His statistical analysis of interview data indicated that the rate which reflective economic reasoning developed varied somewhat by grade and concept, although the general pattern was roughly a steady increase by grade. He described the development of reasoning as “Piaget-like” stages. He explained this phenomenon by attributing it to students' general economic experiences with family or friends. He advises economic educators to use the findings of cognitive development theorists such as Piaget to assist them in developing a curriculum that is appropriate for students at each grade level. Schug suggests that the intermediate grades are an appropriate level at which to emphasize instruction about many fundamental economic concepts.

Based on a review of literature in economic education, Kourilsky (1987) reports that children in every grade level, of different academic ability levels, of different socioeconomic levels, and through a variety of instructional methodologies are capable of

learning economic concepts. She states the importance of developmental awareness of educators to the teaching and learning of economics and, like Schug, recommends relating economics learning to the development stages established by Piaget.

A study by Laney (1989) concluded that real-life experiences and invented concept labels enhance the learning and retention of opportunity cost by first grade students. The teaching/learning of an invented concept label better aided the long-term recall of the concept label than the teaching/learning of the conventional concept label. For example, the students used the invented label 'next best' instead of the conventional label 'opportunity cost.' He also found students participating in a real-life experience scored significantly higher on the understanding of opportunity cost measure than students in the vicarious experience group regardless of the type of concept label that they were taught. This supports Kourilsky's (1983a, 1983b) claims about the superiority of real-life experiences over vicarious experiences in promoting economic learning (Laney, 1989).

A New Perspective on Findings. Based on cognitive psychology's new conception of learning, data analyses in the

above studies in economics could be reexamined and interpreted differently.

Schug's (1983) analysis indicated that the rate which reflective economic reasoning developed varied by grade and concept although the general pattern was roughly a steady increase. He attributed this phenomenon to students' general economic experiences outside of school. Schug suggested that students' concept development seems to follow a stage-like sequence but concepts within a child's experience may develop sooner. Utilizing constructivist theories based on the importance of prior knowledge, this finding would be expected. Students experience meaningful learning when connecting new learning with prior experience.

Wittrock's generative teaching approach could be used to explain the effectiveness of the invented concept label in Laney's (1989) study. Novak's and others' (Novak & Musonda, 1991; Novak & Gowin, 1984) studies reflecting the importance of prior knowledge support Laney's and Kourilsky's findings regarding the importance of real-life experiences.

Laney (1989), Kourilsky (1987), and Schug (1983) state the importance of developmental awareness to the teaching and learning of economics. However, based on current research in cognitive psychology, educators and researchers are realizing the importance of understanding students' prior knowledge and conceptual structures in order to improve the teaching and learning process (Gowin, 1981). Empirical studies, similar to the ones in science education and other areas, based on constructivist theories in cognitive psychology offer different possible interpretations to past findings.

Learning and Retention of Economic Concepts

Laney (1988) explored the learning and retention of economic concepts at the first, third, and sixth grade-levels. He found that first grade students were able to learn basic economic concepts as well as older students but did not retain them for as long. Laney suggests students' stage of cognitive development or stage of economic reasoning may be partially responsible for the differences in retention. He supports Schug's (1983) findings but recommends that the teaching of fundamental economic concepts for

intermediate grades include the second semester of third grade. Laney suggests that the assessment measures may not have been sophisticated enough to detect depth of conceptual understanding and that the instructional methods used with the older students may have provided more in-depth cognitive processing (1988).

Instructional Materials and Methods

A study by Ryan and Carlson (1973) concluded that different learners benefited differently from discovery and expository teaching at the first grade level. They recommend that educators move toward a selection of strategies in terms of not only the objectives of instruction but also the characteristics and background experiences of the individual for whom the teaching strategy is intended (Ryan & Carlson, 1973).

Kourilsky and Ballard-Campbell (1984) found that a highly individualized experience-based economics education/social studies program implemented at the elementary school level benefited students at all ability levels. Significant gains in economic decision-making and attitudes toward school and learning were manifested by low, middle, and high ability students.

Kourilsky (1993) reported exploratory research that resulted in a proposed strategy for identifying children's misconceptions in economics and ideas for correcting these misconceptions. She suggests that economic educators who are training prospective teachers of economics need not only be trained in alternative pedagogies but also to become aware of potential misconceptions of the learners in the existing content knowledge.

Walstad and Soper (1982) used a large national sample of high school classes to test the effectiveness of the Developmental Economic Education Program (DEEP) and the National Awards Program for Teaching of Economics (National Awards) awards program for teaching economics. The study measured both cognitive and affective domains using measures of achievement in economics (ACH), attitudes towards economics as a subject (ATE), and economic attitude sophistication (EAS). DEEP schools were those that had made a commitment to teaching economics including offering high school economics courses, integrating economics into other curricular areas, and sending their teachers to training sessions offered by the Joint Council on Economic Education (now the National Council on Economic Education).

The National Awards Program in Teaching of Economic recognized teachers who showed creativity in their approach to teaching economics. The findings indicated that a formal economics course has powerful effects on student achievement in economics and attitudes towards the discipline. Students enrolled in the DEEP schools showed significantly more economic understanding than students in non-DEEP schools. These students enjoyed economics more and held more sophisticated attitudes toward economic issues than students in non-DEEP schools. The impact of the teacher awards program was less positive. The students of the award-winning teacher held more positive attitudes toward economics but showed less economic understanding. Walstad and Soper suggested possible corrective actions in the awards program to ensure that teaching units display not only creativity, but sound presentation of content. Regarding DEEP, they suggested that the initial expenditures on materials and teacher training may have improved economics learning.

Lopus (1990) investigated the effects of expenditures on performance in high school economics to determine if the level of aggregation of the measures of expenditure affected the results.

She tested the effects of three levels of expenditures: 1) current total expenditure per student in the state; 2) current instructional expenditure per student (spending directly related to classroom instruction excluding administration, food service, and maintenance); and 3) seven variables that served as proxies for expenditures directly allocated to the high school economics class. These proxies measured expenditures for economics teachers (teacher education, teacher experience, and student/teacher ratio) and expenditures for materials and services used to teach economics (audiovisual materials, computers, supplementary texts, and consultants). The results indicated that increasing expenditures in the high school economics class results in higher achievement on the part of the students. Lopus found that spending money to hire teachers with advanced degrees, to reduce class size, and to provide economics education consultants for teachers has strong positive effects on student performance. Inputs directly allocated to the economics classroom had stronger effects on student achievement than more aggregated ones such as total expenditure per student (1990).

Lynch (1990) found that high school students have little chance of understanding both micro- and macroeconomics if the instructor has not taken a large number of economics courses. If the students were taking a social studies course with some economic content or a consumer economics course, there was little learning of economics (as measured by the *Test of Economic Literacy*) regardless of the number of courses that the teacher had taken. The only situation when students have a statistically significant gain in learning is when they are taking an economics course from a well-trained instructor. Economics students whose teachers have had few economics courses may not learn any macroeconomics or international economics. Lynch found that of the 2,483 students in the sample, fewer than one-third of them (802 students) took the type of course (economics) from the type of teacher (four to seven economics courses) that resulted in a statistically significant gain in learning in macroeconomics (1990).

A study by Bosshardt and Watts (1990) supports the importance of teacher training to the economic performance of high school students that Lynch (1990) found. Bosshardt and Watts believe that the “one key link in the educational process” is

teachers. Their findings support the importance of qualified, well-trained instructors and the benefits that can reasonably be expected from programs that improve their training. Using the Test of Economic Literacy to measure understanding, Bosshardt and Watts found that credit for coursework in economics, school size, active participation in DEEP, and higher student IQ scores positively and significantly related to teacher effectiveness (1990).

Becker, Greene and Rosen (1990) reviewed empirical studies on high school economic education and concluded that standardized tests scores have not shown a great difference between one method of instruction or program versus another. They note that this may be a shortcoming of the test instruments and call for the development of alternatives to 'standard paper-and-pencil' test instruments for assessing the value of economic education. They suggest that a "better conceptual basis is needed to integrate the why, how, and what teachers teach with what motivates students to learn" (Becker, Greene, & Rosen, 1990).

Laney, Moseley and Pak (1996) explored fifth-graders' ideas about selected art and economic concepts before and after an integrated art-economics unit. Seventy children within three

classrooms participated in the discipline-based art education unit developed by university-based art and economics educators and taught by elementary school teachers. Written and oral measures were used to pre- and post-test students' understanding and application of art and economics concepts. Laney, et. al. (1996) found that students' understanding of both art and economics increased after the shared curricular integration experience. The economics concepts were learned somewhat better than the art concepts. Higher-achieving students learned more than the lower-achieving students. The findings support the coupling of disciplines to facilitate the learning of concepts for transfer (1996).

Summary of Literature Review

Based on theories and research in cognitive psychology, suggestions for social studies research, the need to improve social studies and economics learning, this review of the literature supports a need for research on conceptual development in economics and learning strategies to promote meaningful learning. Ausubel's (1968, 1963) assimilation theory of meaningful learning

provides a theoretical base stressing the importance of prior knowledge to the learning process and viewing social studies learning in the holistic fashion recommended by scholars such as Armento (1991). Recommendations by Loncaric (1986) to use concept mapping as a learning aid and Dana (1983) to use it to foster critical reflective thinking present possibilities for use of this strategy for the learning of economics. The concept mapping tool, borrowed from research and instruction in science education, may be used in economics as a learning strategy for students and as a tool for instructors to use in studying the development of economics knowledge schema.

CHAPTER III

METHODOLOGY

Statement of Purpose

The purpose of this study was to evaluate concept mapping as a learning aid in economics. Maps provided by K-12 teachers enrolled in an economic education course were used to document change in conceptual knowledge over the two-week course. Effectiveness of concept mapping as a learning strategy was determined by comparing post-test scores between an experimental group (using the concept mapping strategy) and a comparison group (using a guided reflective journaling strategy) on a standardized multiple-choice test of economics. Further, to explore how students' conceptual schema change while learning economics, the researcher analyzed the concept maps for patterns of change over the two-week course, noting correct and incorrect conceptions, and comparing novice maps to maps completed by experienced economic educators.

Research Questions

For this study, a research tool known as cognitive or concept maps, developed by Novak and Gowin (1984) based on Ausubel's (1963, 1968) assimilation theory of meaningful learning was used to document and explore pre-existing knowledge and changing concept schemata. Further, concept mapping and journaling strategies were used to help teachers reflect on the content being learned.

The following specific research questions were examined.

1) Did the concept mapping group score significantly higher on the multiple-choice post-test of economics knowledge than a comparison group?

2) Did the student's concept maps reflect a progressive increase in depth and breadth of economic understandings as illustrated by a larger number of concepts, examples, correct propositions, and cross links?

3) Did student produced maps of economic concepts appear similar to maps produced by experts in the field?

Economics Course

The economics course, Summer Institute in Economic Education, was an intensive two-week, full-day format with mandatory attendance, participation in learning strategies, and assessment activities. The objective of the Institute was to teach fundamental, micro-, and urban economic concepts to kindergarten through twelfth grade teachers and to provide them with activities to integrate economics into their curricula. The researcher was a course instructor. Schober (1984) found that summer courses, similar in format, improve teachers' understanding of economics as well as improve economics achievement of students in subsequent classes taught by these teachers.

The course format included a wide array of activities designed to teach economic concepts while meeting the needs of students with differing learning styles. Lectures on economic content were reinforced by learning activities that the participants could use with students in various grade levels. Guest speaker presentations provided real-life application of economics in the

local, urban economy. Industry and museum field trips illustrated the past and present economy of the city. A day-long trolley tour traced the economic development of the city over time. Students discussed concerns or issues related to teaching economics at their grade level in small group curriculum sessions. The course description and expectations were reviewed the first day of class to familiarize students with the upcoming events and their purposes. The course syllabus is included in Appendix I.

Subjects

The subjects of the study were 55, K - 12 teachers participating in a four-credit, two-week graduate course offered collaboratively by two state universities in a large metropolitan area. Thirty participants (55%) taught elementary school, twelve (22%) taught middle school, twelve (22%) taught high school, and one was a student. Sixteen teachers (29%) worked in rural schools, twenty-six (47%) in suburban schools, and thirteen (24%) in urban schools. Thirteen (24%) teachers had no previous exposure to economics. Thirty (55%) reported taking at least one undergraduate economics course.

Research Design

The research design for this study was quasi-experimental, consisting of an experimental and comparison group. The data for this study were collected before, during, and after students participated in the Summer Institute. Students' knowledge of economics was assessed on the first day of the two-week class using a multiple-choice test of economic concepts, consisting partly of questions from a nationally normed test and partly of questions written especially for this class. Students were divided into two groups based, in part, on their reported previous experiences with the learning strategies. Different learning strategies were taught to students in an experimental and a comparison group. A post-test version of the same modified, standardized test was given at the end of the course to determine economics learning within each group.

The 19 students who indicated previous experience using the concept mapping learning strategy (CM) were placed in the experimental group. Many of these students had used a technique

called webbing or had seen concept maps used as advance organizers. Although, these are not concept maps as defined and/or used in this study, these students were placed in the experimental group because of any possible similarities in the strategies. The remaining 36 students were assigned to the experimental or comparison group in a stratified random manner, to achieve roughly equal numbers in each group of teachers of similar grade levels and/or subjects. The comparison group of 27 students participated in an alternative strategy, guided reflective journaling (GRJ). Both strategies required students to reflect on the concepts presented in class. The CM strategy emphasized connections between and among concepts while the GRJ strategy focused on application of learning to the participants' daily lives. (See Appendix II for letter to participants and form requesting information about use of learning strategies.)

An economics pre-test was given at the beginning of the two-week economics course, and a post-test was given at the end. These test scores were used to determine if the CM group developed a better understanding of economics knowledge than the GRJ comparison group. Participants were allowed to review their

pre-test results and to ask questions about economic content needing clarification before the final examination.

Data Collection

One month before the beginning of the class, students received letters explaining the study and requesting permission to use their test scores, learning strategy results, and course portfolios for research purposes. The letter to the participants is included in Appendix II.

Subjects in the experimental group were sent a packet of information explaining the concept mapping strategy and asking them to complete one map prior to the class. Subjects in the comparison group were sent a packet of information explaining the guided reflective journaling and asking them to complete the first journal entry prior to the class.

Experimental Group

The experimental group was instructed to use the concept mapping strategy. Participants were sent a practice exercise, then were asked to construct, prior to the beginning of the course, a concept map documenting their pre-course economics knowledge.

Concept Mapping Instruction

Students were taught the concept mapping strategy and asked to produce four maps throughout the two-week course. The instruction of the concept mapping strategy was given in writing to students prior to class. They were provided with example maps from social studies education. The sample maps did not include economic concepts, so students didn't have the opportunity to memorize a given map. Learners were given a list of concepts to include in the concept map. Written instructions for concept mapping and the list of concepts are included in Appendix III.

Concept Mapping Data Collection

Concept maps were completed and collected according to the schedule in Figure 3.1. The data collection dates for the concept mapping were determined by the amount of economics content covered. The final data collection date allowed time for students to complete a quality product through several revisions without time constraints.

Figure 3.1: Concept Mapping Data Collection Schedule

Map #	Completed	Collected
First	Before class	First day of class
Second	Fourth day of class in groups	Third day of class
Third	After fifth day /discussion & revision sixth day	Seventh day of class
Fourth	After course	Portfolio due date

Students were asked to document the amount of time spent constructing each map, titles of any reference materials used when constructing any map, and their reflections on the mapping process.

First Mapping Session. Students were asked to attempt the mapping process before the first class session and invited to call the researcher if they had any questions. The researcher contacted each student by telephone the week before class began to see if they understood the mapping process. She explained that the first map provided a base-line measure for content knowledge and that they should not be concerned if they did not know all or most of the concepts at this time. On the first day of class, the researcher spent thirty minutes with students in the experimental group answering questions about the mapping process. The

investigator emphasized the idiosyncratic nature of the maps, informing students that although she was looking for maps reflecting their understanding of economics, there was not one correct answer. The pre-course maps were collected on the first day of class. The following day the researcher reviewed the concept mapping (CM) process with the students in the experimental group.

Second Mapping Session. For the second map, students worked in groups of two or three on a collective map. These group maps were collected by the researcher on the fourth day of class. On the following day, critiqued maps were returned to the students and a partial sample map of economic concepts was constructed to provide modeling, practice, and a review of the process. The processes of linking concepts and labeling lines with linking words (propositions), branching-out, and making cross-links was reviewed and reinforced. The scoring process was discussed at this time to help students understand the evaluation process as well as the elements of a well-constructed map.

Third Mapping Session. The third map was constructed by students individually after the fifth day of class. Students shared

this map with their peers on the sixth day. The researcher asked students to revise their maps on the evening of the sixth day. The revised maps were collected on the seventh day. Maps were critiqued and returned to students the next day.

Final Mapping Session. Students' final maps, constructed individually after completion of course instruction, represented for each, the total collection of economics knowledge at the end of the course. Students were given two weeks to complete their final maps and other course requirements. This additional time allowed for reflection, in-depth organization, and revisions of the final map.

Comparison Group

The comparison group participated in the guided reflective journaling (GRJ) strategy. This strategy was developed to aid students in the process of constructing meaning using a different strategy than the concept mapping. In the guided reflective journaling group, students were asked to spend time reflecting on the economics content presented, considering applications to their personal lives, and planning integration into their own classrooms. Students in this comparison group, guided by specific questions

designed to assist them in the reflective process, were asked to include in their journal entries the same concepts covered on the concept maps. GRJ questions are included in Appendix IV.

Guided reflective journaling learning strategy

Both journaling and reflective thinking are practices that have been used in social studies teacher education (Adler, 1991b; Fulwiler, 1987). The guided reflective journaling strategy was designed to encourage teachers to think reflectively about the economics content, its application to their lives, and effective ways to learn the content.

In defining the journaling process, Fulwiler (1987) suggests that language scholars such as Vygotsky, Moffett, Britton, Elbow, Berthoff, and others argue that human beings find meaning in the world by exploring it through language. He defines language as students' "own easy talky language, not the language of textbook and teacher" (Fulwiler, 1987, p. 1). The skillful educator makes use of such language for learning. The journal provides this opportunity for learners to express their ideas and thoughts and for teachers to become aware of students' thoughts. Journals have

become recognized as useful pedagogical tools in disciplines where critical independent thought, speculation, reflection, or exploration is important. Journals have been widely used in programs which have internship components, such as nursing, education, and counseling, to help learners keep track of their professional growth while learning on their own. Journal or logs have also been used for professional fieldwork of observational sciences (Fulwiler, 1987).

Guided reflective journaling instruction

For this study, the journal was used to structure the students' reflection on their learning of economics. The guided reflective journaling was explained in written form and mailed to teachers in the comparison group in early June. Teachers were asked to complete one journal entry describing their initial understanding of specific economic concepts and their expectations of course participation. Any teacher experiencing difficulty with the pre-instruction journal entry was encouraged to call the researcher for guidance.

Students reflected on their prior knowledge and conceptions of economics before beginning the class. They noted questions generated from their writings and reflections on their knowledge. The researcher provided questions to help students focus on concepts relevant to the class. Questions about the GRJ process or the economics content were answered and discussed in the small group curriculum sessions the first day of class.

During the course students were asked to reflect on specific concepts, the application to their lives, and the implications of inclusion in their curriculum. A double-entry journal system was used providing space for the instructor to comment on entries or for the writer to return and add additional comments at a later time. Students reported that they reflected and wrote journal entries daily for an average of thirty to forty-five minutes. They were asked to spend approximately fifteen or twenty minutes but many students reported exerting extra effort on the assignment.

Guided Reflective Journaling Data Collection

Journal entries were completed daily and collected on the second, fifth, and eighth day of class. The researcher read

students' entries each time they were collected and added comments that clarified or reinforced statements made by the students. These comments showed a concern for their thoughts in this learning process. In addition to showing what students were learning, the comments helped the instructor to know the students and their interests.

The completed journal was submitted as part of the portfolio assessment. The due date was two weeks after the completion of class.

Assessment of Economics Learning

Students' were pre- and post-tested on the first and last days of the course respectively. The pre- and post-tests were composed of 45 questions from the *Test of Economic Literacy* (TEL) and of instructor provided questions on urban economics² (Appendices V

² The TEL was normed in 1977 using a nationwide sample of high school students. Reliability of the TEL was measured using the standard error of measurement and the Cronbach Alpha. The standard errors of measurement on the TEL Form A and Form B are 3.02 and 3.01 respectively. The Cronbach's Alpha equaled .875 and .872 for Form A and Form B respectively. The content validity of the test was established by a working committee, composed of economists, economic educators, and high school teachers who designed the test. It was then reviewed by members of a National Advisory Committee overseeing the development of the test. The two panels exercised their expert judgment as to the appropriate content and structure of the instruments (Soper, 1979). The TEL questions cover fundamental, microeconomics and macroeconomics. Fifteen of the macroeconomics questions were deleted and 14 urban economics questions, written by one of the course instructors, were substituted.

and VI). The students were allowed to see their pre-test results during a review session the day before the final exam. They were allowed to ask questions about any economic content over which they wished clarification before the post-test.

Learning Strategies in Portfolio Assessment

To ensure that students put reasonable effort into the concept mapping and guided reflective journaling strategies, these learning strategies were mandatory parts of the portfolio assessment. The course grade was determined by the portfolio assessment. The economics pre- and post-tests were also mandatory. The CM and GRJ were assigned point values, however, students were given full credit for timely completion of these products.

Data Analysis

The data was analyzed both quantitatively and qualitatively. The pre- and post-tests of economics and the concept map scores served as measures for the quantitative analyses. The concept

maps also provided a rich source of data for the qualitative analysis.

Quantitative Analysis

Analysis of covariance (ANCOVA) provided insight into inter-group differences in economics learning. The modified TEL pre-test score served as a covariate, partialing out the effect of prior knowledge.

Analysis of covariance uses comparisons of regression equations with one or more variables (usually continuous) being introduced for the sole purpose of control. Instead of controlling extraneous variance directly, it is possible to control for it indirectly by the use of statistical techniques. This is accomplished by partialing out of the dependent variable, the variable or variables, for which one wishes to control. Comparisons among treatments in ANCOVA are equivalent to comparisons among the intercepts of the regression equations in which the dependent variable is regressed on the covariate (Pedhazur, 1982).

Dependent Variable

The course post-test score measured the level of economic understanding at the end of the two-week course and served as the dependent variable.

Treatments

The group, experimental or comparison, served as the independent variable of interest in the ANCOVA. The experimental (CM) group was coded as 1, and the comparison (GRJ) group was coded as 0.

Covariate

The course pre-test was used as the covariate, controlling for variation in prior knowledge of students. Prior knowledge varied considerably among subjects of this study because of the different grade levels and subjects taught and the number of economics courses previously taken.

