The Effect of Explicit Teaching of Concept Mapping in Expository Writing on EFL Students' Self-regulation

Mohammad Reza Talebinezhad*

Associate professor, Department of English Sheikh Bahaee University, Isfahan, I.R. Iran

Giti Mousapour Negari **

Assistant professor, University of Sistan and Baluchestan, I.R. Iran

Abstract

The present paper investigated the effectiveness of concept mapping as a learning strategy on EFL students' self-regulation (metacognitive self-regulation, time and study environment, effort regulation, peer learning, and help seeking). Sixty university students participated in the study. They were randomly assigned to control and experimental groups, each including thirty students. They were at the intermediate level of English proficiency and studying English either Translation or Literature. Their language proficiency was determined by the Michigan Test of English Language Proficiency (MTELP) (Corrigan, 1979). The instrument to collect data on the students' self-regulation was the Motivated Strategies for Learning Questionnaire (MSLQ) (Printrich et al., 1991). The findings revealed that students gained higher self-regulation in writing tasks as the result of the explicit instruction of the concept mapping strategy. The findings have implications for pedagogy as well as for research.

Key Words: concept mapping, self-regulation, learning strategies, strategy teaching.

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* Tel: 0541- 2434757, Fax: 0541-2434757, E-mail: r-talebi@fgn.ui.ac.ir

** Tel: 0541-2434757, Fax: 0541-2434757, E-mail: mousapour@hamoon.usb.ac.ir

1. Introduction

Writing is a very complex process in which numerous cognitive and metacognitive activities take place, for instance, brainstorming, planning, outlining, organizing, drafting, revising, and so on. Cognitive aspects have received particular attention, as investigators have attempted to understand the thought processes underlying the compositions of students (Flower & Hayes, 1981). Learning to write is difficult especially for those writing in a second or foreign language in academic contexts. As Bereiter and Scardamalia (1987: 12) stated by putting together concepts and solving problems, the writer engages in "a two-way interaction between continuously developing knowledge and continuously developing text". There is a sufficient body of research that confirms the positive effect of concept mapping in the students' writing tasks in academic contexts. Smith (1987) found concept mapping a worthwhile heuristic for helping experts make their own understanding more evident to learners and for helping learners better understand the structure of knowledge. The process of drawing a map not only demands active involvement of the learner in the learning process but also sheds light on their understanding of a specific learning area. Writing also requires extensive self-regulation and attention control (Graham & Harris, 2000). For skilled writers, writing is a flexible, goal-directed activity that is scaffolded by a rich knowledge of cognitive processes and strategies for planning, text production, and revision. In fact skilled writers engage in purposeful and active self-direction of theses processes and strategies (Harris et al., 1998). A study by O'Malley and Chamot (1990) suggested that successful L2/FL learners are aware of the learning strategies they use and why they use them. The matter of interest in this paper is to investigate the effect of the explicit teaching of the concept mapping strategy in one cognitive aspect of writing, namely self-regulation. The question is whether English language teachers can help students improve their self-control and attention in writing by the explicit instruction of learning strategies like concept mapping.

The aim of the present study is to find out the effect of the explicit instruction of concept mapping strategy in writing tasks on EFL learners' self-regulation.

2. Literature review

Historically, researchers in the field of composition have focused on the processes in which writers engage as they compose a text (Hairston, 1990). Beach (1989) suggested that students' self-perceptions of their own writing competence offer a particularly promising avenue of research for informing writing instruction.

Flower and Hayes (1980: 40) conceptualized writing as a "strategic action where writers employ strategies to juggle with the constraints of composing". They stated that composing strategies are decisions taken to cope with the problems (both linguistic and rhetorical) posed by the writing task as perceived by the writers. Hays and Flower (1980) presented a model of skilled writers in which cognitive processes formed a major component. These included three basic processes: planning what to say and how to say it; translating plans into written text; and reviewing to improve existing text. Planning, in turn, was composed of three ingredients: setting goals, generating ideas, and organizing ideas into a writing plan; whereas reviewing included reading and editing text. The execution of these cognitive processes was thought to be under the writer's direct control, and it was proposed that virtually any subprocess could interrupt or incorporate any other subprocess.