Qualitative Analysis of Concept Mapping

Construction of concept maps involves the learner placing concept labels on a page and linking them, where appropriate, with lines to show relationships between and among concepts. These relationship lines are labeled with a suitable linking word or phrase that reveals the proposition(s) that the learner sees as linking the concepts. Once the relationships are described, the implication is that the construct (cognitive structure) is one in which the relationships are specific, numerous, and context specific. It is assumed that the propositions reflect the information in the learner's cognitive structure. (Stuart, 1985)

Prior knowledge, misconceptions or naive theories, and conceptual change in economics knowledge schemata were illustrated on the series of concept maps by the students' organization of concepts, the propositions used to connect the concepts, and the amount of elaboration. In this study, concept maps were analyzed as follows: they were scored to define and analyze conceptual change; expert maps were collected in an attempt to construct an "ideal" in organization of knowledge; and comparisons were made of emergent patterns across students.

Scoring System

For this study, concept maps produced by the subjects were scored to determine the amount of and the nature of the change in conceptual knowledge illustrated by the students over the course of instruction.

Novak and Gowin (1984) suggest scoring concept maps using the criteria described in Figure 3.2. Novak and Musonda (1991) suggest scores on each of the individual map components can be treated as separate measures of the amount of concept development and connections between concepts in the content domain or can be combined to form one aggregated score. Stuart (1985) recommends using the component scores as separate measures in order to detect differences in the level of complexity of the concept maps of one learner in a pre-test/post-test situation and between different learners. Stuart also found the level of reliability to increase when scoring the component parts separately.

Figure 3.2 Scoring Criteria for Concept Maps

1. *Propositions*. Is the meaning relationship between two concepts indicated by the connecting line and linking word(s)? Is the relationship valid? For each meaningful, valid proposition shown, score 1 point.
2. *Cross-links*. Does the map show meaningful connections between concepts? Is the link valid. 2 points for each cross-link that is valid. Cross-links can indicate creative ability and special care should be given to identifying and rewarding its expression. Unique or creative cross-links might receive special recognition, or special points.
3. *Examples*. Specific events or objects that are valid instances of those designated by the concept label can be scored 1 point each.

-Adapted from Novak and Gowin (1984) Learning How to Learn.

For this study, the three concept map component parts described in Figure 3.2 were scored and analyzed. These component scores were a modification of those suggested by Novak and Gowin (1984). Novak's (1977) description of Lawrence Senesh's economics work, described in chapters one and two of this paper, suggest that interrelationships in the discipline of economics replaces the hierarchical (general to specific) structure usually found among science concepts. This suggestion supports the use of a cross-link score in lieu of a hierarchy score when evaluating economics concept maps.

Novak and Gowin suggested using raw scores for each of the three component parts (propositions, cross-links, and examples) to compare and describe the conceptual change. Because the scoring procedure was revised as the researcher analyzed the students

maps, the final scoring protocol is discussed in Chapter 4 (Figure 4.1.).

Novak and Musonda (1991) and Stuart (1985) believe that while the numerical concepts map scores do detect differences between individuals, and within individuals over time, they miss much of the data provided by a concept map. Stuart (1985) suggests that a more holistic and qualitative scoring technique needs to be developed. As the maps are “both rich and idiosyncratic, ... to continue to rely on numerical scores... is to risk missing research data of great value as well as diagnostic data used to help the pupil” (p. 80). For this reason, the concept maps in this study were further analyzed qualitatively for common misunderstandings and for mapping content patterns that might help the course instructors improve instruction by helping students to organize the information.

Reliability and Validity of Concept Maps. Based on their twelve-year longitudinal study in science education, Novak and Musonda (1991) found concept maps to be valid and reliable assessments of cognitive structure. Novak and Musonda (1991) believe that concept maps have construct validity in terms of

evaluation theory. Stuart (1985) found that simple aggregate scoring systems meet technical criteria necessary to establish reliability, but that a set of the component scores is more reliable. In a study by Novak and Musonda (1991) concept maps scored by seven graduate research assistants were found to have an inter-rater correlation of $r = 0.95$. For this study, the researcher scored six concept maps in order to construct a scoring rubric. The scoring process was then discussed with a social studies educator who had experience scoring concept maps and then modified. The researcher then scored the post-economics instruction concept maps for this study.

Novice/Expert Comparisons

Cognitive research (McGilly, 1994; Torney-Purta, 1991) shows us that experts on a topic reason more powerfully about that topic and learn new things related to it more easily than do novices. Learning is easier when we already know enough to have organizing schemata that we use to interpret and elaborate upon new information. The major differences between experts and novices were found to be in the coherence and integration of

knowledge, not in the number of discrete bits of knowledge (Resnick and Klopfer, 1989; Torney-Purta, 1991). Shuell (1990) found that experts in a domain are able to demonstrate understanding in ways that are “more-or-less automatic.” A task that once constituted a problem for a new learner becomes little more than simple recall for the more experienced and sophisticated learner. To provide a baseline for comparison, concept maps were requested from experts in the field: economists, economic educators, and social studies educators. The maps collected from the experts were intended to provide domain specific novice/expert comparisons.

Emerging Patterns

The content of the concept maps was reviewed for patterns representing structure of content, the appearance of integration of new knowledge with prior knowledge, development of a conceptual understanding, and any persistent misconceptions. Since the concept mapping strategy is new to economic education, the qualitative findings could not be predicted in advance (Patton, 1990).

Practitioner—Researcher

Adler (1993) notes that teacher educators are often torn between their practice of teaching and expectations for conducting research. She argues that research and practice need not be separate. Teaching and conducting research should be seen as part of the same whole. She asks teacher educators to consider defining a broader conception of research, one she describes as disciplined, reflective inquiry into practice. Adler charges teacher educators “to reflect upon our experiences of practice and our inner worlds of meaning emerging from that practice, in ways that are publicly meaningful” (p. 160). She states that to be a scholar a reflective practitioner must first be conscious of and thoughtful about one’s practices and then accept the responsibility of communicating this awareness and the resulting insights to one’s peers. Adler defines four elements that she believes to be essential to reflective inquiry. These include 1) having a sense of responsibility to one’s professional community, 2) paying attention to the contexts of practice, and 3) identifying patterns and

anomalies in the teaching process. The fourth element suggested by Adler is the recognition of the ongoing spiral nature of research requiring a plan, action, critical awareness, retrospective reflection, and then another action. Adler (1993) states that "Reflection, or inquiry, is the attempt to grasp the essential meaning of something and that meaning is multi-dimensional and multi-layered. As one reflects on experience, the researcher seeks out essential themes as foci" (p. 162).

Adler believes the practitioner researcher can bring a valuable perspective to the field of social studies education. She asserts that we can broaden and deepen our understanding of educating through the thoughtful description of and reflection upon practice (Adler, 1993).

For this study, the idea of a "practitioner researcher" was appropriate since the researcher was a course instructor. The researcher desired to understand not only whether concept maps are superior to other strategies in facilitating students' learning of economics, but also students' changing conceptual schemata as their understanding of economics evolved. The latter inquiry helped the researcher to better structure course content by

identifying common misconceptions or missing understandings. It is hoped that others will be informed by and will benefit from the findings of this study.

CHAPTER IV

FINDINGS

The research data was collected and analyzed both quantitatively and qualitatively. This chapter first describes the quantitative analysis used to determine if the concept mapping group score was significantly higher on the multiple-choice test of economics knowledge than the comparison group. Next, the qualitative analysis addresses the second research question by reviewing changes in depth or breadth of economic understandings as illustrated by a larger number of concepts, examples, correct propositions, and cross links. The qualitative analysis was also used to compare the student produced concept maps to the expert produced maps, addressing the third research question.

The following specific research questions were examined:

- 1) Did the concept mapping group score significantly higher on the multiple-choice test of economics knowledge post-test than a comparison group using an alternative learning strategy?
- 2) Did the students' concept maps reflect a progressive increase in depth and breadth of economic understandings as

illustrated by a larger number of concepts, examples, correct propositions, and cross-links?

3) Did student produced maps of economic concepts appear similar to those maps produced by experts in the field?

Analysis of Covariance

Analysis of covariance was used to determine if the experimental group (concept mapping learning strategy) score was significantly higher on the multiple-choice test of economics knowledge than the comparison group (guided reflective journaling learning strategy) after controlling for variation in students' prior knowledge. The economics pre-test score served as a covariate, partialing out the effect of prior knowledge. Fifty-five cases were processed with no cases missing. The type of treatment (concept mapping versus guided reflective journaling) was not found to be a significant predictor of post-test performance.

Dependent Variable -- Economics Post-Test

Descriptive Statistics

The economics post-test served as the dependent variable, measuring the level of economic understanding at the end of the course.

The overall group mean on the post-test was 33.67 (75%) correct out of 45 questions with a standard deviation of 4.26. The concept mapping group post-test mean was 34.25 (76% correct) with a standard deviation of 4.57 and a range of 16. The guided reflective journaling group post-test mean was 33.07 (73% correct) with a standard deviation of 3.91 and a range of 14.

Table 4.1: Pre- and Post-Test Scores

Learning Strategy	Number of Cases	Mean Pre-Test Score	Standard Deviation	Range	Mean Post-Test Score	Standard Deviation	Range
Concept Mapping	28	29.11	5.17	20	34.25	4.57	16
Guided Reflective Journaling	27	28.19	4.56	14	33.07	3.91	14
Total Group	55	28.65	4.89		33.67	4.26	

Covariate--Economics Pre-Test

Descriptive Statistics

The economics pre-test measured the level of economic understanding at the beginning of the two-week course and served as the covariate, controlling for variation in prior knowledge of students. A range of 20 for the CM group and of 14 for the GRJ group indicated that prior knowledge varied considerably among the subjects. This was expected since the subjects had varied backgrounds and differed in the number of economics courses previously taken.

As summarized in Table 4.1, the overall group mean on the pre-test was 28.65 (64% of 45 questions correct) with a standard deviation of 4.89. For the CM group of 28 students, the pre-test mean was 29.11 (65% correct) with a standard deviation of 5.17 and a range of 20 points. For the GRJ group of 27 students, the pre-test mean score was 28.19 (63% correct) with a standard deviation of 4.56 and a range of 14 points.

Mean Difference - (Pre-Test and Post-Test)

A t-test for paired samples was used to determine if the gain in knowledge from the pre-test to the post-test was significant. The t-value of 9.43 was significant at the $p < .000$ level indicating that this difference was not due to chance alone.

Table 4.2: t-tests for Paired Samples

Variable	# of Pairs	Correlation	2-tail Sig.	Mean	SD	SE of Mean
Post				33.6727	4.260	.574
	55	.632	.000			
Pre				28.6545	4.858	.655

Paired Differences

Mean	SD	SE of Mean	t-value	df	2-tail Sig.
5.0182	3.946	.532	9.43	54	.000

ANCOVA Results

The covariate was found to be significant at the $p < .000$ level ($F = 33.87$), indicating that the prior economics knowledge of the students was the major predictor of their level of knowledge at the end of the course. The raw regression coefficient for the pre-test was .548. This coefficient squared ($r^2 = .300$) represents the correlation between the pre- and post-test. Therefore, thirty percent of the variance was explained by the pre-test covariate.

It reasonably could be assumed that the remaining variance indicates that economics learning did take place during the course. One could speculate that at least part of this learning might be explained by the effects of the concept mapping and guided reflective journaling learning strategies. On the other hand, the analysis of covariance indicated that there was no significant difference in economics learning between the experimental and comparison groups ($F = .547$), indicating that concept mapping was no more effective as a learning strategy than guided reflective journaling.

Table 4.3: ANCOVA Results

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig of F
Covariate	379.090	1	379.090	33.870	.000
PRE	379.090	1	379.090	33.870	.000
Main Effects	6.128	1	6.128	.547	.463
TRMT	6.128	1	6.128	.547	.463
Explained	398.098	2	199.049	17.784	.000
Residual	582.011	52	11.193		
Total	980.109	54	18.150		
Covariate	Raw Regression Coefficient				
PRE	.548				

Qualitative Analysis

Qualitative analysis provided insight into whether the concept maps produced by the students' in the experimental group reflected a progressive increase in economic understandings over the two-week course. This change was measured by increasing numbers of concepts, examples, correct propositions, and cross-links.

Scoring of Concept Maps

An attempt was made to score the initial (pre-economics instruction) concept maps in order to compare them with the post-economics instruction maps however, the initial maps were not complete enough to provide an accurate comparison. The researcher was not able to determine if a low score on the initial CM represented the students' lack of understanding of the mapping process or a lack of content knowledge. Eleven students indicated they did not include some concepts because they did not know the meaning or where to place them on the map. Twelve students omitted linking words between concepts or used only one

linking word to cluster many concepts. The importance of linking words was explained verbally and then modeled during class sessions before the students fully included them in their maps. Four pre-economics instruction maps and four post-economics instruction maps are reviewed in the case studies in this chapter for illustrative and comparative purposes (Figures 4.9 - 4.16, pp. 125-141). Two expert maps are also included (Figures 4.17 and 4.18, pp. 146-147).

In scoring the concept maps, the researcher tested the rubrics described in Chapter 3, page 70 (Figure 3.2) on six maps and then reviewed the scoring procedure with an educator/researcher experienced in the use of concept maps. The 'clustering' and the 'number of concepts included' components were omitted at this time for the following reasons.

One, the researcher initially attempted to replace Novak's hierarchy component used in science content (Novak & Gowin, 1984) with a 'clustering' component, reflecting related concepts. On some maps, the economic content formed clusters of concepts, however, scoring these clusters presented problems. They varied greatly in number of concepts included in a cluster. It was difficult

to determine the beginning and end of a cluster. Many maps did not include clusters.

Two, the researcher also attempted to give credit for inclusion of many concepts by creating a 'number of concepts included' component. At least one person included many concepts that were not appropriately connected to other concepts. In this case, the inclusion of many concepts did not represent meaningful connections and falsely inflated the score on the concept map. The researcher believed that the 'correct linkages' components represented the same understandings as the 'number of concepts included' and was therefore redundant. It was determined that the use of the 'correct linkages' component more accurately represented the content.

The revised scoring rubric is explained in Figure 4.1. Additional components designed to reflect the specific economics content students were instructed to include on their maps were added to the rubric.

Figure 4.1: Concept Map Scoring Rubric

# Pts. Possible	Map Structure and Content Criteria
5 pts.	<p>Use of all Concepts: Students were awarded five points for using all of the required concepts. Partial points were given as indicated. Listed below.</p> <p>5 pts. - 45 - 48 concepts 2 pts. - 37 - 32 concepts 4 pts. - 39 - 44 concepts 1 pt. - 31 - 26 concepts 3 pts. - 33 - 38 concepts</p>
1pt./ each	<p>Correct Linkages: Students were awarded points for correctly linking concepts. This illustrated understanding of relationships between concepts (formation of propositions). Points were not awarded for incorrect linkages. Points were not awarded for linking to examples. Points were awarded when linking words were vague but not incorrect.</p>
5 pts./ each	<p>Use of Cross-links: Cross-links represent connections between the concept clusters. Each of these was awarded five points. To qualify as a cross-link, the connecting line must cross the schema to connect two clusters of thoughts.</p>
.5 pts./ each	<p>Use of Examples: Examples connect the concepts to the real-world and demonstrate application of understanding. They must be specific and concrete. When odd numbers of examples were included, the score was rounded up to the next even number.</p>
Content Specifics	
5 pts./ each	<p>Stated Economic Problem: Points were awarded if the student defined the economic problem as scarcity due to unlimited wants versus limited resources. Students were told to include this understanding in their maps.</p>
5 pts./ each	<p>Productive Resources: Points were awarded for correctly including the three productive resources. Partial points were awarded if a resource was omitted or mislabeled. For example, three of the five possible points were awarded for inclusion of two productive resources with additional branching explaining these resources.</p>
5 pts./ each	<p>Determinants of Demand: Points were awarded for including all five determinants of demand covered in the course instruction. Partial credit was awarded if the list was incomplete, one point per correct determinant. For example, four determinants = four points.</p>
5 pts./ each	<p>Determinants of Supply: Points were awarded for including all five determinants of supply covered in the course instruction. Partial credit was awarded if the list was incomplete, one point per correct determinant included.</p>

Student Learning Reflected in Concept Mapping Strategy

Analysis of the concept maps revealed a great deal of gain in economics knowledge as did the economics post-test. This section discusses omitted or incorrect concepts as well as some of the content that was correctly represented on the concept maps.

Missing Understandings

As the researcher read the concept maps, she listed incorrect or inaccurate propositions (linking words connecting concepts). Misunderstandings (omitted or incorrect propositions) presented by three or more students are listed in Table 4.4 on the next page.

Table 4.4: Missing or Incorrect Understandings of Students

Misconceptions or Missing Propositions		
No. of (n) Students (n=28)	Percentage (n/28)	Concept
Scarcity		
15	54%	No direct statement of scarcity being the condition of limited resources versus unlimited wants.
10	36%	No connection of consumers' unlimited wants to the limited resources used by the producer to satisfy those wants.
14	50%	Scarcity is not directly connected to choice.
Productive Resources		
12	43%	Failed to connect human capital to productive resources.
18	64%	Did not connect human capital to increased productivity.
14	50%	Listing the three types of markets (product, resource, financial) without explaining activities that occur in each.
Supply and Demand		
15	54%	Incorrect listing of determinants of supply.
14	50%	Incorrect listing of determinants of demand.
18	64%	Supply is not connected to the producer.
19	68%	Demand is not connected to the consumer.
Social Goals and Economic Questions		
11	39%	Incorrectly stated that the social goals are what, how, for whom to produce.
16	57%	No integration of the social goals to any other concepts within the schema.
17	61%	Did not appropriately connect the three economic questions to other concepts.
Private and Public Sectors		
15	54%	No connection of public sector to city/municipality.
14	50%	Difficulty connecting public and private sectors to other concepts.
23	82%	No examples of external and internal economies of scale.
19	68%	Identifying internal and external economies of scale and infrastructure as economies of agglomeration but not connecting to other concepts such as productivity indicating an understanding of <u>how</u> they impact a city or municipality.

Figure 4.2 lists misconceptions illustrated by fewer than three students but which may lend useful insights for instructors in organizing content to help students make appropriate connections.

Figure 4.2: Additional Misconceptions

Additional Misconceptions
The concept maps of fewer than three novices:
1) did not indicate that land was related to natural resources. Listed it as a separate productive resource and did not include it as an example of natural resources.
2) listed human capital as a productive resource but omitted physical capital.
3) stated that price is a determinant of supply or demand.
4) stated that the determinants of supply and demand are what, how, and for whom to produce.
5) connected demand to the consumer but did not connect supply to the producer.

Correct Understandings

An important use of CMs is to help the instructor recognize what learners do not understand, facilitating reorganization of content or instructional methods to encourage more meaningful

learning. To gain further insight, the researcher analyzed the number of students illustrating correct understandings of specific content required in the CM. This analysis is summarized in Table 4.5 below indicating the number of students achieving the highest possible score of five and the number scoring four out of five. Examples of correct understandings are included in the case studies (pp. 125-141) and the sample CMs (Figures 4.9 - 4.16).

Table 4.5: Correct Understandings

Concepts	# Scoring 5/5	%	# Scoring 4/5	%
Use of All Concepts	14/28	50%	8/28	29%
Basic Econ Problem	11/28	39%	3/28	11%
Productive Resources	22/28	79%	3/28	11%
Determinants of Demand	14/28	50%	3/28	11%
Determinants of Supply	13/28	46%	3/28	11%

Half of the students used all of the requested concepts. Thirty-nine percent of the students correctly stated the basic economic problem of scarce resources needed to satisfy unlimited wants; 79% correctly represented all three of the productive

resources; and almost 50% included all of the determinants of supply and demand.

Figures 4.9 – 4.16, the four pre-instruction and four post-instruction concept maps, show how the students' understandings developed during the course. More depth and breadth of understanding was shown in the post-instruction maps. Many more correct propositions were included in the post-instruction concept maps although some of the connecting words were vague, broad, or naive. For example, the proposition that unemployment is 'determined by' government decisions is naïve. It shows a rudimentary understanding.

The two expert maps included reflect more concise organization and the use of more specific connecting words. For example, the second expert map states that the 'what to produce' question refers to consumption goods, investment goods, or services and that it is based on economic wants and opportunity cost. Both expert maps state that economics 'analyzes choices' made by consumers and producers, an important understanding that is not directly stated in most novice maps.

Attitudes toward Concept Mapping

In order to determine student attitudes toward the concept mapping process and to note change as they become more skilled in the technique, the researcher asked the students to reflect in writing on the CM process throughout the course. These students were adult learners and, for most, this was the first time they had used the concept mapping learning strategy as used in this study.

The researcher analyzed the student comments included with the final concept maps and placed them into one of three categories: frustrated, developing comfort, and comfortable with the strategy. Out of 20 student comments on the third or final map, three students were identified as still frustrated, ten were developing a comfort level, with seven students reporting being comfortable using the mapping strategy.

Four students noted in writing the extensive number of concepts included in one map. Several more students verbally commented that the number of concepts was too large. They reported difficulty drawing the cross-links between the concepts due to the massiveness and complexity of the map. In addition,

two experts commented on the difficulty mapping such a large number of concepts.

All reported student comments, reviewer comments regarding the mapping outcome, pre- and post-test scores, and concept mapping scores are compiled in appendix VII.

Comparison of Post-Test Scores and Concept Map Scores

Table 4.6 shows the correlation of the post-test scores with post-instruction concept map scores. The students' pre- and post-test scores, post-test ranking, gain scores, concept map scores, and concept map ranking are included in Table 4.7.

Post-Test and CM Correlations

A Pearson Product-Moment correlation coefficient was calculated to determine the degree of correlation between CM scores and post-test scores (Table 4.6). A small, positive correlation was indicated by the $r = .199$. The Pearson-Product Moment Correlation squared was .04 indicating that 4% of the variability on the post-test score was related to the CM score. The correlation was not significant (.310) at the $p < .000$ level. The low

correlation indicates that students who do well on the concept mapping measure will not necessarily do well on the post-test measure. These findings are similar to those of Stuart (1985) suggesting that concept maps measure different understandings than traditional forms of assessment.

Table 4.6: CM Score and Post-Test Correlations

		CM Score	Post-Test
Pearson Correlation	CM Score	1.000	.199
	Post-Test	.199	1.000
Sig. (2-tailed)	CM Score		.310
	Post-Test	.310	
N	CM Score	28	28
	Post-Test	28	28

Table 4.7: Experimental Group Summary of Scores

Student #	Pre-Test	Post-Test	Post-Test Rank	Gain	CM Score	Rank on CM
1	26	34	13	8	52	26
2	34	30	23	-4	61	24
3	27	33	17	6	112	11
4	25	29	26	4	57	25
5	37	42	1	5	71	21
6	36	41	3	5	118	8
7	30	36	8	6	179	1
8	31	38	7	7	100	14
9	25	31	19	6	80	19
10	27	36	8	9	173	2
11	25	36	8	11	34	28
12	30	31	19	1	64	23
13	33	39	6	6	125	4
14	30	34	13	4	103	13
15	31	40	5	9	88	18
16	26	26	27	-	92	16
17	39	42	1	3	121	7
18	26	30	23	4	124	5
19	30	31	19	1	114	9
20	30	34	13	4	66	22
21	36	36	8	-	72	20
22	23	32	18	9	122	6
23	26	31	19	5	97	15
24	19	36	8	17	36	27
25	38	41	3	3	168	3
26	25	34	13	9	89	17
27	30	30	23	-	113	10
28	20	26	27	6	105	12

Concept Map Development

Four case studies including pre- and post-instruction concept maps are included. Two students with detailed, elaborate final maps (Case Examples I and IV) were selected for the case examples as well as two students with less developed knowledge schema (Case Examples II and III). The maps show the change in organization and depth of students' knowledge schema. The information provided by the student regarding prior knowledge of economics content and use of concept mapping is included as well as pre- and post-test scores.

Case Example I: Third Grade Teacher (TGT)

TGT teaches in a suburban school district and provides an example of well-developed economic knowledge in her final map. She indicated that she had no previous coursework in economics, either at the graduate or undergraduate level. Her experiences with concept mapping included using the "technique in reading, writing, and across the curriculum." She indicated that the

concept mapping process “helps students to make connections, build information baselines, and organize data.”

Table 4.9: TGT’s Scores

Student #	Pre-Test	Post-Test Rank	Post-Test	Gain Score	Rank on CM	CM Score
10	27 (60%)	8	36 (80%)	9	2	173

TGT’s first map, Figure 4.9, consisted of four concept clusters representing production, consumption, economic base, and government. One misconception noted was the direct connection of scarcity to supply and demand rather than to productive resources and unlimited wants. The concepts connected to economic base were also not accurate. Unemployment may be *impacted* by government decisions but not *determined by* them as stated. This statement is naïve showing a rudimentary understanding. Some linking words were vague and general. For example, in the production cluster, TGT connected specialization, income distribution, comparative advantage, and absolute advantage using the linking words *such as*. All of these concepts affect production but *such as* does not accurately describe their relationships. In her government cluster TGT

indicated that cities/municipalities, including urbanized areas, 1) determine public goods and unemployment, and 2) use taxes to provide goods and services such as utilities, police protection, and fire protection. It is correct to connect cities/municipalities to public goods, unemployment, and taxes but the connecting words could be more specific. For example, it would be better to say cities/municipalities produce (or provide) public goods and that they develop programs designed to decrease unemployment or to assist the unemployed. Taxes pay for many public goods but not usually for utilities. Again, this represents a naïve conception.

In her final map, Figure 4.10, TGT's map was well organized and included all concepts except one. She used six concept groupings or clusters (producers, consumers, productivity, distribution, social goals, and macroeconomics) and developed each idea thoroughly including additional concepts and examples. Each grouping went from the larger, more inclusive, concept to specific real-world examples. She correctly defined scarcity as the dilemma of unlimited wants versus limited resources. She incorrectly listed the determinants of supply indicating that they were the three economic questions of what, how, and for whom to

produce. Her production cluster, which was fairly accurate, stated that the study of economics is the science of production, 1) *involving* producers, 2) *including* entrepreneurs with risk and organization, and 3) *using* productive resources *including* natural resources, human resources, and capital resources. As examples of natural resources, she included land, timber, fish, oil, and mineral deposits. She stated that human resources, provided by human capital or labor, included health, strength, education, training, and skills. Capital resources included buildings, equipment, machinery, dams, and roads. This proposition is an example of the inter-relatedness of the economic content. This cluster went from the more general concept to specific examples.

Her comment on her final concept map regarding the learning of the CM strategy was

This mapping did help provide a framework for organizing the various economic concepts. Perhaps because I had not had a great deal of experience with mapping beyond using it as a means to extend a subject in reading and/or writing with my students, I felt the amount of time it required for me somewhat burdensome. I tend to expect perfection and was somewhat frustrated in the flexibility of accuracy. As I spent more and more time experiencing the process I found myself tending to want to extend it on and on. Meaningful experience! Third Grade Teacher

TGT used reference materials to incorporate additional economic concepts from macroeconomics that were not taught in the class. Her final map reflects her self-described tendency toward perfectionism and her desire to extend the activity. The researcher interpreted her comment about 'flexibility of accuracy' to refer to the idiosyncratic nature of the maps. Concepts can be connected in several ways to correctly form a proposition.

Figure 4.9: TGT Pre-Instruction Concept Map

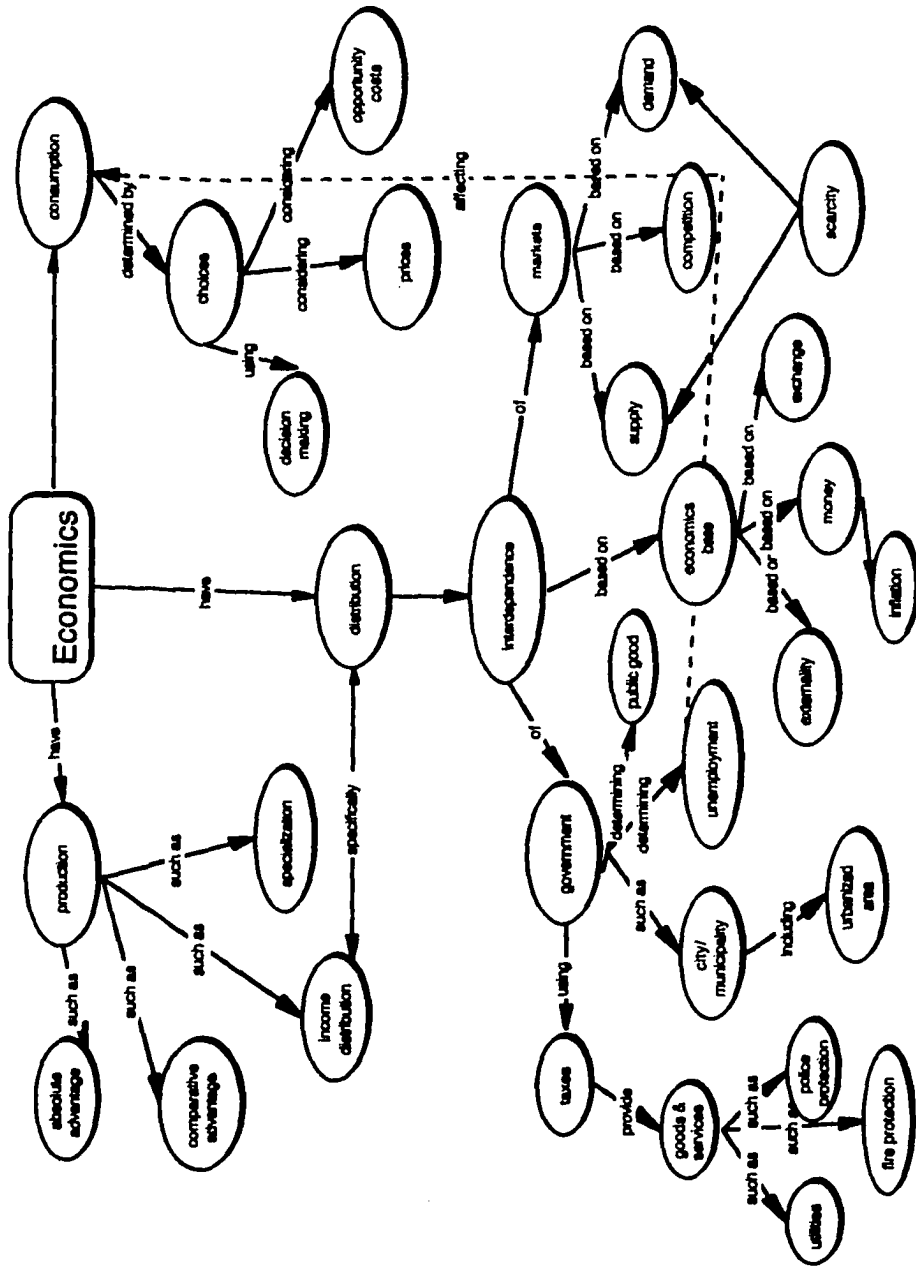
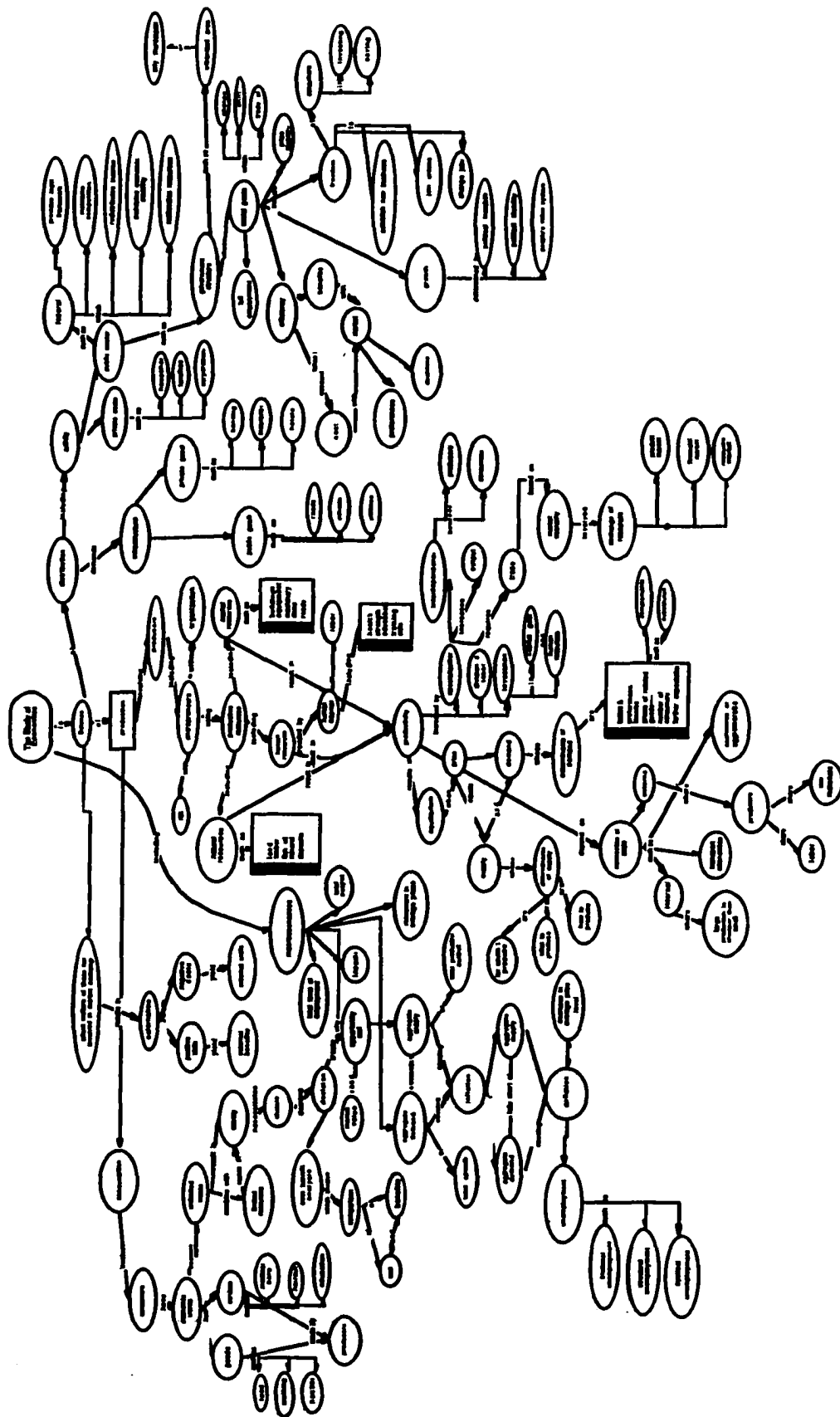


Figure 4.107 - Post-Instruction Concept Map



Case Example II: Fourth Grade Teacher (FGT)

FGT taught fourth grade in a suburban school district. Her final map provides an example of a less well-developed knowledge schema. She was new to the teaching profession, having taught only one year before taking this class. She reported completing one previous five-hour course in economic education the year before this class. She had not taken an undergraduate economics course. She reported that she had never been taught the concept mapping technique but had learned it on her own. She gave an accurate description of concept mapping and its uses.

Table 4.10: FGT's Score Summary

Student #	Pre-Test	Rank on Post-Test	Post-Test	Gain Score	CM Score	Rank on CM
4	25 (56%)	26	29 (64%)	4	57	25

For her pre-instruction CM, Figure 4.11, FGT used economic base as the overarching concept for the map. She stated that economic base *consisted of* 1) government, 2) city municipality, and 3) urbanized area. Economic base is determined by export products, making the above statement inaccurate. Her map indicated that government *operated* through markets and money,

affected public goods, and *enabled* producers *who yielded* economies of scale. It would be more precise to say government *produces* public goods, government policies *hamper* or *encourage* production, and employment is *dependent* upon production. Large production facilities or those located in the same area may *result* in economies of scale rather than *yield* them. FGT stated that money *influenced* taxes, prices, opportunity cost, income distribution, and inflation. Her proposition that money *influences* prices which *depend on* demand and supply, reflected a naive understanding of economics. Her map stated that markets *react* through externalities and competition which *include* exchange, specialization, comparative advantage, absolute advantage, and interdependence. The five concepts previously listed should have been connected to production rather than externalities and competition.

FGT's post-instruction concept map, Figure 4.12, reflects concepts that are appropriately associated but not necessarily linked using the most specific word. For example, FGT's map indicates that the study of economics *includes* external economies of scale, transport economies, economies of agglomeration, and internal economies of scale and that these four concepts *coexist*. FGT's attempt to associate economic sectors and markets showed naïve or emerging understandings. She stated that the private sector, public sector, and urbanized areas *operated through*

financial, product, and resource markets. A more precise description would indicate that public and private sector *transactions occur in* the three types of markets listed. Her statement that markets and sectors *operated through* supply and demand which were *based on* determinants of supply and determinants of demand respectively again illustrated an emerging understanding. Markets are places where sellers and buyers interact with supply and demand determining equilibrium price and quantity. She included a square with the four concepts (supply, demand, determinants of supply, and determinants of demand) as corner-posts and stated that they all *interact to form* an equilibrium. She stated that demand affected supply and vice versa and that determinants of demand affected determinants of supply and vice versa. Technically, she should have said that supply effects quantity demanded and vice versa. Supply and demand *interact* to form an equilibrium but determinants of supply and demand do not directly interact. This was an unusual depiction of supply and demand, their determinants, and equilibrium. It illustrates that she is developing an understanding and is searching for connections and linking words to describe them. An instructor could use this knowledge to clarify the interaction of supply, demand and their determinants. She did not indicate the role of consumers and producers in the creation of supply and demand. FGT incorrectly stated that the determinants

of supply *included* for whom to produce, how to produce, productivity, and productive resources. It would be correct to say that producers use productive resources to determine how to produce goods and services and that their goal is to increase productivity.

FGT used only 38 out of 48 economics concepts. She did not illustrate the basic economic problem of scarcity or list the determinants of demand or supply. These omissions cost her 17 points on her concept map score.

Figure 4.11: FGT Pre-Instruction Concept Map

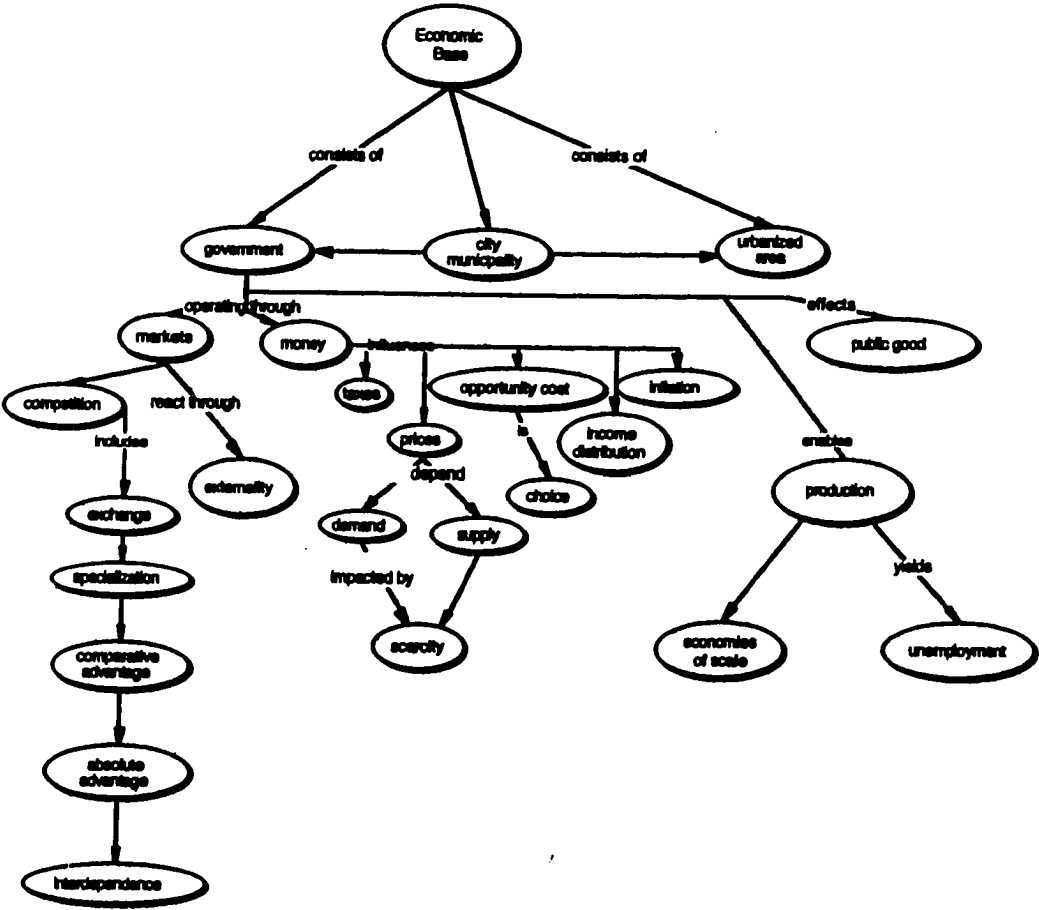
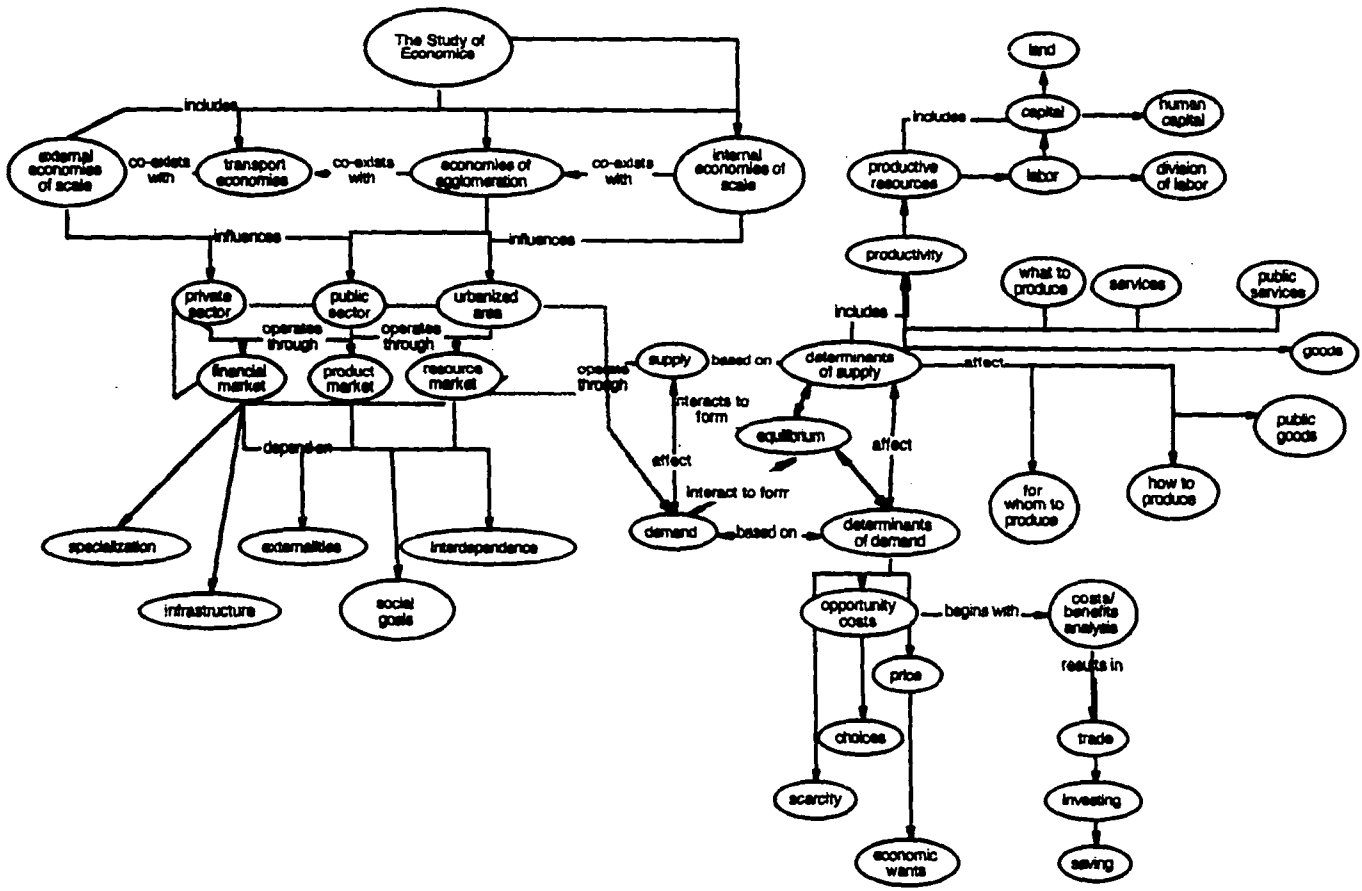


Figure 4.12: FGT Post-Instruction Concept Map



Case Example III: Fifth Grade Teacher (FFGT)

FFGT taught in a suburban school district and provides an example of a less well-developed knowledge schema. She had taken one two-credit course in economics as an undergraduate student. She used concept mapping “to draw, diagram, sort, organize and categorize information.”