Literature reports on the benefits of concept mapping for organizing information, assessing in learning, comprehension of particularly complex communications, refining literacy framework, and successful understanding of the text (Ruddell & Boyle, 1989). A concept map, as a learning strategy, is defined as a visual representation of an individual's knowledge structure on a particular topic as constructed by the individual (Zimmaro & Cawley, 1998). Concept maps represent the relationships among concepts (Novak, 1981). With the visual representation of key words, students can identify main issues of a text and organize these key issues in a meaningful way. There is ample evidence for the effectiveness of the use of concept mapping strategy in writing tasks. Research reports that concept mapping has positive effects on academic writing (Zipprich, 1995; Peresich, Meadows, & Sinatra, 1990). Strategies such as concept mapping help students attend to task, focus on important textures, organize material, and maintain a productive

psychological climate for learning (Weinstein & Mayer, 1986).

Freeman (2002) provided an explanation for the effect of concept mapping on the writing process. She stated that human minds have the ability to create conceptual projections from the concrete to abstract by the process of mapping from one to another. The ability to create mappings enables us to project ourselves into the past and future. According to Schunk (1998) students who believed they were learning a useful strategy were apt to feel efficacious about improving their writing. Concept mapping as a strategy which emphasizes organization may help the students to improve their writing. Students' ability to control their learning or "self-regulation", according to Zimmerman (1986), refers to the degree to which individuals become metacognitively, motivationally, and behaviorally active participants in their own learning process. The good news is that individuals can learn how to regulate their cognitive activities. Self-regulation is neither a measure of mental intelligence that is unchangeable after a certain point in life nor a personal characteristic that is genetically based or formed early in life (Livingston 1997: 3). Self-regulation in writing was defined as the strategy that writers adopt to preplan what they are going to write, and to review and edit output (Zimmerman & Risemburg, 1997). Research showed that adolescents who used different types of self-regulatory processes wrote more effectively; they produced more information in their papers; they wrote more organized pieces; and they received higher grades in writing (Zimmerman & Risemberg, 1997).

Many teachers attempted to influence the course of this development in a relatively straightforward and direct fashion. They might model and explicitly teach the types of strategies used by more skilled writers, or might establish predictable routines where writing processes such as planning and revising were expected and reinforced (Graham & Harris, 1996).

Strategy instruction is a teaching approach that assists students in developing strategies for all phases of the writing process and teaches self-regulation of performance of the strategies. Strategy instruction assists student writers by breaking down writing tasks and making the subprocesses and skills much more explicit

(Sturm & Rankin- Erickson, 2002). Since self-regulation is not a personality trait, students can control their behaviors and affect in order to improve their academic learning and performance. Students learn self-regulation through experience (Pintrich, 1995) so teachers can teach in ways that help students become self-regulating learners (Coppola, 1995).

An examination of the literature reveals a wide range of terminology associated with learner training, which is also referred to as strategy teaching (Richards et al., 1992) or strategies-based instruction (SBI) (Brown, 2000). Since the 1970s, there has been growing interest in the concept of the 'good' language learner and the importance of learning styles and learner preferences (Oxford, 1990). This has marked a continued investigation into learning processes and support for the communicative philosophy of teaching learners how to learn, and thus become independent and autonomous learners through the use of learning strategies (Wenden, 1991); together with increasing learners' language awareness through inductive learning approaches and activities, such as consciousness-raising (Sharwood Smith, 1981).

Richards et al. (1992: 355) present a specific definition of strategy training and outline three different approaches. They suggested that training in the use of learning strategies can improve a learner's effectiveness. A number of approaches to strategy training are used, including: 1) Explicit or direct training: learners are given information about the value and purpose of particular strategies, taught how to use them and how to monitor their own use of the strategies. 2) Embedded strategy training: the strategies to be taught are not taught explicitly but are embedded in the regular content of an academic subject area, such as reading, math or science. 3) Combination strategy training: explicit strategy training is followed by embedded training.

Brown (2000: 130) acknowledges work on the effectiveness of learning strategies for various learners in a variety of contexts. He then states "…we probe its implications for your teaching methodology in the classroom, specifically, how your language classroom techniques can encourage, build, and sustain effective language-

learning strategies in your students". Learner training can therefore be summarized as teaching learners how to learn, with a view to becoming independent and autonomous learners.