Table 4.11: FFGT’s Score Summary

Student #	Pre-Test	Post-Test Rank	Post-Test	Gain Score	Rank on CM	CM Score
1	26 (58%)	13	34 (76%)	8	26	52

FFGT did not use connecting words on the pre-instruction CM, Figure 4.13, making it difficult to determine accuracy of understanding. For example, government had lines connecting it to taxes, public goods, externalities, income distribution, city/municipality, and urbanized area. These propositions could be correct with the use of an appropriate connecting word but this would require an assumption on the part of the person scoring the map. In another cluster, she connected money to inflation, economic base, exchange, and unemployment. Connecting money to inflation is correct but the nature of the relationship is not explained. It is much more difficult to determine what relationship

she was describing between money and economic base or unemployment.

On the post-instruction CM, Figure 4.13, FFGT used vague connecting verbs such as *involves* and *includes* that did not specifically define the proposition. For example, she said the study of economics *involves* social goals such as economic freedom, economic efficiency, economic equity, economic security, full employment, price stability, and economic growth. These concepts are correctly associated but the linking words used to form the propositions do not describe a specific understanding. She states that markets *determine* supply and demand which *determine* price and equilibrium and *involve* determinants of supply and demand. A better way to describe this proposition would be to say that markets *reflect* supply and demand. The second two propositions in the statement are correct, however, substituting *based on* in place of *involved* would be a more accurate description.

FFGT did not use all of the concepts required or include propositions defining the basic economic problem, all of the productive resources, or the determinants of supply and demand. These omissions affected her concept map score.

Figure 4.13: FFGT Pre-Instruction Concept Map

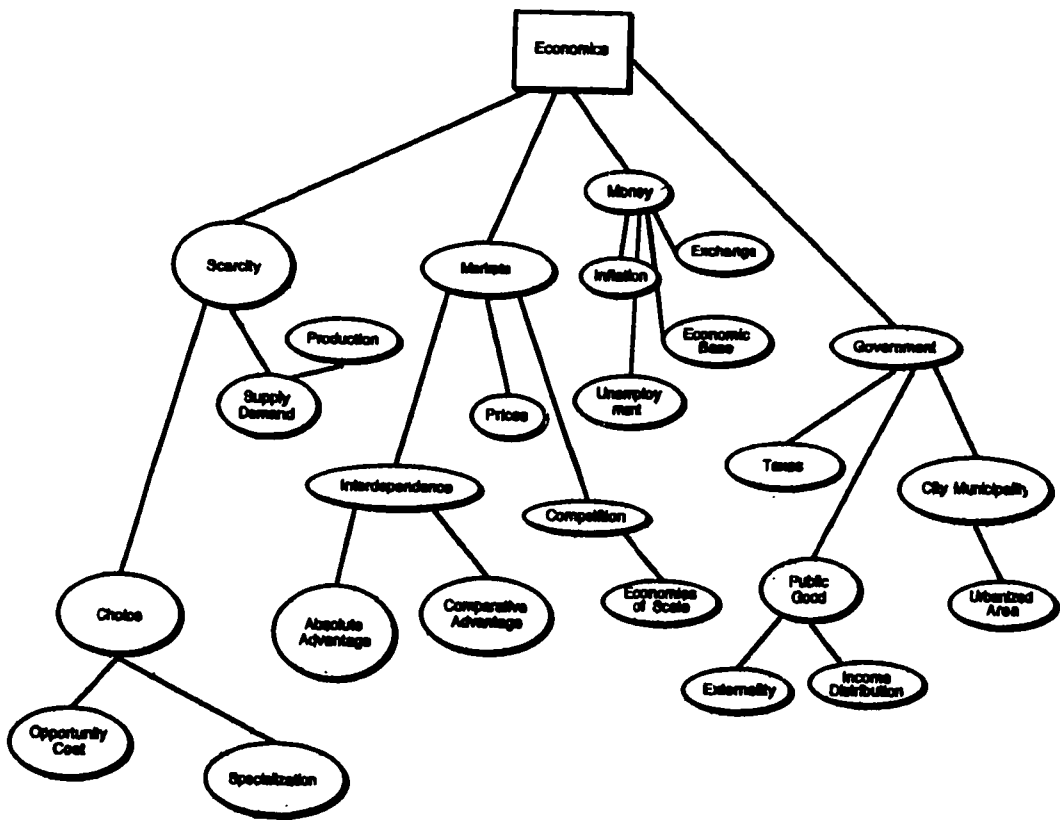
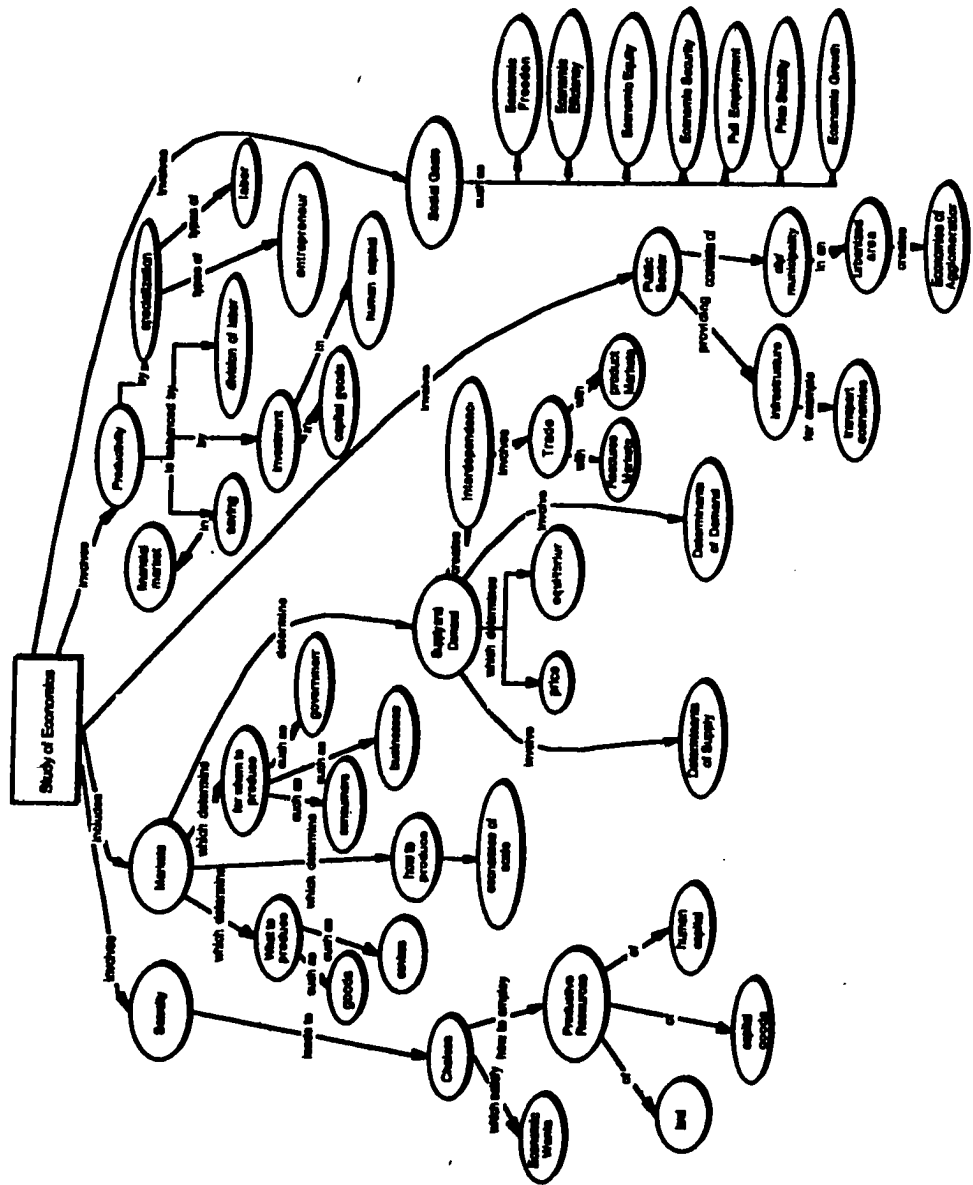


Figure 4.14: FRGT Post-Instruction Concept Map



Case Example IV: Sixth Grade Teacher (SGT)

SGT teaches in a middle school in a suburban school district. Her concept map represents a well-developed knowledge schema. On her participant information form, she reported previously taking three hours of undergraduate economics and eleven hours of graduate economic education classes. She indicated that she had used concept mapping in classes and that she occasionally required her students to use it.

Table 4.12: SGT's Scores

Student #	Pre-Test	Post-Test Rank	Post-Test	Gain Score	Rank on CM	CM Score
#25	38(84%)	3	41 (91%)	3	3	168

SGT's pre-instruction map, Figure 4.15, stated that 1) economics is money, 2) concerns government, 3) involves opportunity cost, and 4) is production. One misconception stated was that money *leads to* profit. Another is that income distribution *determines* economic base. Much of the clustering was not incorrect, but was vague, giving an unclear picture of her actual understanding. For example, she states that production is *related* to resources, interdependence, unemployment, externalities,

economies of scale, markets governed by competition, and specialization. She does not give more specific information about the nature of this relationship. She correctly states that the three resources are *limited by* scarcity but does not indicate that it is relative to unlimited wants. Her map contains four cross-links: production is *restricted by* demand and supply; international trade is *affected by* exchange rates; unemployment *relies on* taxes; and comparative advantage *affects* international trade. It would be more accurate to say that unemployment programs *are paid for with* taxes and that supply and demand for foreign exchange *affects the nature and extent of* international trade; production levels *are determined by* supply and demand; and comparative advantage *determines* products for trade.

Her post-instruction map, Figure 4.16, was more accurate and complete. It included additional concepts not required. She used examples appropriately. She used appropriate cross-links between concept clusters such as productive resources *are used to produce* goods and services and *are limited and contribute to* scarcity.

SGT's comments regarding the concept mapping learning strategy after completion of the third map were "Excellent method of organizing information and thoughts. Useful connections for world history. Time consuming when there are virtually unlimited concepts." For the final map she commented, "Add one more term

and the next map will, of necessity, be on a bed sheet.” Her CM confidence level was categorized as comfortable with the strategy.

Figure 4.15: SGT - Pre-Instruction Concept Map

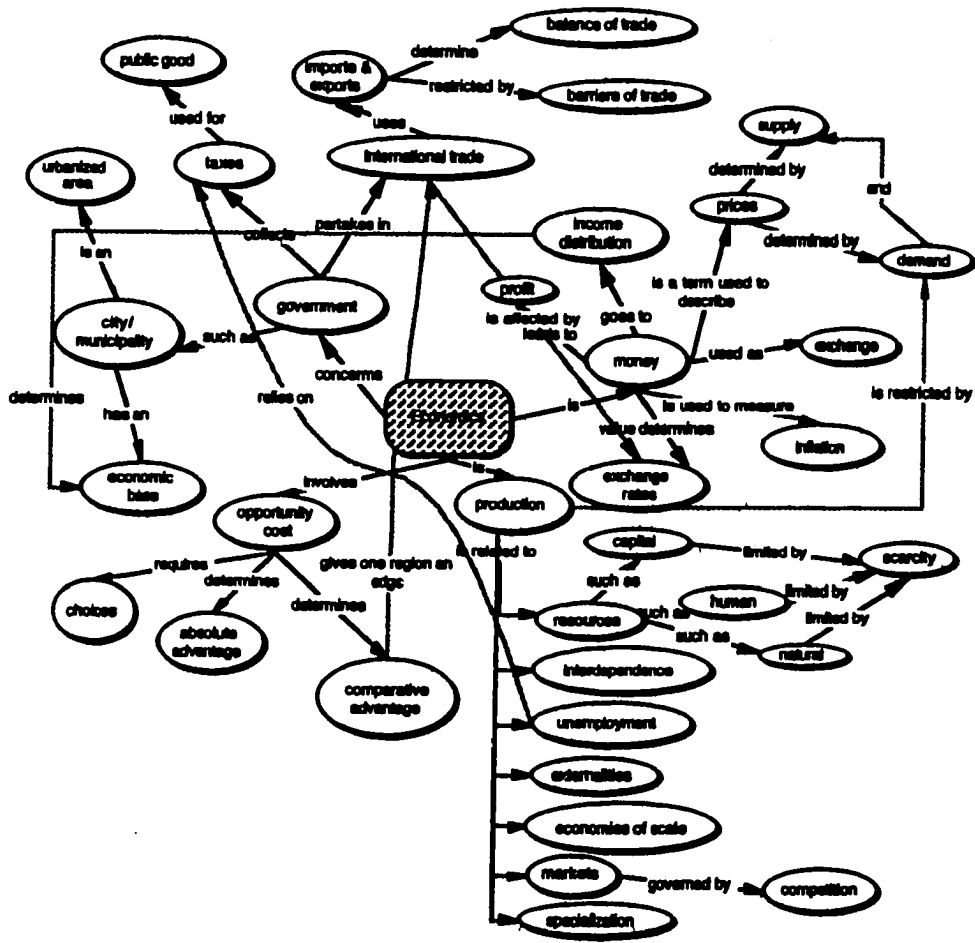
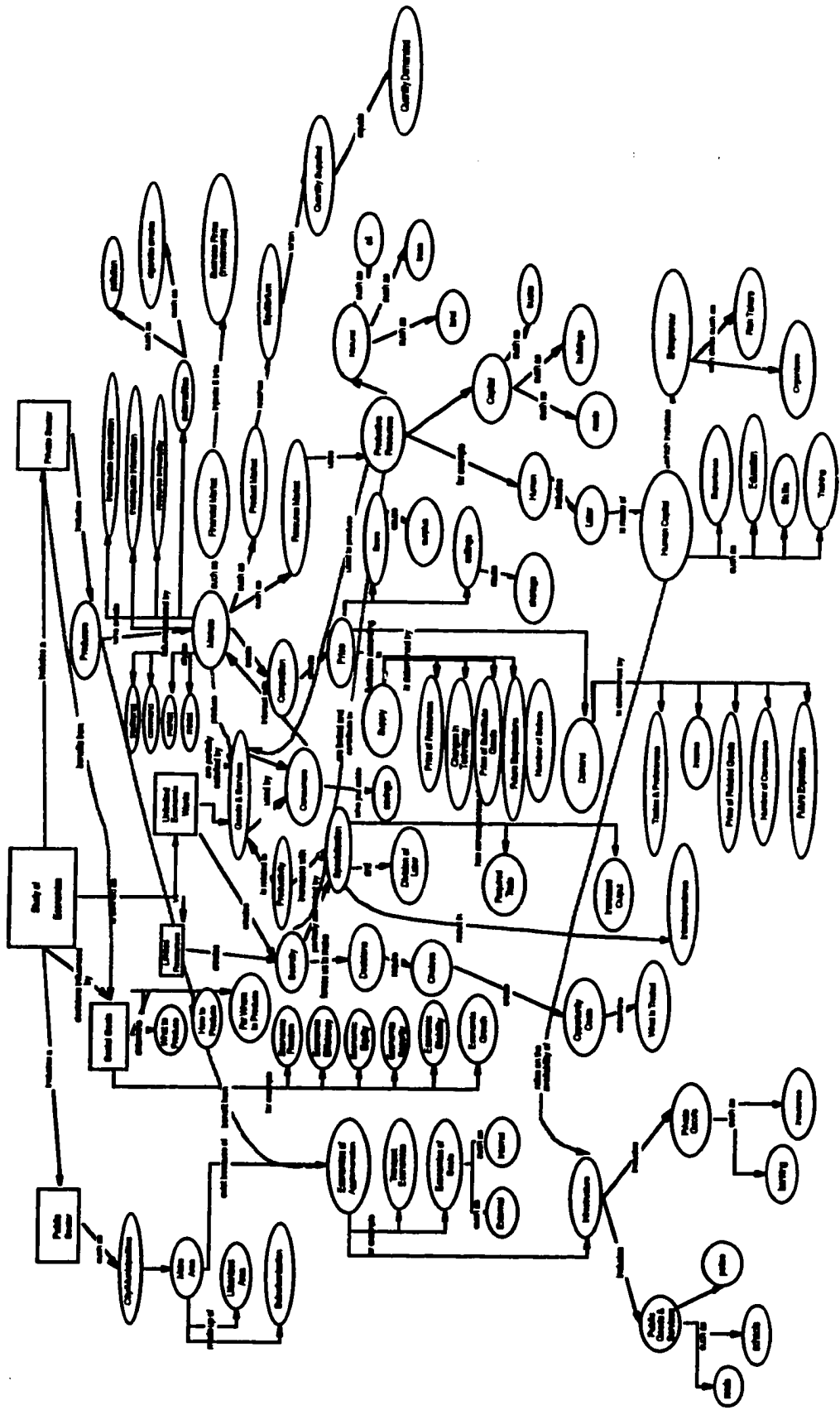


Figure 4.16. SGT - Post-Instruction Concept Map



Novice/Expert Comparisons

Five expert concept maps were completed out of twelve requests for a return rate of 41%. Scoring of the expert maps was not possible because although these individuals could be considered economics experts, they had no experience with concept mapping. Generally, they provided few or no connecting propositions since the experts had not benefited from class instruction or feedback on the concept mapping strategy. For this reason, the researcher believes that the experts' map scores do not accurately represent their understandings and should not be compared to the scores of the novices.

Two of the expert maps that used connecting words to form propositions are included for comparisons of conceptual development (Figures 4.17 and 4.18). Review of these maps shows the idiosyncratic nature of knowledge construction. The two expert maps used over 40 of the requested 48 concepts. Two of the five experts commented on the difficulty of organizing such a large number of concepts.

The two expert maps analyzed used specific linking words that created clear propositions. The novices frequently used nebulous linking words that created imprecise propositions making it difficult to determine meaning of the proposition.

The expert maps, though both were idiosyncratic, were compactly organized. They did not elaborate on concepts or provide examples. This could be due to the lack of understanding of the learning strategy, a lack of time, or to the certainty of their knowledge. The novice maps included more concepts and appeared less organized. The novices were encouraged to include examples and furthermore, may have felt that the examples helped to demonstrate their understanding.

Students included the required concepts in their maps, attempted to make appropriate connections, but often failed to form meaningful propositions, and sometimes overlooked what an expert would consider to be a 'basic' understanding. For example, 50% of the learners did not form a proposition indicating that scarcity resulted in the need to make choices. Both of the experts identified the need to make choices due to scarcity of resources as a central proposition of the map. Sixty-four percent of the learners

did not indicate that investment in human capital resulted in increased productivity. One expert explicitly stated this idea and the other implicitly stated it.

In another example, almost 50% of the students correctly listed the determinants of supply and demand but more than 60% failed to show that supply is determined by the producer and that demand is determined by the consumer. The determinants are more meaningful when attributed to the roles of the producer and consumer in our economic system. In another example, 79% of the students correctly listed the productive resources (natural, human, and capital) but 43% failed to include human capital and 64% did not describe the importance of human capital in increasing productivity.

Summary

The pre- to post-test gain in economics learning was significant, showing that all students learned economics during the two-week course. Neither learning strategy, however, was found to be superior to the other in aiding economics learning. Prior

knowledge of economics was a highly significant predictor of the post-test score. The concept mapping learning strategy documented the students' knowledge gain and their process of learning. The concept maps provide insights into prevalent misconceptions and understanding that could be beneficial to future course design in a similar economic education course.

Figure 4.17: Expert I - Concept Map

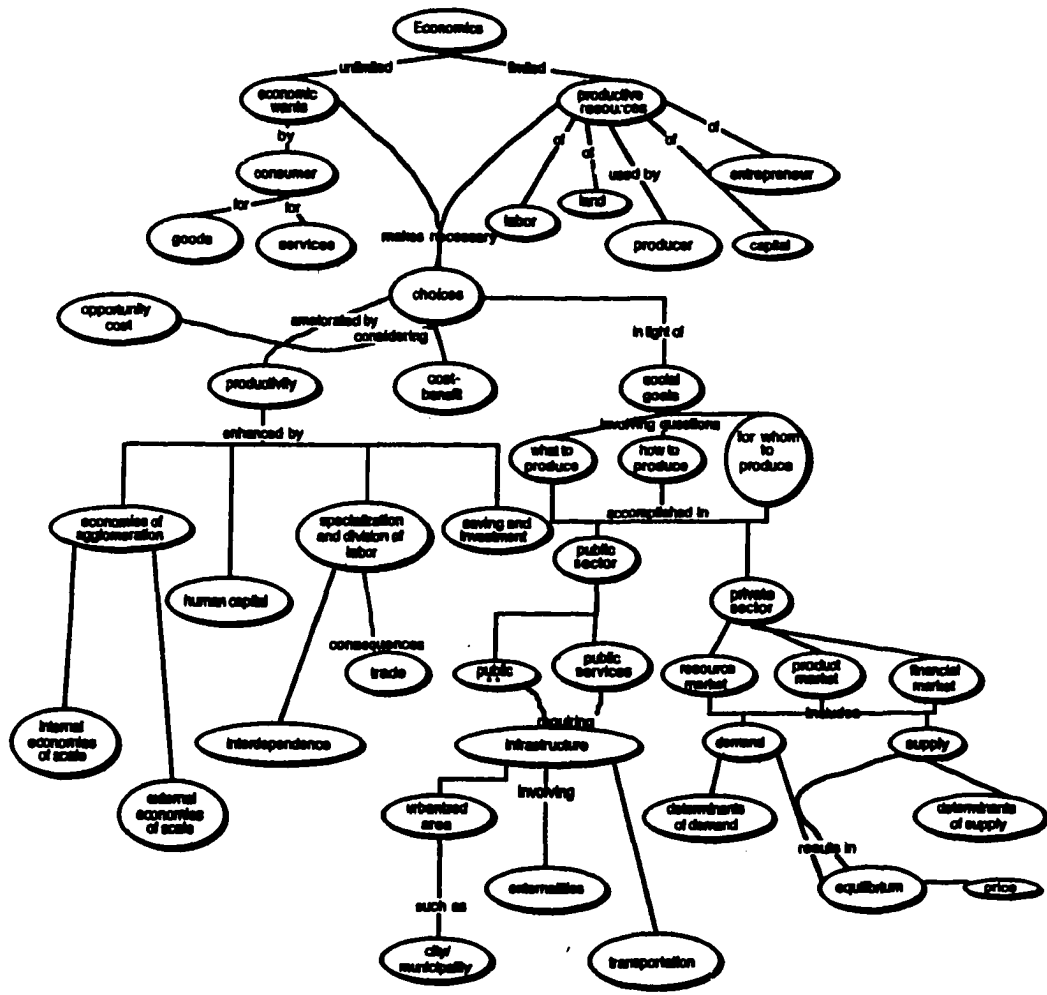
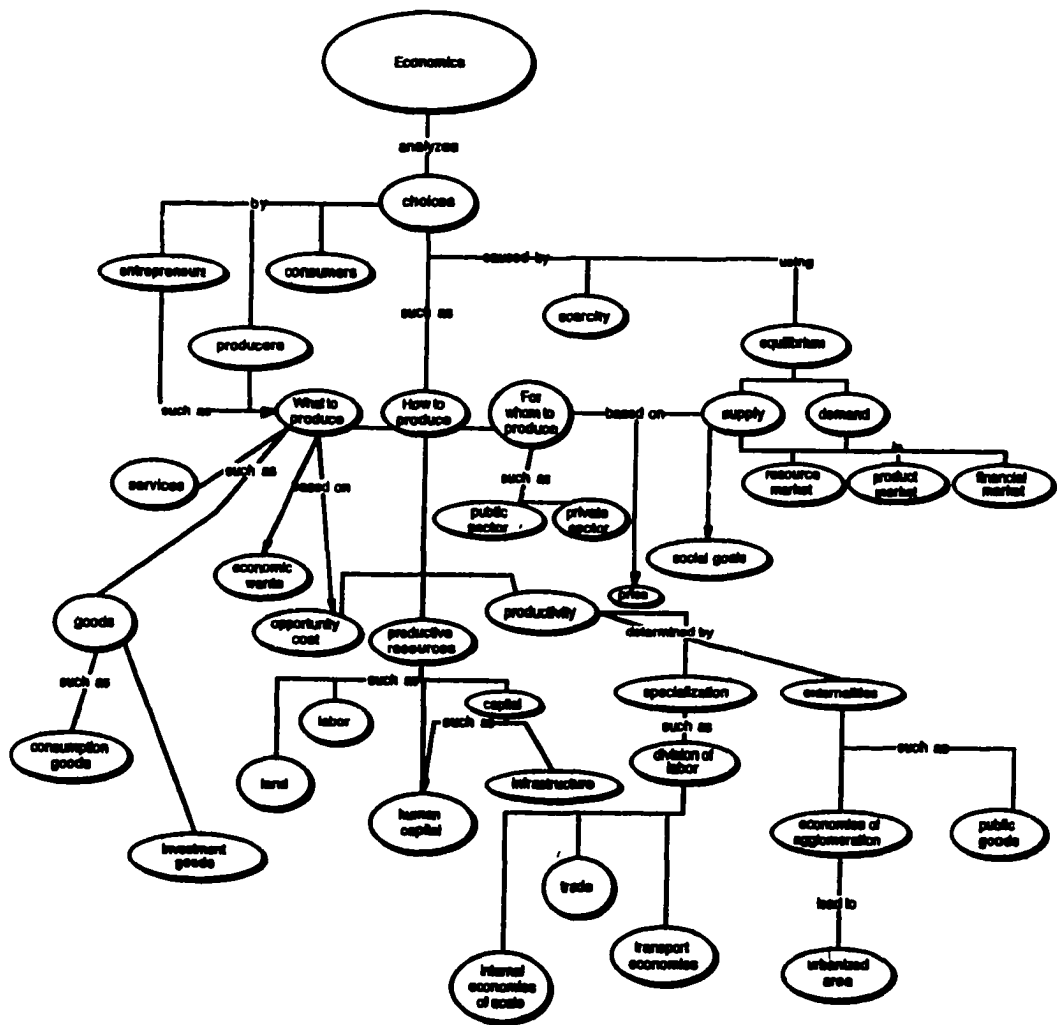


Figure 4.18: Expert II - Concept Map



CHAPTER V

CONCLUSIONS

This study evaluated the concept mapping learning strategy as an aid to the learning of economics and explored the changing knowledge schemata of learners during a two-week course of instruction in economics. Although students using the concept mapping learning strategy did not show significantly greater scores on the economics post-test than those using guided reflective journaling, the pre- to post-test gain was significant for both the experimental and comparison groups, suggesting that all students learned economics during the class. The major predictor of a student's post-test score was the pre-test score measuring prior knowledge of economics. It accounted for 30% of the variance indicating that prior knowledge of economics was an important variable contributing to the future learning of economics. Furthermore, the twenty-seven pre- and post-instruction concept maps created by the participants in the two-week economic education course provided a rich source of data on the students' process of learning economics.

Effectiveness of Concept Mapping Learning Strategy

A possible reason the concept mapping group did not score significantly higher on the post-test of economics knowledge than the comparison group is that both strategies were designed to promote reflective thinking. While the concept mapping strategy emphasized the connections between and among concepts and the guided reflective journaling strategy emphasized connections to real-world experiences, both were based on similar learning theories. Both strategies helped the learner to construct knowledge by connecting the new information to be learned to prior knowledge and experiences.

Lehman, Carter, and Kahle (1985) compared the effectiveness of the concept mapping learning strategy to an outlining strategy. Similar to the findings of the present study, they found no significant differences in the mean achievement scores of their experimental or comparison groups. They argued that these results were due to the difficulty of the experimental strategy (concept mapping), the short duration of the study, or the difficulty of the achievement instruments. The short duration of

this study (two-weeks) may also have impacted the findings. With more time to become comfortable and confident using the concept mapping strategy, students may have become better able to use it as an aid to learning. Students in the comparison group spent less time and energy learning the journaling strategy and therefore, may have devoted more of their time to learning the economics concepts.

Stuart (1985) found that concept map scores did not have a strong relationship with performance on traditional forms of assessment. In addition, she found that concept map scores do not account for the 'quality' of the relationships shown. Stuart discussed two concept maps receiving similar scores yet one map illustrated a greater understanding of the genetics topic than the other based on the quality of the propositions or the inclusion of more important ideas. This student received a higher score on the traditional examination than the student who received the same concept map score. The map scores did not necessarily differentiate students with a better understanding of the content from others. In this study, similar to findings by Stuart, the correlation between the concept map scores and the post-test

scores was not strong, $r = .199$. For example, four students with post-test ranks of 8 (raw score of 36 out of 45) received concept maps scores ranked 1, 2, 20 and 28. Therefore, students receiving 80% on the post-test had concept map scores ranging from the highest to the lowest. These findings indicate that the concept map scores do not differentiate between students' knowledge levels in the same way that a traditional multiple-choice test does.

Dana (1993) found that students using concept mapping in a social studies education class passed through four stages of comfort levels while learning the strategy. Students were initially comfortable but became frustrated when attempting to construct the maps and realizing the difficulty of the process. After passing through a resolution stage, the students reported feeling elation and pride. Finally, when becoming comfortable with the process, the students felt empowered and valued their thinking. In the present study students reported similar feelings regarding the mapping process. At the end of two weeks, most students noted an emerging level of comfort with the process. Students' comfort levels varied, however, possibly due to cognitive preferences (Okebukola & Jegede, 1988) and/or the short period of time to

'master' the learning strategy. Given a longer learning period, students' increasing comfort with the strategy may have better aided the learning of economics.

Development of Economic Understandings

By the end of the course, concept maps demonstrated an increase in the students' depth and breadth of economic understanding as illustrated by a larger number of concepts, examples, correct propositions, and cross links. In addition, the propositions provided the course instructors with insights about what content students understood and what misconceptions they held at the end of the course.

In general, the students were able to list important concepts as isolated bits of information but did not yet show an understanding of the relationship of these concepts within the overall structure of economics. Such a schematic overview is helpful to curriculum planners and course instructors desiring to improve instruction. The schematic overview can either be presented directly to learners showing how the concepts are

connected or the instructor can present the information in a manner that facilitates the development of appropriate relationships between concepts.

Two experts and five novices commented on difficulty constructing a map with 48 concepts. The large number of concepts and the weights on the scoring rubric may have caused the learners to focus on inclusion of all concepts rather than the inter-relatedness among the concepts. The researcher believes the number of concepts included should either have been fewer or the content should have been structured in a way to better help the learners understand the relationships between concepts. Development of the economics schema they planned to teach might have given the instructors insights into the complexity of the expectations or ways to structure the content so that it is more meaningful to a novice.

Novice/Expert Concept Map Comparisons

Review of the expert maps supported findings of other researchers who conducted novice/expert comparisons (Torney-

Purta, 1991; McGilly, 1994). The two expert maps included in this study used specific linking words creating clear propositions, unlike the novices who frequently used nebulous linking words creating imprecise propositions. The expert maps, though both were idiosyncratic, were compactly organized. These maps represented fewer propositions than the novices but included more higher level propositions or organizing relationships from the economics domain. The novice maps included more concepts and omitted higher level propositions such as scarcity or productivity. Both experts used over 40 of the 48 required concepts. Upon review of novice/expert comparisons, Torney-Purta noted that the major differences in novice and expert knowledge schemata were in the “coherence and integration of knowledge, not in the number of discreet bits of knowledge” (1991, p. 195). The implications of these findings suggest that educators might help students to improve their learning by finding effective ways to help them organize their newly forming knowledge around key concepts and ideas.

Implications for Instruction and Curriculum Planning

Analysis of the 28 concept maps revealed students' understandings, misconceptions, and naïve theories. These findings supplied the researcher/practitioner with insights into curriculum planning and instruction to facilitate meaningful learning of economics.

Torney-Purta (1991) suggests that social studies instruction should be centered on a small number of key concepts and that students should be encouraged to make connections between new information and existing knowledge. Novak (1977) argues that good curriculum design requires an analysis of concepts in the field of knowledge and consideration of some relationships between these concepts that illustrate which concepts are most general or super-ordinate and which are more specific or subordinate. Novak suggests that the hierarchical concept development in science be replaced by relational development in disciplines such as economics. He uses Senesh's concept based K-12 economics program as an example of a curriculum developer who identified the key concepts and their inter-relatedness. The economics

concept maps of both novices and experts illustrated the inter-relatedness of the economics discipline as opposed to the more hierarchical structure of science.

In *A Framework for Teaching Basic Economics Concepts with Scope and Sequence Guidelines, K-12*, Saunders and Gilliard (1995) state that:

- 1) an understanding of basic economic concepts is more important than a heavy dose of factual knowledge;
- 2) instructional efforts should concentrate on aiding students to achieve a fundamental understanding of a limited set of economic concepts and their interrelationships;
- 3) students should be given a conceptual framework to help them organize their understanding of economics, and they should be exposed to a manner of thinking that emphasized systematic, objective analysis;
- 4) the real personal and social advantages of economic understanding become apparent as individuals achieve competence in applying their knowledge to a wide range of economic issues they confront.

(Saunders & Gilliard, 1995, p.4)

Analysis of the concept maps support suggestions made by Saunders and Gilliard (1995) regarding the importance of concentrating instructional efforts on fewer basic economic concepts, emphasizing inter-relationships between concepts, and

providing learners with a conceptual framework with which to organize their knowledge schemata. The number of concepts taught should be a function of students' prior knowledge and the length of the instructional period. Content should be organized to help the learner develop an understanding of important concepts and their relationships to each other. The *Voluntary National Content Standards in Economics* (NAEE, 1997) defines the key concepts in the economics discipline for K-12 students. It is suggested that the curriculum planner select the key concepts from the economics standards based on the amount of time for instruction and the prior knowledge of the students. The content of this particular course had a special focus on urban economics. The course instructors presented both basic economics content and the urban economics concepts. This curriculum included a large number of concepts given the varied levels of prior economics knowledge. Students demonstrated a significant gain in economics knowledge. However, after analyzing the concept maps, the researcher would recommend either covering fewer concepts, requiring students to have a given level of prior knowledge of

economics, or directly illustrating the connections between the fundamental concepts and the urban economics.

Novak (1977) suggests that curriculum development requires the best available talent with respect to the knowledge of the discipline working with curriculum experts in the process of “unpacking” knowledge from a discipline. The *Voluntary National Content Standards in Economics* were developed by a team of noted economists working with economic educators to determine what was important to know in grades kindergarten through twelve. Therefore, in economic education we have a document describing what experts believe is important to know. Now we need to determine which of these concepts are the key or overarching concepts in the field, how these concepts relate to each other, and what methods are effective for teaching these concepts and the inter-relationships among these concepts. The organizing ideas in a discipline, such as scarcity and choice in economics, need to be reinforced periodically as new concepts are introduced. The connection to earlier learning needs to be directly shown to the learner as the new information is presented. The relevance of the new idea to the overall economics content needs to be explicitly

stated and reinforced. An example from the economics domain would be the concept of productivity and its importance in helping producers to fulfill the unlimited wants of consumers.

Summary

It is suggested that concept mapping, though not proven effective as an instructional aid in this study, be tried in studies of longer duration or that use alternative assessment to measure knowledge. Concept mapping is a useful tool for discovering students' prior knowledge of economics, observing developing understandings, and identifying misconceptions. These insights are valuable to curriculum planners and teachers. Although not specifically explored in this study, concept mapping has potential as an evaluation tool. The concept map provides a wealth of valuable information about the learning process and students' understandings.

Experts have developed standards for key economic concepts recommended for kindergarten through twelfth grade. This study suggests a need to further refine an organizing framework that

recognizes the inter-relatedness of the key economic concepts. This organizing framework would move the focus of instruction toward relationships among and between concepts rather than on isolated bits of information. As students learn this connected-ness of knowledge they will be better able to apply the knowledge in various situations.

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APPENDICES

APPENDIX I:

Summer Institute Course Syllabus

An Inside Look at the Kansas City Economy: Past & Present

June 17 - 28, 1996

Centers for Economic Education

**University of Kansas
&
University of Missouri-Kansas City**

Thanks to Our Contributors

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An Inside Look at the Kansas City Economy--Past and Present*
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University of Missouri-Kansas City Center for Economic Education**

Course Rationale and Purpose:

An understanding of basic economic concepts and our economic system begins, for today's students, in the world closest and most relevant to them, their own community. Through an understanding of the development of their local economy, students will better grasp the functioning of an economic system and their roles in it.

In the *1996 Summer Institute in Economic Education: An Inside Look at the Kansas City Economy--Past and Present*, we will introduce and review the fundamental principles of economics, economic reasoning, and our economic system and will develop and reinforce these concepts through a focus on the economic development of Kansas City. Focus on the Kansas City economy provides you, and consequently your students, with the opportunity to apply economics learning to the real world. The *Summer Institute* will consist of lecture/discussions on basic economic concepts, a series of presentations by members of the local business and governmental communities, past and present, and an array of tours of area businesses, museums, and other sites important in the economic development of Kansas City. The program will tie economic principles and Kansas City economic development to the best in educational materials and methods appropriate for grades K-12.

With an economics framework, those of you already teaching local and state history to your students will acquire a deeper understanding of that history. From your students' perspectives, an understanding of their local economy will foster a sense of pride in their community, an understanding of their roles in it, and knowledge of the function of economic decision-making in the development and vitality of that community.

Course Objectives:

Participation in this course will lead you to:

1. Understand basic economic concepts underlying community economic development.
2. Examine development of Kansas City through a framework of basic economic reasoning.
3. Develop teaching ideas and examine materials and methods appropriate for integrating the economics of the metropolitan area into your curriculum.
4. Appreciate the role of economic education in preparing young people to live in our modern world.
5. Network with other area educators interested in economics learning and teaching.

Institute Staff:

Directors:

Senior Educator and Co-Director--

Rita Littrell, Director, UMKC Center for Economic Education

Senior Economist and Co-Director--

Barbara Phipps, Director, KU Center for Economic Education

Associate Directors:

Mike Duckworth, Associate Director, UMKC Center for Economic Education

Sherie Surbaugh, Associate Director, KU Center for Economic Education

Kansas City Historian:

William Worley, [title]

Curriculum Specialists:

Margie Carr, Field Coordinator & Graduate Fellow, KU Center for Economic Education

Mickey Ebert, Economic Education Consultant & Teacher, Blue Springs School District

Gayle Ficenec, Economic Education Consultant & Teacher, Blue Springs School District

Richard Hughes, Field Coordinator & Graduate Fellow, KU Center for Economic Education

Patty Palmer, Operation Outreach Coordinator, UMKC Center for Economic Education

Meet the Staff

Barbara Phipps, Ph.D.

Barbara has fifteen years experience as an economic educator and economics instructor. She has developed and taught a wide array of economic education courses, programs, and summer institutes on special topics in economic education. She is Associate Professor in Curriculum and Instruction at KU and has published articles on children's learning of economic concepts and effects of attitudes on economics and has authored core economic education curriculum materials.

Rita Littrell, Ed.S.

Rita has fifteen years experience as a classroom teacher, economic educator, gifted education coordinator, and school administrator. She has developed an array of economic education curriculum projects which have won national awards. Teaching awards and recognitions include Outstanding Young Educator, Phi Delta Kappa Educational Leadership Award, National Council on Economic Education Awards, and National Federation of Independent Business Award for Entrepreneurship Education.

Sherie Surbaugh, Ed.D.

Sherie has 22 years experience in education. Her experiences include assistant junior high school principal, counselor, and English teacher. She coordinated a school reform project for the Iowa State Department of Education. She has been working in economic education for the past four years.

Mike Duckworth, M.S.

Mike holds degrees in economics and education. His experience includes social studies and mathematics teaching and economic education. Mike has given numerous economic education presentations and seminars and develops economic education curriculum.

Bill Worley, Ph.D.

Bill has been a college Dean of Students, treasurer of a feed-and-grain corporation, and a college instructor-professor-researcher-writer for 10 years. Bill and his wife Kathryn have raised three sons and have owned a children's and teacher's book store. Currently, Bill specializes in Kansas City regional history in the UMKC history department.

Margie Carr, M.S.

Margie has ten years of teaching experience at both the pre- and the middle school levels. She is a founding member and past president of Wonderscope Children's Museum in Shawnee, Kansas. She is currently pursuing a Ph.D. in economic education from the University of Kansas and works as a field coordinator at KU's Center for Economic Education.

Mickey Ebert, M.A.

Mickey is currently a fifth grade school teacher with over twenty years of teaching experience at a variety of grade levels. After completing Master's degrees in Administration and Supervision and Economic Education, Mickey specializes in economic education curriculum development for the Blue Springs school district and for the Blue Springs School of Economics. Mickey was awarded the 1996 Tots to Teens Entrepreneurship Educator Award.

Gayle Ficenec, M.A.

Gayle has seven years teaching experience at various elementary grade levels. She has developed economic education curriculum materials for the Blue Springs School District, most recently completing a middle school economic and entrepreneurship program. She has served as an adjunct professor for Rockhurst college and as an Executive Board member for Blue Springs School of Economics. Gayle recently received the 1996 Tots to Teens Entrepreneurship Educator Award and was Daniel Young's 1994-95 Teacher of the Year.

Richard Hughes

Richard has four years teaching experience in high school social studies including U.S. and world history, economic, and government. As field coordinator at the KU Center for Economic Education, he is pursuing a doctorate in history. His experience at KU has included work with graduate and undergraduate teachers of social studies.

*The diverse staff has a variety of skills to offer participants.
We look forward to working with you!*

Portfolio Assessment

100 Points

The portfolio consists of a collection of items demonstrating student understanding of economic concepts. Fifty percent of the portfolio components are predetermined by the instructors and are listed below. Fifty percent of the items are selected by you from the list which follows. Each portfolio component is weighted as listed. **Elective items should be selected to total fifty points.** In preparing your completed portfolio, please put a cover page on each entry. This page should include the title of the entry, the point value, your name, and the institution from which you are receiving credit.

Required Components (50 Points)

- 30** Successfully complete the requirements for the learning strategy to which you are assigned. Successful completion includes thoughtful consideration in completing each assignment and handing each entry in to one of the Institute Co-Directors at or before the required time.
- 10** Complete the pre- and post-tests on economic concepts at the times scheduled for administration.
- 10** Summarize your museum field trip. Emphasize the exhibits depicting aspects of economic history.

Elective Components (50 Points): Select options to total 50 points.

- 30** Create a lesson or activity of your own. Lesson format is available from course staff members. Include a description of what you believe to be the strengths of the activity based on education theory (i.e., cooperative learning, learning styles, simulations, creative thinking, interdisciplinary learning, themes). Discuss how and when the economic concepts tie into the curriculum. Note: This lesson may be tied to *The Kansas City Advocate* by William Worley.
- 30** Design a plan for an interactive classroom museum representing one or more aspects of Kansas City economic development. Describe how it will be constructed and used by your students. Include samples.
- 20** Review age appropriate fiction or nonfiction to teach urban or regional economics to your students. Include economic concepts taught, how they are presented, and when and how you would incorporate the book into your curriculum.
- 20** Develop a lesson plan to use a primary source document to teach urban or regional economic concepts to your students. Include a copy of the document.
- 20** Write a geo-poem and an econ-poem of Kansas City. Descriptions will be provided in class.
- 20** Prepare a brief genealogy of your family to determine family members' contributions to their own local or regional economy. Go back at least three generations, starting with your parents. [The Missouri Valley Room at the main Kansas City Public Library has a fairly extensive collection on genealogies.]

- 20 Conduct an interview with an individual who can recall important or interesting events during the history of Kansas City and prepare a written report of this oral history.
- 10 Analyze the costs and benefits of teaching urban or regional economics in your curriculum. Make a decision about if, what, and how you will incorporate regional or local economics. Describe your decision and your opportunity cost.
- 10 Complete a detailed plan or sample of an activity from the course handout, "Learning about the Kansas City Economy."
- 10 Prepare a summary of a Kansas City personality, other than those presented in class, and indicate how you would present this personality in your classroom.
- 10 Prepare an editorial cartoon illustrating a KC issue today or in the past.
- 10 Prepare an item for inclusion in a "trunk" for teacher use to teach about some important aspect of Kansas City's economic history. Include a "concrete" item that students can view or touch accompanied by a written description of the item's contribution to the Kansas City economy. Include four copies.
- 10 Summarize the presentation of one guest speaker or panel and discuss the economic issues inherent in the presentation.
- 10 Select a newspaper article on a local or regional economic issue, clip it, and attach to it an analysis of the economic concepts and terminology.
- 10 Adapt one curriculum lesson or activity, describe the main economic concepts presented, and tell how the lesson could be incorporated into your curriculum to teach economic development of a city.
- 10 Create a short teaching activity to accompany a reading from *The Kansas City Advocate* by William Worley.

Creative Option: Invent your own portfolio item! See instructor for approval and determination of point value.

Portfolio Date Due: Friday, July 12th, 1996.
(Completed portfolios may be submitted earlier.)