The literature has reported the growing body of research involving the idea that students' self-regulation may vary under the effect of learning strategies. The area of interest is to know whether explicit instruction of learning strategies, namely concept mapping can lead to an increase in students' self-regulation.

3. Method

3.1. Restatement of the problem

There has been growing interest in learning processes and support for teaching learners how to learn, and thus become independent and autonomous learners through the use of learning strategies. Some researchers as Hacker, Dunlosky, and Graesser (1998) suggested that instructional strategies that teach students to practice cognitive skills can increase learners' performance in academic subjects. The principal aim of this study was to investigate the effectiveness of the explicit instruction of the strategy of concept mapping in expository writing in EFL students' self-regulation.

3.2. Design

The study had a pretest-posttest control group design. Both control group and experimental group participated in pretest and posttest self-regulation questionnaire, but only the experimental group received the treatment.

3.3. Participants

Sixty university students participated in the study. They were studying English either as translation or literature. They were at the intermediate level of English language proficiency. The Michigan Test of English Language Proficiency (MTELP) was administered to determine their level of English proficiency. Then

according to the mean performance and the standard deviation of the test, subjects were assigned into high, mid and low groups. Those students whose scores fell one standard deviation below and above the mean were assigned as the mid group. Then they were randomly assigned to control and experimental groups (each including thirty students). In the experimental group, twelve students were male and eighteen students were female. In the control group, ten students were male and twenty students were female.

3.4. Instructional Material

The treatment for the experimental group was instruction and practice in concept mapping. Students were provided with handouts that included definition of concept mapping, different uses and examples of concept maps. Students practiced the application of concept mapping in writing essays. They were required to draw concept maps of their own or to complete the incomplete maps. In the experimental group, the students practiced writing expository essays, using concept mapping strategy. The topics for the essays sequenced from easy and familiar topics (unnecessary to have specialized knowledge) to difficult and unfamiliar topics. They included: plants, time, weather, air pollution, the function of heart, and psychology. Familiarity/unfamiliarity and simplicity/difficulty of the topics were judged by three university teachers who were teaching writing courses. The control group wrote essays about the same topics without the use of concept mapping strategy. (See Appendix B).

3.5. Instruments

The instrument used to determine the level of the students' English proficiency was the Michigan Test of English Language Proficiency (MTELP) (Corrigan, 1979); and the Motivated Strategies for Learning Questionnaire (Printrich et al., 1991) was applied to measure the students' self-regulation. The MSLQ was developed at the National Center for Research to Improve Postsecondary Teaching and Learning at the University of Michigan. The MSLQ instrument has been used widely in

investigating students' motivation and learning strategies in many countries, such as Arabia (Almegta, 1997), Australia (Fuller, 1999), Canada (d'Apollonia, Galley, & Simpson, 2001), and China (Rao, Moely, & Sachs, 2000).

First, the students were asked to participate in the Michigan Test of English Language Proficiency. The test consists of three parts: written composition, listening comprehension and multiple choice test containing grammar, cloze reading, vocabulary, and reading comprehension problems. From among ninety students who were at the intermediate level of English proficiency sixty students were randomly selected. Then the students were asked to fill out the MSLQ. The learning strategies section had 50 items regarding students' use of different cognitive and self-regulated learning strategies. Only five scales in the learning strategies section (metacognitive self-regulation, time and study environment, effort regulation, peer learning, and help seeking) were relevant to self-regulation and were used in this study. It contains 31 items regarding students' use of different cognitive and metacognitive strategies. The scales were adapted to measure students' self-regulation in writing tasks. Cronbach's coefficient for the scale was .76 (See Appendix A).

3.6. Procedure

Instruction period was about twelve weeks and comprised of three phases:

3.6.1. Pre-testing

Before the students in experimental group received any instruction, all the students in two groups completed the self-regulation questionnaire (MSLQ). The instrument was designed to be given in class and takes approximately 20-30 minutes to administer.

3.6.2. Strategy instruction

Following pre-testing the students participated in twelve sixty-minute study sessions. The students in experimental group received the instruction for concept mapping strategy. The strategy was taught following Harris and Graham (1996): (1)

Strategy description, (2) Discussion of goals and purposes, (3) Modeling of the strategy, (4) Student mastery of strategy steps, and (5) Guided practice and feedback.