Monday, June 17

**KU Regents Center--
126th & Quivira, OPKS**

8:00 - 8:30	Coffee & Rolls; Welcome; Get Acquainted
8:30 - 9:00	Course Overview
9:00 - 9:45	Pre-Test
9:45 - 10:00	BREAK
10:00 - 11:15	Economics Foundations 1: <i>The Economic Way of Thinking</i>
11:15 - 12:00	Curriculum Activity: <i>KC Product Opportunity Cost</i>
12:00 - 1:00	LUNCH (On your own)
1:00 - 1:30	Film: <i>Chickenomics</i>
1:30 - 2:30	Economics Foundations 2: <i>Broad Social Goals</i>
2:30 - 2:50	KC Personality BREAK
2:50 - 3:35	Curriculum Session 1: <i>Portfolio Assessment & Learning Strategy</i>
3:45 - 4:30	Curriculum Session 2: <i>Portfolio Assessment & Learning Strategy</i>

ASSIGNMENT FOR TOMORROW:

1. Personal Graffiti: Think of one word that best describes you. Draw a picture representing the word, cut out your picture; and incorporate a photo of yourself. Be prepared to quickly (30 seconds or less) share with the class why you chose this word. Your production will become part of our class graffiti display.
2. Readings: *KC Business Journal*, pp. 13-18.
Framework, pp. 3-17.
Recommended:
The Kansas City Advocate, Issues 1 & 2.

Tuesday, June 18

**KU Regents Center--
126th & Quivira, OPKS**

8:00 - 8:15	Coffee & Rolls; MITs; News Analysis: <i>(Resources; Scarcity, Opportunity Cost, Specialization/Division of Labor)</i>
8:15 - 9:20	Economics Foundations 3: <i>Demand for Goods and Services</i>
9:20 - 9:35	Personal Graffiti
9:35 - 9:55	BREAK
9:55 - 11:00	Curriculum Session 3
11:10 - 12:00	Oral History: <i>J.C. Nichols and the Residential Development of Kansas City</i> --J.C. (Clyde) Nichols, Jr.
12:00 - 1:15	KC Classics LUNCH (KC Masterpiece)
1:15 - 2:00	Curriculum Activity: <i>Unequal Resources--Urban Edition</i>
2:00 - 2:15	Personal Graffiti
2:15 - 2:35	KC Personality BREAK
2:35 - 3:50	Economics Foundations 4: <i>Supply and Market Equilibrium</i>
3:50 - 4:20	Curriculum Activity: <i>Changing Markets & Impact on Kansas City Economy</i>
4:20 - 4:30	Debriefing

ASSIGNMENT FOR TOMORROW:

1. Kansas City Products Search--Bring one GOOD produced in Kansas City. If it is inconvenient to bring the actual item, you may substitute a label, box, paper, or photo representing the product. These products will be used in class activities. They will not be returned to you.
2. Readings: *KC Business Journal*, pp. 1-12.

Wednesday, June 19

DIASTOLE HOUSE--
25TH & HOLMES, KCMO

- 9:00 - 9:30 **Coffee & Rolls; MITs**
- 9:30 - 10:15 **Economics Foundations 5:**
Introduction to Urban Economics
- 10:15 - 10:35 **KC Personality BREAK**
- 10:35 - 11:00 **Curriculum Application:**
Cost/Benefit Analysis of City Life
- 11:00 - 11:30 **Personal Graffiti**
- 11:30 - 12:30 **LUNCH** (On your own)
- 12:30 - 2:00 **Curriculum Session 4**
- 2:00 - 2:15 **BREAK**
- 2:15 - 3:00 **Economics Foundations 6:**
Kansas City's Socioeconomic Indicators
Guest Presentation: Ron Sagraves and Jim
Becker,
Mid-West Research
Institute
- 3:00 - 3:45 **Economics Foundations 6 (cont.):**
Kansas City: A Comparative Profile
- 3:45 - 4:15 **Special Guest Presentation:**
Tom Pendergast
- 4:15 - 4:30 **Debriefing**

ASSIGNMENT FOR TOMORROW:

Readings: *KC Business Journal*, pp. 20-34.

Framework, pp. 22-23.

Recommended:

The Kansas City Advocate, Issues 5 & 6.

Thursday, June 20

DIASTOLE HOUSE--
25TH & HOLMES, KCMO

- 9:00 - 9:15 **Coffee & Rolls; MITs**
- 9:15 - 10:15 **Economics Foundations 7:**
The Kansas City Economic Base--Past and Present
Guest Speaker--Frank Lenk, Research Economist,
Mid-America Regional Council
- 10:15 - 10:45 **Curriculum Activity:**
Researching the Kansas City Economy
- 10:45 - 11:05 **BREAK**
- 11:05 - 12:30 **Panel Discussion:**
Kansas City's Economic Base--Past & Present
Moderator: Bill Worley, UMKC
Bill Trickey, Farmland Industries, Inc.
William Galligan, Kansas City Southern
Don Forsythe, Sprint
- 12:30 - 1:30 **LUNCH (Catered) & Field Trip Sign Up**
- 1:30 - 2:45 **Curriculum Session 5**
- 2:45 - 3:05 **KC PERSONALITY BREAK**
- 3:05 - 4:20 **Economics Foundations 8:**
Public Goods; Infrastructure
- 4:20 - 4:30 **Debriefing**

ASSIGNMENT FOR TOMORROW:

1. Suggested items for Trolley Tour:
 - Cool, comfortable, casual clothing
 - Camera
 - Cool drink: suggest small thermos
 - Sunglasses
2. Readings: *Framework*, pp. 25, 26 (Public Goods); 26-29 (The Role of Government)
Recommended:
The Kansas City Advocate, Issues 7 & 8.

Friday, June 21

KANSAS CITY TROLLEY TOUR

8:45 - 4:00

Meet at 8:45 A.M. at Penguin Court on the Country Club Plaza. Plaza parking is free all day.

Lunch will be provided. Bring something to drink, if you wish.

Tour Guides: Bill & Kathryn Worley

ITINERARY:

9:00

Leave Plaza from Penguin Court

9:00 - 11:45
10:00 - 10:45

Tour in Kansas City, MO [To be determined]

Stop: 18th and Vine

Speaker:

History and Development of 18th and Vine

Rowena Stewart, Executive Director

18th and Vine Development

Project

12:00 - 1:20

LUNCHEON

Manny's Restaurant, Southwest Boulevard

1:30 - 3:00

Tour Southwest Blvd.; Argentine; Armourdale

2:00 - 3:00

STOP: Kansas City, KS Municipal Bldg.

Guest Speakers:

The Kansas City, Kansas Economy--Past and Present,

Dean Katerndahl, Director of Economic Development and Planning

Larry Hancks, Principal Planner, Planning and Zoning Division, City of Kansas City, Kansas

3:00 - 4:00

Return to Plaza via Armourdale neighborhood and Prairie Village

Assignment for Tomorrow:

1. Reflection: Include in your MIT your ideas for integrating Trolley Tour information into your curriculum.
2. Bring a salad ingredient or other food product representing your ethnicity--(to serve 10)
3. Readings:

Framework, pp. 23-26 (Income)

Monday, June 24

**KU Regents Center--
126th & Quivira, OPKS**

- 8:00 - 8:15** **Coffee & Rolls; MITs; News Analysis**
(Demand; Supply)
- 8:15 - 9:45** **Economics Foundations 9:**
Income Distribution, Externalities & Urban Problems
- 9:45 - 10:00** **KC Personality BREAK**
- 10:00 - 11:00** **Guest Speaker:**
Urban Core Business Development in Kansas City
Mr. Don Maxwell, President,
Community Development Corporation of
Kansas City
- 11:00 - 12:00** **Guest Speakers:**
Hispanic Immigration to Kansas City
Mary Lona, Founder, La Lista Latina
Rita Bodeo, Interim Executive Director of Hispanic
Chamber of Commerce
- 12:00 - 1:00** **LUNCH** (Ethnic Salad)
- 1:00 - 2:00** **Curriculum Session 6**
- 2:00 - 2:30** **BREAK**
- 2:15 - 4:30** **Curriculum Round Robin**
See Schedule and descriptions.

ASSIGNMENT FOR TOMORROW:

- 1. Dress up day tomorrow.** Professional Attire. Car Pooling Arrangements and Parking Suggestions will be made in class.
- 2. Readings: Framework, pp. 29-35.**
Recommended:
The Kansas City Advocate, Issue 10.

Tuesday, June 25

**Federal Reserve Bank--
925 Grand Avenue, KCMO**

8:00 - 8:15	Coffee & Rolls
8:15 - 8:30	Video: <i>Inside the Fed</i>
8:30 - 9:00	MITs; News Analysis: <i>(Infrastructure; Public Goods)</i>
9:00 - 10:30	Tour: Federal Reserve Bank and Mezzanine Exhibits
10:30 - 10:40	BREAK
10:40 - 11:20	Presentation:
11:20 - 11:30	Presentation: <i>Federal Reserve Resources for Teacher Anne Foraker, Visitor's Center</i>
11:30 - 11:45	Field Trip Evaluation
11:45 - 1:15	LUNCH (Federal Reserve Executive Dining Room)
1:15 - 1:30	Field Trip Assignments and Car Pool Arrangements
1:30 - 4:00	MUSEUM MENAGERIE Choose a museum in which you have an interest and take a self-guided tour. Go alone or in groups. We prefer that you choose a museum which you have not previously visited. NOTE: If you wish to visit a museum which is closed today, you may visit it on the weekend of June 22, 23 and do something else this afternoon.

[Museum list is in the back of this book.]

ASSIGNMENT FOR TOMORROW:

Readings: Recommended:

The Kansas City Advocate, Issue 11.

Wednesday, June 26

DIASTOLE HOUSE--
25TH & HOLMES, KCMO

9:00 - 9:15

Coffee & Rolls; MITs

9:15 - 10:20

Curriculum Session 7

10:20 - 10:40

BREAK

10:40 - 12:00

Panel Discussion:

Urban Problems and Solutions

Cliff Sargeon, Chairman of the Board of
Directors, AdHoc Group Against Crime

Gary Baker

Jim Cacomo

12:00 - 12:30

Curriculum Activity:

Social Decision Making

12:30 - 4:30

Lunch (on your own) &

Kansas City Industry Field Trips:

You will participate in the field trip for which you
have previously registered. Details and maps will
be provided in class.

Tension Envelope

KU Medical Center

TWA Overhaul Base

American Italian Pasta Company

Thompson's Pasta Plus

Faultless Starch

? Ford Claycomo

ASSIGNMENT FOR TOMORROW:

Readings: *KC Business Journal*, pp. 44-46.

Framework, pp. 35-40.

Thursday, June 27

DIASTOLE HOUSE--
25TH & HOLMES, KCMO

9:00 - 9:30

Coffee & Rolls; MITs; Q & A

9:30 - 10:30

Curriculum Activity:

Negro League Baseball Game

10:30 - 10:50

BREAK

10:50 - 12:00

Economic Foundations 10:

Kansas City in the International Economy

12:00 - 1:00

LUNCH (On Your Own)

1:00 - 2:00

Curriculum Activity:

Marketing Kansas City Products

2:00 - 2:20

KC PERSONALITY BREAK

2:20 - 4:15

Panel Discussion:

Kansas City's Young Entrepreneurs :

Mark Friend, Farm to Market Bread Company

Danny O'Neill, Roasterie Coffee

Debbie Pettid, Reading Reptile

Vonda Sinha, Prairie Point

Michael Mabon, Mabon's Etc.

4:15 - 4:30

Planning Time:

Field Trip Skits (In Field Trip Groups)

ASSIGNMENT FOR TOMORROW:

Study for Post-Test

Friday, June 28

KU REGENTS CENTER--
126th & Quivira, OPKS

8:30 - 9:00	Coffee & Rolls; MITs; News Analysis: (Potpourri: The Kansas City Economy)
9:00 - 10:00	Post-test
10:00 - 11:30	Skits: June 26 Field Trips
11:30 - 12:00	TRAVEL TIME
12:00 - 1:30	FAREWELL LUNCHEON: [Location] Guest Speaker:

APPENDIX II:

Participant Information Form

1996 Summer Institute in Economic Education

Participant Information Form

Name: _____

School: _____

First name preferred on name tags and plates: _____

Number of economic education classes previously completed: _____

Please list title of classes, university, and number of credit hours (as best remembered!):

Did you take an undergraduate economics course(s)? _____ If yes, # of hours: ____

Please briefly describe, as specifically as possible, your experiences teaching or learning the following:

Concept Mapping:

Journaling:

Cooperative Learning:

Reflective Thinking:

Use the enclosed stamped envelope and return by May 29, 1996 to:

Rita Littrell, Director
Center for Economic Educaiton
University of Missouri - Kansas City
365 School of Education
5100 Rockhill Road
Kansas City, MO 64110

APPENDIX III:

**Letter Explaining Concept Mapping Process
And Instructional Maps**

June 4, 1996

Dear:

As part of our learning strategies study in the *1996 Summer Institute in Economic Education*, you have been assigned to a section where we will look at how concept mapping helps you to learn the economics content. If concept mapping is new to you, don't worry. We will help you to understand the process throughout the class. **HOWEVER**, before the Summer Institute begins, we ask you to read the following directions which will:

1. Define concept mapping;
2. Teach you how to construct a concept map;
3. Provide you with a set of practice activities.
4. Instruct you to construct a concept map with a given set of economic concepts.

When you are constructing your first economics concept map, you may recognize none or just a few of the concepts we give you. Don't worry about this. Just do your best. Although the concepts may seem foreign to you now, we assure you that we teach them to you in the course using *interesting, fun, and painless methodologies*. When you complete the Summer Institute, economics will not seem like a foreign language!!

Because concept maps require reflection and thinking, they do take time and effort. For these reasons, the learning strategy will be a major component of your course grade. You **WILL NOT**, however, be graded on the correctness of your map. You will be awarded full credit for attempting to create a thorough map and for submitting it on time. We will also ask you to share your thoughts on the mapping process and to keep track of the amount of time you spend on the maps.

Prior to June 17, we ask you to devote **three periods of approximately 45 minutes** each to learn concept mapping and complete your first map. During the week of June 10, one of us will call you to check on your progress and to answer any questions you may have. Please call Rita at 235-2461 if you have any questions regarding the concept mapping.

We greatly appreciate your cooperation and earnest efforts in helping us to study this learning strategy. We believe that it will aid us in developing the most effective methods for teaching economics, and we hope that it will give you a new

or enhanced strategy to help your students learn in a variety of disciplines. When we have completed our study, we will share the results with you. Because we are studying the relative effectiveness of several learning strategies, we ask that you **NOT** discuss concept mapping with any other class members outside your curriculum group. You will learn of your curriculum group assignment on the first day of class.

Please read the attached pages and complete all activities as we've outlined prior to June 17. We look forward to working with you from June 17 - 28. Additional course details have been included for your information. Please note class locations and time. Call Teresa at 235-2254 if you need additional information.

Sincerely,

Rita L. Littrell, Co-Director
*Summer Institute in Economics Education:
The Kansas City Economy--Past & Present
Present*
Student Investigator

Barbara J. Phipps, Co-Director
*Summer Institute in Economic Education:
The Kansas City Economy--Past &
Present*
Faculty Advisor

attachments

What is a Concept Map?

A concept map is a schematic drawing of a set of concepts interconnected to depict the relationships among the concepts. In some ways, a concept map is similar to a flow chart or a Venn diagram. It is a visual representation of a body of knowledge that you are learning.

There are a number of educational uses of concept maps. One use is as a learning strategy to help a student to organize a body of knowledge. Although concept maps have been used fairly extensively in science education, they are a relatively new learning aid in social studies.

Concept mapping is based on a learning theory developed by the cognitive psychologist, David Ausubel. Ausubel theorized that meaningful, retained learning occurs when new knowledge or concepts are related by the learner to learnings or experiences from his or her past. Ausubel believed that the most important determinant of what a student learns is the base of knowledge and experiences he or she already holds.

Well-constructed concept maps give the teacher a concrete representation of what students know of what he or she has taught and of what misconceptions the learners still hold. The teacher can then plan additional teaching activities and strategies to increase the learners' understandings.

CONCEPT MAPPING INSTRUCTIONS

SESSION 1: Learning to Concept Map

- A. Background information and exercises to prepare for concept mapping:
1. Think of a park. Make two lists of words related to a park--**object** words and **event** words. Objects might include such things as bench, flower, and path. What other objects can you list? Events might include walking, cooking, and playing ball. What other events can you list?
 2. When thinking about a park, each person visualizes something different even though many things will likely be similar. The mental images you have of your objects and events are **concepts**. Sometimes one person may have trouble understanding another because their concepts (mental images) of a word may not be the same.
 3. Words such as *have*, *and*, *between*, and *versus* are linking words. These words are used with concept words to construct meaning. Linkages between concepts form **propositions** or statements. Examples are: "Parks *have* grass"; or "people *use* parks *for* walking *and* jogging." Now, insert linking words between two or more of your park objects and events to construct propositions.
 4. Proper nouns are NOT concept words. They are typically not used in concept maps.
 5. Your words are the **labels** for your concepts, not the concepts themselves.
- B. A practice concept map:
1. Look at the "park" concept labels in the squares in Appendix I. Add the concept labels you generated that are not already included. Cut out the concept labels.
 2. Now look at your concept labels. Do you see any natural groupings, that is, categories into which these concepts fall? For example, "natural objects" and "Human-built" objects might be

groupings for things found in a park. What other categories do you see?

3. Put the word "park" at the top of a sheet of paper. This is the general topic of your concept map. The concept categories you developed in step 2 may be more general or inclusive than other concepts you have listed. Do you have other concepts which are more general or inclusive? Put the most general concepts you have listed in a row just beneath "park." Group increasingly more specific concepts in a hierarchy under your more general or inclusive concepts.
4. If you notice additional categories of concepts forming as you construct your concept map, add them. This may happen naturally as you organize your knowledge.
5. Some words may be so specific that they are actually examples of a more general concept.
6. When you are satisfied with your organization of the concepts, copy the array of concept labels on a blank piece of paper. Draw a circle around each concept label.
7. Now, draw lines between related concepts or sets of concepts and insert **linking words** (or phrases) that show the connection between concepts. Use arrows to show the direction of the relationship.
8. Individual concepts can be linked between as well as within groupings. These linkages are called **cross-links**.
9. As you review your first map, you may think of other ways to organize the concepts OR other concepts which need to be included. It may take several drafts to complete a map that adequately represents your own knowledge (cognitive structure). As you concept map, you may see new relationships and actually be developing new knowledge about your concepts and their linkages.
10. Now that you have constructed your own concept map, refer to Appendix II in this instructional package. Compare your map to this one. Although the maps may be different, neither is right or wrong. Everyone's conceptions will differ somewhat. As learners

share ideas on a topic, they will learn new ways of organizing knowledge.

- 11. Save this map and submit it to Rita Littrell on the first day of class.**

SESSION 2: Practicing Concept Mapping in the Social Studies

Your second practice map will organize your knowledge of the social studies. More specifically, we want you to think about and organize your knowledge of social studies areas, skills, and methods. Now turn to Appendix III for a start to the social studies map and follow the instructions below:

Attempt to **complete** this map by elaborating on each of the general concept areas. This elaboration should include general and more specific concept labels and linkages described in SESSION 1 instructions above. Remember to use arrows to show directional relationships and to label all lines. This is the beginning of a map for you to complete based on your conception of social studies education.

Submit this map to Rita Littrell on the first day of class.

SESSION 3: Concept mapping in economics—a baseline

In your third session, you will construct a map of economic concepts. **Remember, we do not expect you to know much about economics at this point.** Now, refer to the list of economic concept labels in Appendix IV. Look through the concepts to help you think about economics. Using as many concept labels as possible, attempt to construct a your own map. You may add additional concepts and examples if you desire.

We are asking you to construct this map to give us a baseline measure of the economic knowledge which you bring into our class. Your economics concept map will grow and change throughout the course. You will reconstruct this initial map several times during the two-week course.

As you construct your economics concept map, follow the steps below:

1. From the given list (Appendix IV), identify the major general or inclusive concepts.
2. Group the other concepts that are related to the most general concepts.
3. Rank the concepts in each group from general to specific.
4. Arrange the concept labels, on a sheet of paper, in a hierarchy as you did for the park concept map.
5. Draw lines between related concepts and connect them with linking words and arrows.
6. Try to include very specific words as examples of concepts whenever possible.
7. Include cross-links between concepts in different groups whenever you believe they are appropriate.
8. Reconstruct your map until you are satisfied that it represents your best knowledge of economics at this time.

Submit this map to Rita Littrell on the first day of class.

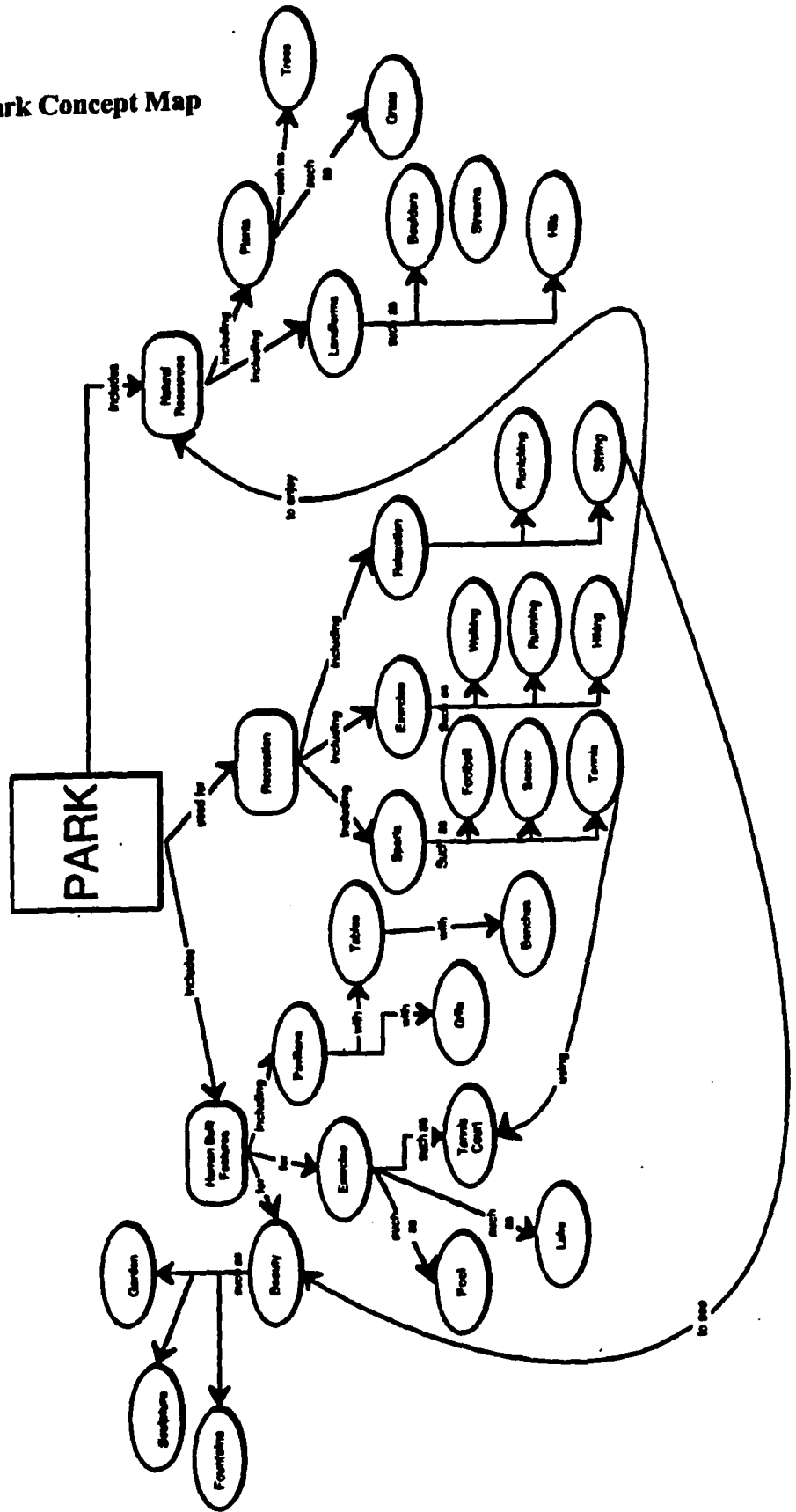
Additional maps have been included as examples. Some are teacher produced and some are student produced.

Appendix I:

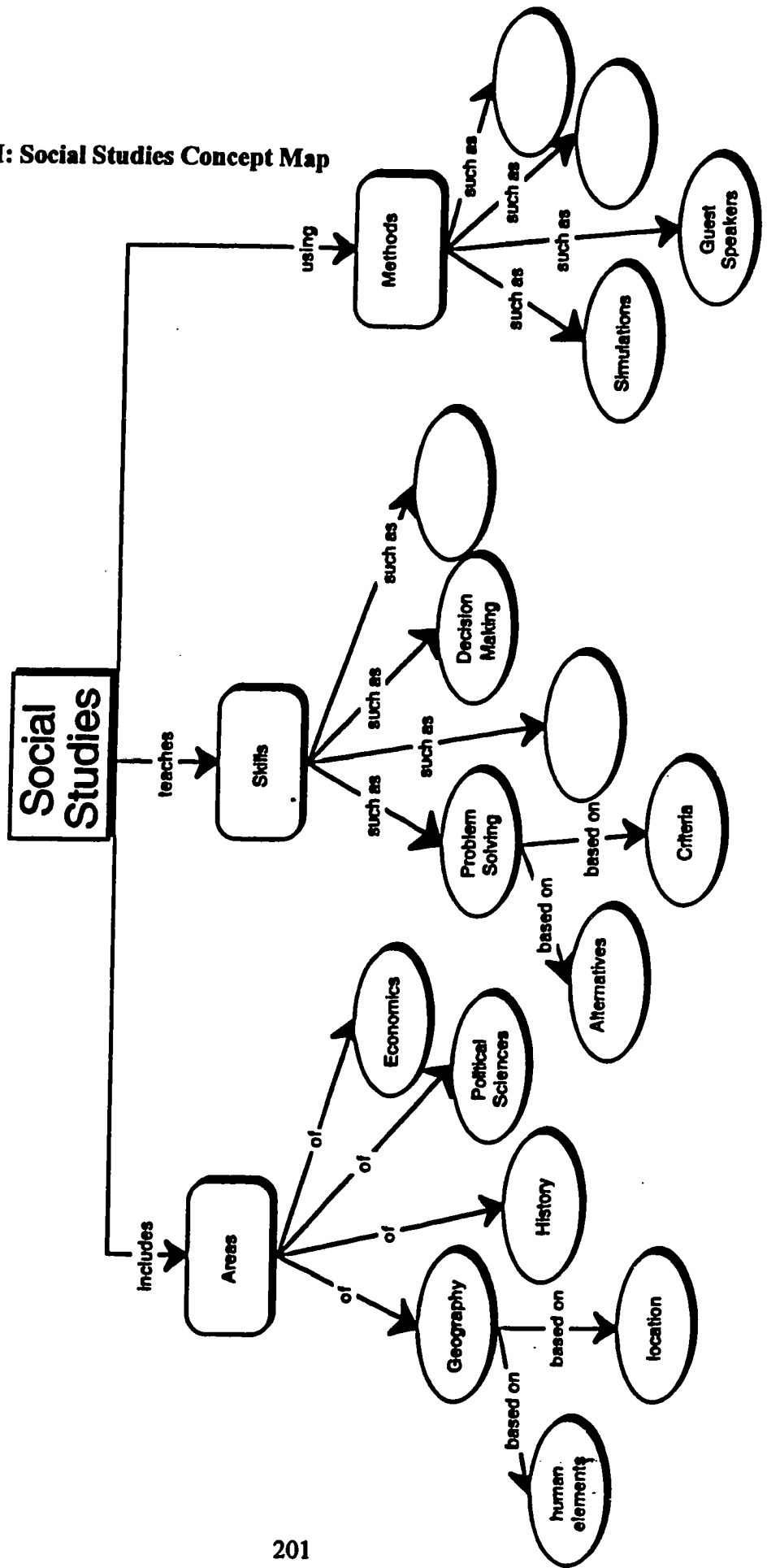
Park Concepts

man-made features	natural features	gardens	flowers
pavilion	pond	lake	trails
jogging	running	sailing	exercise
recreation	fitness	plants	roses
lilies	tennis court	tennis	boats
hills	streams	hiking	sitting
picnicking	sculptures	fountains	picnic tables
benches	grills	walking dogs	

Appendix II: Park Concept Map



Appendix III: Social Studies Concept Map



Appendix IV:

Economic Concepts: Use the following concepts to construct your concept map of economics. It is not expected that you will know all or most of the concepts at this time. You may add additional concepts to the existing list in order to give more specific information about your current level of understanding.

1. **scarcity**
2. **choice**
3. **opportunity cost**
4. **production**
5. **specialization**
6. **exchange**
7. **interdependence**
8. **money**
9. **markets**
10. **prices**
11. **supply**
12. **demand**
13. **city/municipality**
14. **urbanized area**
15. **economies of scale**
16. **economic base**
17. **competition**
18. **income distribution**
19. **externality**
20. **public good**
21. **government**
22. **taxes**
23. **unemployment**
24. **inflation**
25. **absolute advantage**
26. **comparative advantage**

APPENDIX IV:

**Letter Explaining The Guided Reflective Journaling
Learning Strategy And GRJ Questions**

June 6, 1996

Dear:

As part of our learning strategies study in the *1996 Summer Institute in Economic Education*, you have been assigned to a section where we will look at how guided reflective journaling helps you to learn the economics content. If keeping a journal is new to you, don't worry. We will help you to understand the process throughout the class. HOWEVER, before the Summer Institute begins, we ask you to read the following directions which will:

1. Define the guided reflective journaling process;
2. Explain the double entry journal;
3. Instruct you to begin reflective thinking through journaling using the first question provided.

Guided Reflective Journaling: The guided reflective journaling strategy will provide you with specific questions or topics for daily journal entries. These entries are designed to guide your reflective thinking on topics of importance to the course content. The journals will be collected several times throughout the course providing opportunities for the instructors to comment on your thoughts. You should plan to spend approximately thirty minutes a day writing in your journal.

Double Entry Journal: We will use double entry journaling for the guided reflective journaling. This type of journal provides two columns: content and reflection. The content column provides space for summarizing the days content. The reflection column provides space for your own reflections, for the instructor to comment on your thoughts, and for you to revisit previous content to add additional comments.

Pre-Instruction Entry: When you are constructing your first journal entry for the course, you may not feel that you know much about the topic. Don't worry about this. Just do your best. Although the topics may seem foreign to you now, we assure you that we teach them to you in the course using *interesting, fun, and painless methodologies*. When you complete the Summer Institute, economics will not seem like a foreign language!!

Because journaling requires reflection and thinking, it does take time and effort. For these reasons, the learning strategy will be a major component of your course

grade. You **WILL NOT**, however, be graded on the correctness of your thoughts. You will be awarded full credit for creating thorough entries and for submitting them on time. We will also ask you to share your thoughts on the journaling process and to keep track of the amount of time you spend on the journals. A few pages describing use of journals in the school curriculum from *Journaling: Engagements in Reading, Writing, and Thinking* by Karen Bromley have been enclosed to provide background information.

Prior to June 17, we ask you to devote **one period of approximately 45 minutes** to complete your journal entry using the pages provided. (Use additional paper if needed.) Please call Rita at 235-2461 if you have any questions regarding the guided reflective journaling. **Submit this entry to Rita Littrell the first day of class** during the curriculum session.

We greatly appreciate your cooperation and earnest efforts in helping us to study this learning strategy. We believe that it will aid us in developing the most effective methods for teaching economics, and we hope that it will give you a new or enhanced strategy to help your students learn in a variety of disciplines. When we have completed our study, we will share the results with you. Because we are studying the relative effectiveness of several learning strategies, we ask that you **NOT** discuss journaling with any other class members outside your curriculum group. You will learn of your curriculum group assignment on the first day of class.

We look forward to working with you from June 17 - 28. **Additional course details have been included for your information.** Please note class locations and time. Call Teresa at 235-2254 if you need additional course information.

Sincerely,

Rita L. Littrell, Co-Director
*Summer Institute in Economics Education:
The Kansas City Economy--Past & Present
Present*
Student Investigator

Barbara J. Phipps, Co-Director
*Summer Institute in Economic Education:
The Kansas City Economy--Past &
Present*
Faculty Advisor

attachments

1996 SUMMER INSTITUTE IN ECONOMIC EDUCATION

**An Inside Look at the Kansas City Economy -
Past and Present**

Guided Reflective Journaling Learning Strategy

Name: _____ **Date:** _____

Amount of time spent journaling: _____

Guided Reflective Topic: Using your own words, define economics. Base your definition on prior learning, experiences, and observations. Discuss the impact of economics on your personal and professional life. Give three examples of economic decisions you have made in the past month.

For this first entry, the content section will be based on your own conception of economics as described above. You may use the "reflection" column to revisit these ideas at a later time. On your future journal entries, the "content" column will relate to the contents of the day. The "reflection" column will be used for your own thoughts and experiences related to the content.

Content	Reflection

1996 SUMMER INSTITUTE IN ECONOMIC EDUCATION

Guided Reflective Journaling Learning Strategy

Name: _____ **Date:** June 17, 1986 - Monday

Amount of time spent journaling: _____

Guided Reflective Topics: 1) Using your own words, define scarcity and opportunity cost. 2) Give examples of scarcities experienced in your personal life.
3) Give three examples of a choice you have made and an opportunity cost you have experienced in your life. 3) Which social goal discussed today do you feel is of the most importance?

In the "content" column, summarize the content of the day related to the guided reflective question. In the "reflection" column, give the examples requested and add your own thoughts and experiences related to the content.

Content	Reflection

1996 SUMMER INSTITUTE IN ECONOMIC EDUCATION

Guided Reflective Journaling Learning Strategy

Name: _____ **Date:** June 18, 1996 - Tuesday

Amount of time spent journaling: _____

Guided Reflective Topics: 1) What are the determinants of demand? Give some examples of how these determinants effect you or your household. 2) What determines how much of a product is supplied to the market? 3) How do you determine how much of your service you will supply to the market?

In the "content" column, summarize the content of the day related to the guided reflective question. In the "reflection" column, give the examples requested and add your own thoughts and experiences related to the content.

Content	Reflection

1996 SUMMER INSTITUTE IN ECONOMIC EDUCATION

Guided Reflective Journaling Learning Strategy

Name: _____ Date: June 19, 1996, Wednesday

Amount of time spent journaling: _____ (It is anticipated that you should spend approximately 20 - 30 minutes on this journal entry.)

Guided Reflective Topics: 1) Discuss why Kansas City has grown and developed as a city. 2) Describe in your own words two or three economies of agglomeration which exist in Kansas City. 3) Discuss three socioeconomic indicators and compare Kansas City to other comparable U.S. cities.

In the "content" column, summarize the content of the day related to the guided reflective question. In the "reflection" column, give the examples requested and add your own thoughts and experiences related to the content.

Content	Reflection

1996 SUMMER INSTITUTE IN ECONOMIC EDUCATION

Guided Reflective Journaling Learning Strategy

Name: _____ **Date:** June 20, 1996 - Thursday

Amount of time spent journaling: _____

Guided Reflective Topics: **Guided Reflective Topics:** 1) What products make-up Kansas City's economic base? 2) Which, if any, of these products do you consume? 3) How has Kansas City's economic base changed over time? 4) How is a public good different from a private good? 5) What public goods do you frequently consume?

In the "content" column, summarize the content of the day related to the guided reflective question. In the "reflection" column, give the examples requested and add your own thoughts and experiences related to the content.

Content	Reflection

1996 SUMMER INSTITUTE IN ECONOMIC EDUCATION

Guided Reflective Journaling Learning Strategy

Name: _____ **Date:** June 24, 1996 - Monday

Amount of time spent journaling: _____

Guided Reflective Topics: 1) If you were mayor of Kansas City, on which public goods would you suggest the city spend its monies? 2) What externalities affect citizens of Kansas City or the area in which you live? 3) What do you think is the best way for Kansas City to deal with its urban core problems of poverty, crime, and housing blight?

In the "content" column, summarize the content of the day related to the guided reflective question. In the "reflection" column, give the examples requested and add your own thoughts and experiences related to the content.

Content	Reflection

1996 SUMMER INSTITUTE IN ECONOMIC EDUCATION

Guided Reflective Journaling Learning Strategy

Name: _____ **Date:** June 25, 1996 - Tuesday

Amount of time spent journaling: _____

Guided Reflective Topics: 1) Do you think cities should give away tax revenues by using the Community Redevelopment Act? 2) On your field trip to the museum, many economic understandings were illustrated by the displays. Summarize the economic understandings illustrated by the museum.

In the "content" column, summarize the content of the day related to the guided reflective question. In the "reflection" column, give the examples requested and add your own thoughts and experiences related to the content.

Content	Reflection

1996 SUMMER INSTITUTE IN ECONOMIC EDUCATION

Guided Reflective Journaling Learning Strategy

Name: _____ **Date:** June 26, 1996 - Wednesday

Amount of time spent journaling: _____

Guided Reflective Topics: 1) Which solutions to urban problems do you think represent the best possible options for Kansas City? 2) On your field trip many economic understandings were shown and discussed. Which ones did you find to be the most surprising?

In the "content" column, summarize the content of the day related to the guided reflective question. In the "reflection" column, give the examples requested and add your own thoughts and experiences related to the content.

Content	Reflection

1996 SUMMER INSTITUTE IN ECONOMIC EDUCATION

Guided Reflective Journaling Learning Strategy

Name: _____ **Date:** June 27, 1996 - Thursday

Amount of time spent journaling: _____

Guided Reflective Topics: 1) How does the global economy impact businesses and consumers in the Kansas City area? 2) Which entrepreneur would you consider inviting to your class? Why?

In the "content" column, summarize the content of the day related to the guided reflective question. In the "reflection" column, give the examples requested and add your own thoughts and experiences related to the content.

Content	Reflection

1996 SUMMER INSTITUTE IN ECONOMIC EDUCATION

Guided Reflective Journaling Learning Strategy

Name: _____ Date: June 28, 1996 - Friday

Amount of time spent journaling: _____

Now it is time to reflect on the entire course! Some of these questions will be similar to questions on the course evaluation. However, your journal entry will provide more ideas about why you benefited from certain speakers or events. This entry is due when you submit your portfolio -- not on the last Friday of class!

Guided Reflective Topics: 1) Which economic foundation presentation did you find to be the most interesting and educational? Why? 2) Which guest speaker or panelist provided you with the most new information? 3) What was your favorite curriculum activity and what did you learn from that activity? 4) Which portfolio entry was the most successful in reinforcing the learning of economics? 5) What changes would you make in the format of the class?

In the "content" column, summarize the content of the day related to the guided reflective questions. In the "reflection" column, give the examples requested and add your own thoughts and experiences related to the content.

Content	Reflection

APPENDIX V:

Pre-Test

**1996 Summer Institute in Economic Education:
An Inside Look at the Kansas City Economy--Past and
Present**

PRE-TEST

1. When the United States trades wheat to Saudi Arabia in exchange for oil
 - a. both countries gain.
 - b. both countries lose.
 - c. the United States gains, Saudi Arabia loses.
 - d. Saudi Arabia gains, the United States loses.

2. The opportunity cost of a new public high school is the
 - a. money cost of hiring teachers for the new school.
 - b. cost of constructing the new school at a later date.
 - c. change in the annual tax rate to pay for the new school.
 - d. other goods and services that must be given up to build the new school.

3. Which of the following choices do all economies face? How to
 - a. balance imports and exports.
 - b. balance the government's budget.
 - c. make the best use of scarce resources.
 - d. save money to reduce the national debt.

4. Sandy Smith can take a job paying \$10,000 a year when she graduates from high school, or she can go to college and pay \$5,000 a year for tuition. Measured in dollars, what is her opportunity cost of going to college next year?
 - a. \$0.
 - b. \$5,000.
 - c. \$10,000.
 - d. \$15,000.

5. The specialization of labor results in
 - a. increased price inflation.
 - b. less output per hour worked.
 - c. greater economic interdependence.
 - d. more equal distribution of income.

6. Which of the following is the most essential for a market economy?
 - a. Effective labor unions.
 - b. Good government regulation.
 - c. Responsible action by policymakers.
 - d. Active competition in the marketplace.

7. Suppose you wanted to increase the productivity of labor. Which of the following policies would help do this?
 - a. Discourage the use of labor-saving technology.
 - b. Increase pollution control requirements.
 - c. Encourage capital investment.
 - d. Spend less on education.

8. Profits are equal to
 - a. sales minus taxes and depreciation.
 - b. sales minus wages and salaries.
 - c. assets minus liabilities.
 - d. revenues minus costs.

9. In a market economy, the public interest is likely to be served even when individuals pursue their own private economic goals because of
 - a. the operation of competitive markets.
 - b. the social responsibility of business leaders.
 - c. careful planning and coordination of market activity.
 - d. individuals' understanding of what is in the public interest.

10. The functions of money are to serve as a
 - a. unit of account, a medium of exchange, and a store of value.
 - b. determinant of investment, consumption, and aggregate demand.
 - c. determinant of capital spending, aggregate supply, and exchange.
 - d. system for accounting, a means of income redistribution, and a resource allocator.

11. "Economic demand" for a product refers to how much of the product
 - a. is available for purchase from business at each price.
 - b. people are willing and able to buy at each price.
 - c. people want, whether they can buy it or not.
 - d. consumers can afford.

12. Suppose that Teen Power, a teenage organization, proposed that the minimum wage for teens should be increased. What effect would this increase most likely have on teen wages and employment in a market economy?
- a. Wages rates would go up and teen employment would go up.
 - b. Wage rates would go up and teen employment would go down.
 - c. Wage rates would go down and teen employment would go up.
 - d. Wages rates would go up and teen employment would stay the same.
13. The price of shoes is likely to be increased by
- a. new machines reducing the cost of shoe production.
 - b. more capital investment by producers.
 - c. a decrease in the demand for shoes.
 - d. a decrease in the supply of shoes.
14. "Americans are a mixed-up people. Everyone knows that baseball is far less necessary than food and steel. Yet they pay ball players a lot more than farmers and steelworkers." Why?
- a. The employers of the ball players are monopolists.
 - b. Ball players are really entertainers rather than producers.
 - c. There are fewer professional ball players than farmers or steel workers.
 - d. Good ball players are more scarce, given the demand for their services.
15. Business firms wish to sell their products at high prices. Households wish to buy products at low prices. In a market economy this conflict of interests usually is resolved by
- a. competition.
 - b. government.
 - c. businesses.
 - d. voters.
16. Of the following which is *the most general* cause of low individual incomes in the United States?
- a. Lack of valuable productive services to sell.
 - b. Discrimination against nonunion workers.
 - c. Unwillingness to work.
 - d. Progressive tax rates.

17. "ANOTHER SHIP WRECKED -- For the fourth time in six years, Rocky Point claims more victims. Millions of dollars in ships and cargo have been lost. Ships heading into the nearby port must come dangerously close to this well-known hazard. Citizens are concerned that no lighthouse protects shipping into our port." Private businesses are NOT likely to build a lighthouse because
- ship owners won't pay for lighthouses because they buy insurance policies to protect themselves from losses.
 - the light from the lighthouse can be used even by ships that do not pay a fee for the service.
 - it would cost a private business more than it would cost the government to build a lighthouse.
 - the cost of building the lighthouse is too high.
18. Those who believe that people should be taxed according to their ability to pay would most likely favor
- an excise tax.
 - a general sales tax.
 - a progressive income tax.
 - a residential property tax.
19. Three major factors of production are natural, human, and capital resources. Which of the following groups best illustrates these three factors?
- Rent, workers, and money.
 - Oil, taxi drivers, and bonds.
 - Iron ore, teachers, and trucks.
 - Farmers, investors, and manufacturers.
20. If from time to time total spending declines relative to productive capacity, the growth rate of the economy over a long period will be
- lower because some productive resources will not be fully employed.
 - lower because of a heavier reliance on the raw materials of foreign countries.
 - higher because inefficient plants, equipment, and labor no longer need to be employed.
 - higher because production will be concentrated on necessary goods rather than luxuries.
21. Increased taxation is a preferred method of financing government spending when
- the interest rate is low.
 - corporate profits are low.
 - the economy is experiencing inflation.
 - the economy is experiencing a recession.

22. A government budget deficit exists when
- government spending exceeds tax revenues.
 - government spending is increased.
 - the national debt is decreasing.
 - taxes are reduced.
23. Specialization and division of labor by nations followed by increasing international trade probably would
- increase the likelihood of worldwide unemployment.
 - increase total world production of goods and services.
 - lower living standards in the poor nations of the world.
 - eliminate differences in standards of living among nations.
24. If Kansas has a comparative advantage over Illinois in the production of wheat, then
- there are no gains from specialization and trade in cars between Kansas and Illinois.
 - the opportunity cost of producing wheat in Kansas is higher than in Illinois.
 - the opportunity cost of producing wheat in Kansas is lower than in Illinois.
 - Kansas will benefit from a decline in the demand for wheat.
25. Which of the following statements about tariffs is true?
- Tariffs increase the market for exports.
 - Tariffs decrease employment in protected industries.
 - Tariffs benefit some groups at the expense of others.
 - Tariffs encourage the growth of the most efficient industries.
26. "Economic demand for a product refers to how much of the product
- is available for purchase from business at each price.
 - people are willing and able to buy at each price.
 - people want, whether they can buy it or not.
 - consumers can afford.