1. Strategy description. As an introduction to the first lesson, students were told that they were going to learn about the strategy of concept mapping. Concept mapping was described as a strategy that could be used to categorize information in a graphic form through drawing. It was also described as a strategy that could help them with vocabulary development, reading comprehension, study skills, and prewriting activities. Finally, the sequence of steps for creating a concept map was described.

2. Discussion of goals and purposes. The teacher discussed the students about the significance and benefits of using the concept mapping strategy in writing. Students were asked two questions: (1) How do you think this strategy might help you write? and (2) How could this strategy help you with different types of writing? To reinforce student participation as collaborators in the learning process, goals and purposes that students generated were written on the white board.

3. Modeling the strategy. The teacher modeled use of concept mapping strategy by creating a map while students were offered several topics to select from for the activity. Once the group agreed on a topic, the teacher wrote it on the white board. This topic was labeled as "main idea" of the concept map. Next possible subtopics were generated. The teacher demonstrated use of arrows to connect main ideas and subtopics. Finally, details were generated and added to each of the subtopics. Students participated in the process by brainstorming possible categories and details. Students were taught how to write subtopic information in telegraphic form. The teacher modeled use of telegraphic language forms and explained that this involves choosing the most important information. Students assisted by generating ideas to be

placed on the map. Then, the teacher discussed how the categories and the details could be sequenced into paragraphs, and sentences within paragraphs, to compose an essay. The teacher explained that each subtopic may represent different paragraphs in the essay. Upon completion of the map , the teacher modeled the transfer of subtopic information from the map into written form-instruction followed the sequence of procedures for transferring concept maps into written paragraphs, starting with top-level structures i.e., topics and subtopics) , the teacher reviewed the information on the map. Each category was reviewed, including the main ideas and supporting details. The teacher modeled how she would rewrite the information from the map into complete sentences. For each subtopic, a topic sentence was written, followed by supporting sentences. Finally, the concluding paragraph was explained and with the help of the students the teacher wrote a concluding paragraph.

4. Student mastery of strategy steps. During this stage, students rehearsed and memorized the sequence of activities for concept map construction.

5. Guided practice and Feedback. During these sessions, feedback was provided for students' performance. Students chose a topic and created maps. Then, they used the concept maps to compose essays.

   The first three sessions were spent on the instruction of the concept mapping strategy. The other nine sessions were spent on practicing the strategy for the students to master the fundamental skills. They practiced individually or in groups. One essay was composed every two weeks for a total of four essays for each student. The essays were corrected by the teacher and returned to the students in the two groups. During these sessions, other formal teaching techniques were not employed by the teacher. . The teacher was a non-native English teacher who taught writing courses for many years at the university. The same teacher taught the control group essay writing but without the use of concept mapping strategy. Before starting the

project, the teacher was trained how to teach concept mapping strategy within three sessions (following Harris and Graham's strategy teaching, 1996). The length of the course was the same for both the experimental and the control groups. During the instructional period the students in the control group wrote as many expository essays as the experimental group but without the use of concept mapping strategy.

3.6.3. Post-testing

After the instruction of the strategy of concept mapping (at the conclusion of the treatment period) all the students in two groups again completed the self-regulation questionnaire (MSLQ).

3.7. Scoring of the Data

The research applied the Motivated Strategies for Learning Questionnaire (MSLQ) to assess the students' self regulation. The students were asked to identify the number between 1 and 5 that best describes them.

Responses were scored using a 5 point Likert type scale: 1) Not at all true of myself 2) Slightly true of myself 3) About halfway true of myself 4) Mostly true of myself 5) True of myself. Scale scores were determined by summing the items and taking an average for each student. There were several items that had to be reverse-scaled (R). For reverse-scaled items, 1 = 5, 2 = 4, 3 = 3, 4 = 2, and 5 = 1.

4. Data analysis

The analysis of the data was carried out using the ANCOVA. First, mean scores and standard deviations of the two groups were estimated. Table 1 displays the descriptive statistics of the two groups.

Table1. Means and standard deviations for pretest and posttest scores on self-regulation

	M	SD	N
Pretest			
Experimental group	2.35	.52	30
Control group	2.51	.56	30
Posttest			
Experimental group	3.79	.52	30
Control group	3.21	.67	30

The ANCOVA was performed to investigate the effectiveness of the instruction of the concept mapping strategy on the students' self-regulation. The independent variable was the instruction of concept mapping strategy and the pretests were considered as covariates to control the effect of the continuous variable. Table 2 shows the significance value of the covariate by the dependent variable interaction (group * pretest). The significance value of the interaction (.26) is greater than 0.05 which shows it is not significant. Moreover its partial eta squared (.022) is near 0 which accounts for the assumption of homogeneity of the groups for the covariate (pretest).

Table2.The estimate of the interaction of the group by the pretest

Source	Type III sum of squares	df	Mean square	F	Sig.	partial eta squared
Group	1.347	1	1.347	3.638	.062	.61
Pretest	.172	1	.172	.466	.498	.008
Group*pretest	.467	1	.467	1.261	.266	.022
Error	20.738	56	.370			

Next, the results for the effect of the independent variable were estimated. Table 3 shows the results. The significance value for the participation in the instruction

(group) is less than 0.05, indicating it has a significant effect on the students' performance. The results revealed that the explicit instruction of the concept mapping strategy had a positive effect on the students' self-regulation. The data analysis confirmed that the students in the experimental group gained higher self-regulation in contrast to the students in the control group.

Table3. The estimate of the effect of the group and the pretest

Source	Type III sum of squares	df	Mean square	F	Sig.
Pretest	.224	1	.224	.602	.441
Group	5.133	1	5.133	13.797	.000*
Error	21.205	57	.372		

The parameter estimate showed that the size of the effect of the instructional program was (-.6, $p< 0.05$) for the control group.

5. Results and discussion

The ultimate goal of the present study was to investigate the effect of the explicit instruction of concept mapping strategy in writing expository essays on EFL intermediate students' self-regulation. The results showed a significant effect of the explicit instruction of the concept mapping strategy on the students' self-regulation. The results are consistent with the findings of Ley and Young (1998) in that instruction in strategy use is an effective means of promoting self-regulation; and that of Zimmerman and Paulsen (1995) that organizing is a key component of self-regulation. Moreover, it confirms the findings of Hofer et al. (1998) that organizational strategies, such as outlining content or relating concepts within content, are among the cognitive learning strategies that individuals use to self-regulate.

One explanation might be that, as Barnhardt (1997) stated, there is a relationship

between strategy use and confidence in language learning. For students who had long have difficulties in writing a foreign language, a positive change in attitude due to their success in the application of the concept mapping strategy might be the initial step toward improved self-regulation. It meant that when the students had a better idea of how to go about a writing task, they were more positive about the task. In other words, concept mapping strategy helped students attend to writing tasks, and control their learning more effectively. This created a much more tangible evidence of the quality of both the learning process and concept understanding.

Another explanation may be that the construction of concept maps might have helped students to build more complex cognitive structures in regard to information which was vital for writing. According to Pintrich (2000), the cognitive area of self-regulation begins with goal setting, prior knowledge activation and planning. He places the actual use of cognitive strategies in the phase of cognitive control and regulation. It has been suggested that strategy instruction should be integrated into a larger framework of self-regulation involving the helping of students to identify their goals in a learning task (Butler, 2002).Butler states that by strategy intervention it is easier to demonstrate the different types of knowledge which are essential for fostering students' self-regulated strategy use.

Improved self-regulation due to the positive effect of concept mapping strategy is explained by McAleese (1998) that individuals are affected by control mechanisms that are both external and internal. According to him, there is some interaction between the external representation (concept mapping) and the internal understanding (self-regulation). The factors that determine students' behavior shift between the internal self-regulation and the external factor of concept mapping.

6. Conclusion and implications

The findings clearly demonstrate that the instruction of the concept mapping can benefit EFL university students at the intermediate level of language proficiency. In fact, the benefits of concept mapping might extend beyond achievement gains to some variables such as self-regulation which is an achievement-related variable. It

seems that the use of concept mapping strategy in our courses of writing in the university has been rewarding as a means of constructing knowledge and promoting self-regulation. This has important implications for both students and teachers. Students maximize their learning by using concept mapping in their essay writing; hence they feel more independent and feel more responsibility for their own learning. Because concept mapping is easily adopted by the students, teachers may enhance their students' self-regulation in writing by familiarizing them with the concept mapping strategy.