27. The price of wheat is likely to be increased by
- a. new machines reducing the cost of wheat production.
 - b. a decrease in the demand for wheat.
 - c. more farmers switching from growing milo to growing wheat.
 - d. a decrease in the supply of wheat.
28. Specialization and division of labor by nations followed by increasing international trade probably would
- a. increase the likelihood of worldwide unemployment.
 - b. increase total world production of goods and services.
 - c. lower living standards in the U.S.
 - d. eliminate differences in standards of living among nations.
29. To achieve economic growth, a city must
- a. increase investment.
 - b. increase consumption.
 - c. rely on centralized city planning.
 - d. rely strictly on the market system.
30. The primary source of tax revenues for most cities is
- a. the sales tax.
 - b. the property tax.
 - c. the income tax.
 - d. taxes upon occupational licensing.
31. A city's *infrastructure* refers to
- a. all of those factors which underlie urban sprawl.
 - b. the total of all the manufacturing output produced in the city over some time period.
 - c. all of the tax revenues collected by the city government.
 - d. certain utilities and other services available to firms and their employees in the city.

32. What percentage of our population currently lives in urban areas?
- a. about one-half
 - b. about two-thirds
 - c. about three-fourths
 - d. about nine-tenths
33. The long-run problem in urban transportation involves:
- a. the decision on whether or not to apply user charges to drivers of automobiles.
 - b. the decision as to whether public investment should be in streets and freeways or in some form of mass transit.
 - c. reducing the price of gasoline so as to promote convenient and economical automobile travel.
 - d. solving the problem of automobile pollution.
34. Economies of agglomeration include:
- a. mostly internal economies of scale.
 - b. mostly location or transport economies.
 - c. mostly external economies of scale.
 - d. all of the above.
35. What kinds of businesses have tended to remain in the central cities?
- a. financial, legal, and advertising services
 - b. heavy manufacturing
 - c. retail and convenience services
 - d. all of the above.
36. Internal economies of scale consist of lower costs resulting from
- a. availability of more highly skilled labor.
 - b. a larger plant size.
 - c. the attraction of more secondary or support industries to an area.
 - d. tax breaks given by a local government.
37. External economies of scale consist of lower costs resulting from
- a. more competition.
 - b. a larger plant size.
 - c. the attraction of more secondary or support industries to an area.
 - d. reduced pollution.

38. Of the three major economic functions of government--stabilization, income transfers, and production of public goods--which predominates in local governments?
- a. Stabilization
 - b. Income transfers
 - c. Production of public goods
 - d. All are equally predominant local government functions.
39. If a good is *nonrivalrous*,
- a. those who do not pay for the good cannot be prevented from consuming it.
 - b. there is only one producer of the good.
 - c. more than one person can consume the same good at the same time.
 - d. there are no externalities involved in its consumption.
40. If a good is *nonexclusionary*,
- a. those who do not pay for the good cannot be prevented from consuming it.
 - b. there is only one producer of the good.
 - c. more than one person can consume the same good at the same time.
 - d. there are no externalities involved in its consumption.
41. The problem of political fragmentation which has accompanied urban sprawl is particularly severe because:
- a. most families who receive welfare payments are located in the suburbs.
 - b. of large differences in incomes and wealth between various political units.
 - c. the quality of urban mass-transit systems has deteriorated.
 - d. Federal legislation prohibits central cities from levying income taxes.
42. According to U.S. Census definitions a metropolitan area is
- a. a city with over 100,000 population or at least two cities with 75,000 population each.
 - b. any area with a population density of at least 500 people per square mile and an urbanized area of at least 100,000 people.
 - c. a city, or combination of cities, with a total population of at least 500,000.
 - d. a city with a population of 50,000 or more or an urbanized area of at least 100,000 people.

43. One of the earliest functions of cities was as
- a. market centers.
 - b. defensive fortresses.
 - c. industrial production centers.
 - d. transportation hubs.
44. Which statement is true of households which live below the poverty level of income?
- a. Both female- and male-headed households obtain the largest share of their income from transfer programs (welfare).
 - b. Both female- and male-headed households obtain the largest share of their income from employment.
 - c. Female-headed household obtain the largest share of their income from transfer programs while male-headed households obtain the largest share of their income from employment.
 - d. Male-headed households obtain the largest share of their income from transfer programs while female-headed households obtain the largest share of their income from employment.
45. Which type of discrimination is a cause of poverty?
- a. Wage
 - b. Employment
 - c. Residential
 - d. All of the above.

APPENDIX VI:

Post-Test

An Inside Look at the Kansas City Economy--Past and Present

POST-TEST

1. When the Kansas City trades barbecue sauce to Bemidji, Minnesota in exchange for wild rice
 - a. both cities gain.
 - b. both cities lose.
 - c. Bemidji gains, Kansas City loses because wild rice is more expensive per ounce.
 - d. Kansas City gains, Bemidji loses because the barbecue season is so short in northern Minnesota.

2. The opportunity cost of the new Union Station Science Museum is
 - a. very low because it is being financed largely by private donations.
 - b. the goods and services which will be given up to build and renovate the facility.
 - c. change in the annual tax rate to finance the new museum.
 - d. the admission charges which will be given up to make the museum free to school children.

3. Which of the following choices do all economies face?
 - a. How to balance imports and exports?
 - b. How to balance the government's budget?
 - c. What to produce?
 - d. What taxes to charge?

4. Sandy Smith can take a job paying \$10,000 a year when she graduates from high school, or she can go to college and pay \$5,000 a year for tuition. Measured in dollars, what is her opportunity cost of going to college next year?
 - a. \$0.
 - b. \$5,000.
 - c. \$10,000.
 - d. \$15,000.

5. The specialization of labor results in
 - a. higher unemployment.
 - b. greater output per hour worked.
 - c. less economic interdependence.
 - d. more equal distribution of income.

6. Which of the following is a characteristic of a market economy?
 - a. Effective labor unions.
 - b. Government ownership of the major means of production.
 - c. Internal economies of scale.
 - d. Active competition in the marketplace.

7. Suppose you wanted to increase the productivity of labor. Which of the following policies would help do this?
 - a. Encourage the use of labor-saving technology.
 - b. Increase pollution control requirements.
 - c. Discourage capital investment and hire more labor.
 - d. Privatize education.

8. Deglomerative forces in an urban economy include
 - a. public transportation.
 - b. sales taxes.
 - c. congestion and pollution.
 - d. roads and highways.

9. In a market economy, the public sector has importance in
 - a. discouraging too much competition.
 - b. ensuring the financial responsibility of business leaders.
 - c. careful planning and coordination of market activity.
 - d. correcting for external costs.

10. In a specialized economy, money serves as
 - a. a determinant of investment, consumption, and aggregate demand.
 - b. a determinant of capital spending, aggregate supply, and exchange.
 - c. a unit of account, a medium of exchange, and a store of value.
 - d. a system for accounting, a means of income redistribution, and a resource allocator.

11. "Economic demand" for a product refers to how much of the product
- is available for purchase from business at each price.
 - people are willing and able to buy at each price.
 - people want, whether they can buy it or not.
 - consumers can afford.
12. Suppose that Congress raises the minimum wage by 20 percent. What effect would this increase most likely have in a market economy?
- Illegal alien workers would be forced out of the market.
 - Unemployment would go up for low paid workers.
 - Unemployment would go down for high paid workers.
 - Unemployment would go up for high paid workers.
13. The price of shoes is likely to be increased by
- shoe companies opening more plants in the Philippines.
 - new technology allowing shoes to be produced mostly by machine.
 - a new teen fad of going to school barefoot.
 - an increase in the price of leather.
14. The city of Kansas City, KS could increase its revenues considerably if it levied
- a sales tax.
 - an excise tax.
 - an earnings tax.
 - a property tax.
15. City governments in the Kansas City metropolitan area spend little on education because
- other governmental units produce education.
 - education produces little revenue to offset city expenditures.
 - most education in the U.S. is paid for by the Federal government.
 - education is financed by bond issues rather than by taxes.

16. **WATER -- For at least the fifth time this century, a major flood of the rivers in Kansas City kills, destroys, and inflicts misery to thousands. Millions of dollars in resources have been lost. Citizens are concerned that flood control on Kansas City rivers is inadequate." Private businesses are NOT likely to undertake flood control projects because**
- a. **business owners won't pay for flood control because they buy insurance policies to protect themselves from losses.**
 - b. **the benefits from the flood control can be used even by people and businesses that do not pay a fee for the service.**
 - c. **it would cost a private business more than it would cost the government to produce flood control.**
 - d. **the cost of flood control is too high.**
18. **In the aggregate, although not necessarily locally in Kansas City, city governments get most of their revenues from**
- a. **sales and excise taxes.**
 - b. **licenses and fees.**
 - c. **personal income taxes.**
 - d. **property taxes.**
19. **Three major factors of production are natural, human, and capital resources. Which of the following groups best illustrates these three factors?**
- a. **The Missouri River, bank tellers, and computers.**
 - b. **Farmers, investors, and manufacturers.**
 - c. **Rent, workers, and currency.**
 - d. **Copper, taxi drivers, and stocks.**
20. **In an urban economy, the employment multiplier tells local officials**
- a. **how many workers make up a city's economic base.**
 - b. **how many new jobs will be created by attracting a new export firm into the city.**
 - c. **how many new workers are needed to attract a new export firm into the city.**
 - d. **whether or not a city should encourage a new firm to locate in the city.**
21. **An earnings tax is a useful method of financing city government spending when**
- a. **more people work than live in a city.**
 - b. **the local economy is experiencing economic growth.**
 - c. **fewer people work than live in a city.**
 - d. **the local economy is experiencing a recession.**

22. The most important economic function of city governments is
- maintaining economic stability.
 - redistributing income.
 - maintaining competition.
 - reallocating resources.
23. Specialization and division of labor by nations followed by increasing international trade probably would
- increase the likelihood of worldwide unemployment.
 - increase total world production of goods and services.
 - lower living standards in the poor nations of the world.
 - eliminate differences in standards of living among nations.
24. If Kansas has a comparative advantage over Illinois in the production of wheat, then
- there are no gains from specialization and trade in cars between Kansas and Illinois.
 - the opportunity cost of producing wheat in Kansas is higher than in Illinois.
 - the opportunity cost of producing wheat in Kansas is lower than in Illinois.
 - Kansas will benefit from a decline in the demand for wheat.
25. Which of the following statements about U.S. tariffs on imported goods is true?
- Tariffs create a favorable balance of trade for the U.S.
 - Tariffs protect American jobs.
 - Tariffs raise revenues for the U.S. government.
 - Tariffs protect the most efficient U.S. industries.
26. Economic demand for a product depends upon
- the price of resources.
 - technology changes.
 - consumer incomes.
 - all of the above.

27. The price of wheat is likely to increase if
- new machines reduce the cost of wheat production.
 - the Federal government removes subsidies to wheat production.
 - more farmers switch from growing milo to growing wheat.
 - the Federal government negotiates a huge sale of wheat to Russia.
28. To achieve economic growth, a city must
- increase investment.
 - increase consumption.
 - rely on centralized city planning.
 - rely strictly on the market system.
29. The primary categories of expenditures for cities generally are
- transportation; hospitals.
 - public health; public welfare.
 - education and libraries; public health.
 - public safety; housing and environment.
30. A city's *infrastructure* refers to
- its central city core which in many cities is deteriorating due to the effects of urban sprawl.
 - public utilities, banking services, education, and other services available to firms and their employees in the city.
 - the total of all the manufacturing output produced in the city during a year which is exported for consumption outside the city.
 - tax revenues collected by the city government minus expenditures.
31. What percentage of our population currently lives in urban areas?
- about nine-tenths
 - about three-fourths
 - about two-thirds
 - about one-half

32. **The Community Reinvestment Act regulates**
- a. **consumer decisions about where to live and where to shop in urban core areas.**
 - b. **business decisions about redeveloping inner city areas which have become blighted due to suburban flight.**
 - c. **lenders' decisions to provide loans for housing and business development in underserved areas of cities and rural areas.**
 - d. **city government decisions addressing the urban problems of air pollution due to auto emissions and industry wastes.**
33. **Economies of agglomeration involve**
- a. **primarily internal economies of large plant size.**
 - b. **lower production costs resulting from the concentration of economic activity in urban locations.**
 - c. **lower product prices due to the large number of sellers producing and selling similar products.**
 - d. **the extra costs which society incurs due to the pollution and congestion resulting from concentration of economic activity.**
34. **A problem of inner cities which tends to exacerbate poverty and blight is**
- a. **the lack of jobs as most economic activity moves to the suburbs.**
 - b. **the lack of retail and convenience services.**
 - c. **that jobs which tend to match skills of inner city residents have moved to the suburbs.**
 - d. **that people living in inner cities are generally not interested in working.**
35. **Economies resulting from larger plant sizes are called**
- a. **internal economies of scale.**
 - b. **infrastructure economies.**
 - c. **locational economies.**
 - d. **external economies of scale.**
36. **External economies of scale consist of lower production costs resulting from**
- a. **a larger plant size.**
 - b. **the location of more secondary or support industries in an area.**
 - c. **increased competition.**
 - d. **reduced pollution and congestion.**

37. One of the major functions of the Federal Reserve System is
- a. to help stabilize the economy.
 - b. to redistribute income through the tax and transfer system.
 - c. to make sure that there are enough financial institutions in a region to support economic activity.
 - d. All are equally predominant Federal Reserve functions.
38. If a good is *nonrivalrous*,
- a. there are no externalities involved in its consumption.
 - b. those who do not pay for the good cannot be prevented from consuming it.
 - c. more than one person can consume the same good at the same time.
 - d. there is only one producer of the good.
39. If a good is *nonexclusionary*,
- a. there are no externalities involved in its consumption.
 - b. those who do not pay for the good cannot be prevented from consuming it.
 - c. more than one person can consume the same good at the same time.
 - d. there is only one producer of the good.
40. The problem of political fragmentation which has accompanied urban sprawl is particularly severe because
- a. of crime in the inner city.
 - b. of competition between political units for limited resources.
 - c. of the distance between the inner city and the suburban fringe.
 - d. central cities typically do not levy income taxes.
41. The objective of monetary policy is to
- a. stabilize the economy by controlling the money supply.
 - b. redistribute income by transferring money from upper to lower income groups.
 - c. finance the Federal deficit by issuing U.S. Treasury securities.
 - d. maintain a competitive market for financial transactions.

42. Which of the following is NOT an early function of cities?
- a. market center
 - b. religious center
 - c. industrial production center
 - d. defense fortress
43. Transfer payments are
- a. Payments by the government to individuals in return for their productive services.
 - b. Payments by corporations to their stockholders.
 - c. Payments by the government to homemakers who engage in home production rather than market work.
 - d. Payments by the government to individuals which are not in exchange for current productive services.
44. Which of the following is an example of an *external benefit*?
- a. the beautiful flowers in your next door neighbor's yard
 - b. your next door neighbor's new Mercedes convertible
 - c. your next door neighbor's garbage
 - d. the new movie showing at the theater in your neighborhood
45. A true public good is
- a. nonexistent.
 - b. one that benefits the government at the expense of individuals.
 - c. one in which the external benefits outweigh the external costs.
 - d. one which would never be produced by the private sector.

APPENDIX VII:

Student Comments Regarding Concept Mapping Process

Figure 4.3: Summary of Tests Scores, Gain Scores, and CM Scores

**Tests Scores, Gain Scores, Concept Map Scores,
Student Comments, and Reviewer Comments**

Student #1: Map #3 - I understand the concept, but very difficult to incorporate all the terms.

Reviewer Comments: Emerging structure.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
1	26	34	8	52

Student #2: Map #1 - I spent about 45 minutes on each. I misunderstood I guess, I thought this was just a way for you to assess our existing knowledge. Concept mapping is always a little frustrating to me because I'm sort of a neat freak and I tend to "clean" them up too much and have only a "skeleton" left for the final product. # 3 - Still a little frustrating, getting easier to organize. Very helpful for reviewing your work. #4 - Still frustrating. I don't think it really reflects what I know very well.

Reviewer Comments: Basic map using no examples. Beginning attempts at organization.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
2	34	30	-4	61

Student #3: Map #1 - Dictionary didn't help; weren't in it. I didn't know many of the definitions of these words! I remembered learning some of these at the same time during high school or zooconomy and grouped those together. Quite a bit of guessing was done! #4 - It seems as

though all the concepts relate somehow or another. It's hard to attach all of them with a line.

Reviewer Comments: Several crosslinks. Emerging clusters. Good use of examples. Very detailed.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
3	27	33	6	112

Student #4: No comments.

Reviewer Comments: Left out concepts. Hard to follow. Use of vague descriptors.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
4	2 5	29	4	57

Student #5: No comments.

Reviewer Comments: Incorrect linking words. Did not use all of the concepts. Did not state the basic economic problem of scarcity.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
5	37	42	5	71

Student #6: Map #3 - Confusing at beginning but by process of elimination I finally found a place for each item. #4 - This is still difficult but it does seem to help me organize my thoughts and forces connections and decisions.

Reviewer Comments: Good use of examples. Emerging structure. Struggling with organization.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
6	36	41	5	118

Student #7: Map #1 - Dictionary no help! No other references available.
Reviewer Comments: Good use of examples. Emerging structure. Well organized. Very detailed.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
7	30	36	6	179

Student #8: Map #4 - This has been very difficult for me. One of the reasons I didn't become a math teacher is because geometry proofs were so difficult. This reminds me of that process. Because I teach accounting, I see little application for me. However, at least now I know what the concept is and can look for opportunities to use this. I really did understand this from the notes and lectures and book. I'm just not sure that came across with my mapping!

Reviewer Comments: Difficulty organizing the map.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
8	31	38	7	100

Student#9: Map #1 - I was very confused on how to complete this map. My map can show my confusion. #4 - I still find it hard to connect with words and it seems to be extremely time consuming.

Reviewer Comments: Good basic organization.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
9	2 5	31	6	80

Student #10: Map #4: This mapping did help provide a framework for organizing the various economic concepts. Perhaps because I had not had a great deal of experience with mapping beyond using it as a means to extend a subject in reading and/or writing with my students, I felt the amount of time it required for me somewhat burdensome. I tend to expect perfection and was somewhat frustrated in the flexibility of

accuracy. As I spent more and more time experiencing the process I found myself tending to want to extend it on and on. Meaningful experience!

Reviewer Comments: - Six page neatly done concept map! Well organized. Used textbook to add information. Very detailed.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
10	27	36	9	173

Student #11: Map #4 - Believe it became easier as the class went on. Would still like more instructions on how to construct these.

Reviewer Comments: Little clustering. Fairly linear with several incorrect propositions.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
11	25	36	11	34

Student #12: Map #1 - I have to put the concepts I want in my map on strips of paper. Then I can arrange them into groupings and think through how they link together. I always change something as I write the concepts and add the linking words or phrases. #3 I have put the concepts I want in my map on strips of paper. Then I can arrange them into groupings and think through how they link together. I always change something as I write the concepts and add the linking words or phrases. #4 - This time I understood more after looking at someone else's map. I feel this is closer to correct.

Reviewer Comments: Beginning to organize and cluster. Difficult to read.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
12	30	31	1	64

Student #13: Map #1 - I shifted those pieces around until they were tattered. #4 - It has gotten easier although more time consuming!

Reviewer Comments: Excellent map. Well organized and accurate. Complete. Good use of examples.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
13	3 3	39	6	125

Student #14: Map #4 - With added terminology, constructing new maps each time gets harder and harder. Making maps with specificity would be easier if done in parts, rather than starting completely over from supply/demand. Way too complicated!

Reviewer Comments: Partially organized. Good use of examples.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
14	30	34	4	103

Student #15: Map #3 - Hard for whole-to-part person. Confusing when you aren't sure about the knowledge base.

Reviewer Comments: Organization emerging.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
15	31	40	9	88

Student #16: Map #4 - I feel that this exercise caused me to utilize more resources than ever before. This exercise caused me to think and structure words. I've gained much knowledge! Thank you!

Reviewer Comments: Very disorganized map. Several incorrect propositions.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
16	26	26	-	92

Student #17: Map #3 - This is still very difficult. #4 - This would definitely not be the most efficient way for me to learn material but I have appreciated being exposed to a different learning strategy. I believe I could use this with my students using fewer concepts.

Reviewer Comments: Six lists with several connections between them. Minor clustering.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
17	39	42	3	121

Student #18: Map #3 - I would rather outline and talk like in class with (*Instructor*).

Reviewer Comments: MANY ideas not well connected. Struggling with organization.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
18	26	30	4	124

Student #19: Map #3 - It's not getting any easier! #4 - This was just too many concepts to try to put on one map. I really worked hard on this- used my notes, etc. but I still got very frustrated. Maybe because this is the first economics class I have ever had? I think I need more time to process all of this.

Reviewer Comments: - Very good map. Well organized. Only a few misconceptions.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
19	30	31	1	114

Student #20: Map #3 - It was very hard. I know what the terms mean but it is hard arranging them.

Reviewer Comments: Beginning to develop organizational structure.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
20	30	34	4	66

Student #21: No comments.

Reviewer Comments: Map reflected general understanding of economics including public and private sectors. Verbs were very descriptive. Did not use all of the concepts required and did not include determinants of supply and demand.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
21	36	36	-	72

Student #22: No comments.

Reviewer Comments: Connected unlimited wants, scarcity, and demand but did not connect to limited productive resources.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
22	23	32	9	122

Student #23: No comments.

Reviewer Comments: Use of most concepts. Well organized.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
23	26	31	5	97

Student #24: No comments.

Reviewer Comments: Omitted connecting words. Correctly included required content.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
24	19	36	17	36

Student #25: Map #3 - Excellent method of organizing information and thoughts. Useful connections for world history. Time consuming when there are virtually unlimited concepts. #4 - Add one more term and the next map will, of necessity, be on a bed sheet.

Reviewer Comments: - Excellent map structure and organization. Accurate and complete.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
25	38	41	3	168

Student #26:

Reviewer Comments: Does not understand determinants of supply and demand. Used many examples. Made no connection between human resources and human capital.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
26	25	34	9	89

Student #27: Black to Grey [*Background color of map*]. Map #3 - I have "some" understanding of the economic concepts. However, I got stuck in a "void" when it came to relating some of them. I grouped ones I felt were related to one another together. I'm sure I will be "beamed up" soon and will have a more global understanding. #4 - Grey to white!

Reviewer Comments: Emerging structure. Detailed.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
27	30	30	-	113

Student #28: Map #3 - Found the task somewhat easier this time around, more familiar with (some) terminology - some terminology, no idea! #4 - Still struggling - just takes me awhile to process information in order to "connect."

Reviewer Comments: Good organizational structure. Few misconceptions.

Student #	Pre-Test	Post-Test	Gain Score	CM Score
28	20	26	6	105