Although the present study suggests that the strategy of concept mapping is beneficial to university students, there are areas that need to be studied further. In regard to university students, it needs to be investigated whether the benefits of concept mapping would be the same for the students at the elementary level of English proficiency. Moreover, one may be interested in finding out the extent to which students' writing improvement under the effect of using concept mapping strategy is partially due to an increase in their self-regulation. Clearly more research is needed to throw light on the nature of strategies that are involved in writing skill.

References

Almegta, N. R. (1997). Relationship of self-efficacy, causal attribution, and emotions to female college students' academic self-evaluation. *Dissertation Abstracts International, 58*(01).

Barnhardt, S. (1997). Self-efficacy and second language learning. *The NCLRC Language Resource*, 1 (5).

Beach, R. (1989). Showing students how to assess. Demonstrating techniques for response in the writing conference, In C. M. Anson (Ed.). *Writing and response* (pp. 127-148). Urbana, IL: NCTE.

Breiter, C., and M. Scardamalia. (1987).*The psychology of written composition*. Hillsdale, N.J: Lawrence Erlbaum.

Brown, H. D. (2000) Principles of Language Learning and Teaching. (Fourth Edition) New York: Longman.

Butler, D.L. (2002). Individualizing instruction in self-regulated learning.*Theory Into Practice*, 41, 81-92.

Coppola, B. P. (1995). Progress in practice: Using concepts from motivational and self-regulated learning research to improve chemistry instruction. In P. R. Pintrich (Ed.), *Understanding self-regulated learning* (pp. 8787-96). San Francisco, CA: Jossey-Bass.

Corrigan, A. (1979). *The Michigan test of English language proficiency*. Ann Arbor: English Language Institute, University of Michigan.

d'Apollonia, S., D. Galley & M. Simpson. (2001). Formal reasoning and conceptual development. Retrieved July 17, 2001 from http://www.place.dawsoncollege.qc.ca/~sdapoll/ PAREA96.htm

Flower, L., J.R. Hayes. (1980). The dynamics of composing: making plans and juggling constraints. In: Gregg, L., Steinberg, E. (Eds.), *Cognitive processes in writing* (pp. 31-50). Lawrence Erlbaum Associates, Hillsdale.

---. (1981).Plans that guide the composing process. In C. H. Fredeiksen, M. F. Whiteman, and J. F. Dominic (Eds.)Writing: the nature of development, and teaching of written communication .(vol. 2). Hillsdale, N. J: Erlbaum.

Freeman, M. H. (2002). *Cognitive mapping in literacy analysis*. Los Angeles Valley College. EBSCO Publishing.

Fuller, R. (1999). Do university students' conceptions of learning really influence their learning? Retrieved July 17, 2001 from: http://www.herdsa.org.au/vic/ /cornerstones/PDF/fuller.

Graham, S. and K. Harris. (1996). Self-regulation and strategy instruction for students who find writing and learning challenging. In Levy, M. and Ransdell, S. (eds.) *The science of Writing: Theories, methods, individual differences and applications*, (PP.347-360). Mahwah, NJ: Lawrence. Erlbaum.

---. (2000). The role of self -regulation and transcription skills in writing and writing development. *Educational Psychologist 35*, 3-12.

Hacker, Dunlosky, & Graesser. (1998). *Metacognition in educational theory and practice*. Mahwah, New Jersey: Lawrence Erlbaum Associates.

Hairston, M. (1990).The winds of change: Thomas Kulm the revolution in the teaching of writing . In R. L. Grares (Ed.) *Rhetoric and Composition* (PP.3-15). Portmouth, NH: Heinemann.

Harris, K. R., & S. Graham. (1996). *Making the writing process work: Strategies for composition and self-regulation*. Cambridge, MA: Brookline Books.

Harris, K.R., T. Schmidt & S. Graham. (1998). Every child can write: Strategies for composition and self-regulation in the writing process. In D Schunk & B. Zimmerman (Eds.), Self-regulated learning: From teaching to self-reflective practices (pp. 131-167). New York: Guilford.

Hayes, J. and L. Flower. (1980). Identifying the organization of writing processes. In: Gregg, L. and Steinberg, E. (Eds.) .*Cognitive processes in writing*, (pp. 3-30). Hillsdale, NJ: Lawrence Erlbaum.

Hofer, B. K., S. L.Yu, & P.R., Pintrich. (1998). In D. H. Schunk & B. J. Zimmerman, (Eds.) *Self-regulated learning: from teaching to self-reflective practice* (pp.57-85). New York: The Guilford Press.

Jonassen, D. H., & B. L. Grabowski. (1993). *Handbook of individual differences, learning, and instruction.* Hillsdale, NJ: Erlbaum.

Ley, K., & D.B. Young. (1998). Self-regulation behaviors in underprepared (developmental) and regular admission college students. *Contemporary Educational Psychology 23*, 42.

Livingston, J. (1997). *Metacognitive: An overview*. State University of New York at Buffalo Web site. Retrieved July 24, 2003, from: http://gse.buffalo.edu/FAS/Shuell/CEP564/Metacog.htm

McAleese, R. (1998). The knowledge Arena as an extension to the concept map; reflection in action. *Interactive Learning Environments, 6*(3), 251-272.

Novak, J. D. (1981). Applying learning psychology and philosophy of science to biology teaching. The American Biology Teacher, 43(1), 12-20.

O'Malley, M. and A. Uhl. Chamot. (1990). Learning Strategies in Second Language Acquisition. Cambridge & New York, Cambridge University Press.

Oxford, R. (1990) *Language learning strategies: What every teacher should know*. New York, Newbury House.

Perescich, M., J. Meadows, and R. Sinatra. (1990). Content area mapping for reading and writing proficiency. *Journal of Reading* 33 6, pp. 424–432.

Pintrich, P. R. (1995). Understanding self-regulated learning. In P. R. Pintrich (Ed.), *Understanding selfregulated learning* (pp. 3-12). San Francisco, CA: Jossey-Bass.

---. (2000). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology*, 92, 544-555.

Printrich, P. R., D. A. Smith, T. Garcia, & W. J. McKeachie. (1991). *A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ).* National Center for Research to Improve Postsecondary Teaching and Learning. Ann Arbor: University of Michigan.

Rao, N., B. Moely, & J. Sachs. (2000). Motivational beliefs, study strategies, and mathematics attainment in high- and low-achieving Chinese secondary school students. *Contemporary Educational Psychology, 25(3*), 287-316.

Richards, J. C., J. Platt, and H. Platt. (1992) *Dictionary of Language Teaching & Applied Linguistics*. (Second Edition), Harlow, Essex: Longman.

Ruddell, R. B., & O. F. Boyle. (1989). A study of cognitive mapping as a means to improve comprehension of expository text. *Reading Research and Instruction*, 29(1), 12–22.

Schunk, D. (1998). Teaching elementary students to self-regulate practice of mathematical skills with modeling. In D.H. Schunk & B.J. Zimmerman, (Eds.)*Self-regulated learning; from teaching to self-reflective practice* (pp. 137–159). New York: The Guilford Press.

Sharwood Smith, M. (1981), "Consciousness-raising and the second language learner." In *Applied Linguistics* 2, pp. 159-168. Cited in van Lier (2001), p. 161.

Smith, K. A. (1987) .Educational engineering: Heuristics for improving effectiveness and efficiency. *Engineering Education, 71(5)*, 274-279.

Sturm, J. & J. Rankin-Erickson. (2002). Effects of hand-drawn and computer generated concept mapping on the expository writing of middle school students with learning disabilities. *Learning Disabilities Research and Practice*, 17(2), 124-139.

Weinstein, C. E. and R. E. Mayer. (1986). The teaching of learning strategies. In M. wittrock (Ed.), *the Handbook of Research on Teaching* (pp. 315-327), New York. Macmillan.

Wenden, A. (1991) *Learning strategies for learner autonomy: planning and implementing learner training for language learners*. Hemel Hemstead, Hertfordshire: Prentice Hall.

Zimmaro, D. M. and J. M. Cawley. (1998). *Concept map module.* Schreyer institute for innovation in learning, The Pennsylvania State University.

Zimmerman,B. J. (1986). Development of self-regulated learning: which are the key subprocrsses. *Contemporary Educational Psychology*, 16, 307-313.

Zimmerman,B. J. and A. S. Paulsen. (1995). Self-monitoring during collegiate studying: An invaluable tool for academic self-regulation. In P. R. Pintrich (Ed.), Understanding self-regulated learning (pp. 13-28). San Francisco: Jossey Bass.

Zimmerman, B. and R. Risemberg. (1997). Becoming a self-regulated writer: a social cognitive perspective. *Contemporary Educational Psychology*, 22, 73-101.

Zipprich, M. A. (1995). Teaching web making as a guided planning tool to improve student narrative writing. Remedial and Special education, 16 (1), 3-15.

Appendix A. Test of Self-regulation (MSLQ)

-Please answer the following questions by circling the response that best describes how you feel when you study and practice writing courses.

	Not at all true of myself	Slightly true of myself	About halfway true of myself	Mostly true of myself	True of myself
During class time I often miss important points because I'm thinking of other things.(R)	1	2	3	4	5
When writing for this course, I make up questions to help focus my writing.	1	2	3	4	5
When I become confused about something I'm writing for this class, I go back and try to figure it out.	1	2	3	4	5
If course writing tasks are difficult to do, I change the way I am writing.	1	2	3	4	5
Before I write new course material thoroughly, I often try to organize it.	1	2	3	4	5
I ask myself questions to make sure I understand the material I have been studying in this class.	1	2	3	4	5
I try to change the way I write in order to fit the course requirements and the instructor's teaching style.	1	2	3	4	5
I often find that I have been reading for this class but don't know what it was all about.(R)	1	2	3	4	5
I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying.	1	2	3	4	5
When writing for this course I try to determine which concepts I don't understand well.	1	2	3	4	5
When I write for this class, I set goals for myself in order to direct my thoughts in each period.	1	2	3	4	5
If I get confused while writing in class, I make sure I sort it out afterwards.	1	2	3	4	5
I usually write in a place where I can concentrate on my course work.	1	2	3	4	5
I make good use of my writing time for this course.	1	2	3	4	5
I find it hard to stick to a study schedule.(R)	1	2	3	4	5
I have a regular place set aside for writing.	1	2	3	4	5
I make sure that I keep up with the weekly readings and assignments for this course.	1	2	3	4	5
I attend this class regularly.	1	2	3	4	5
I often find that I don't spend very much time on this course because of other activities. (R)	1	2	3	4	5

|					
I rarely find time to review my notes or readings before an exam. (R)	1	2	3	4	5
I often feel so lazy or bored when I write for this class that I quit before I finish what I planned to do. (R)	1	2	3	4	5
I work hard to do well in this class even if I don't like what we are doing.	1	2	3	4	5
When course work is difficult, I either give up or only study the easy parts. (R)	1	2	3	4	5
Even when writing tasks are dull and uninteresting, I manage to keep working until I finish.	1	2	3	4	5
When studying for this course, I often try to explain the material to a classmate or friend.	1	2	3	4	5
I try to work with other students from this class to complete the course assignments.	1	2	3	4	5
When writing for this course, I often set aside time to discuss course material with a group of students from the class.	1	2	3	4	5
Even if I have trouble writing the material in this class, I try to do the work on my own, without help from anyone.	1	2	3	4	5
I ask the instructor to clarify concepts I don't understand well.	1	2	3	4	5
When I can't understand the material in this course, I ask another student in this class for help.	1	2	3	4	5
I try to identify students in this class whom I can ask for help if necessary.	1	2	3	4	5

Based on and adapted from Printrich, P. R., Smith, D. A., Garcia, T., & McKeachie, W. J. (1991).A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ).

Appendix B: Instructional Material

1. What is a concept map?

Concept map is a graphic representation of ideas and concepts. It consists of concepts or nodes linked by labeled lines to show relationships and inter-relationships between terms. Concepts are arranged hierarchically so that the most inclusive, subsumptive concepts appear at the top of the map, with less inclusive, subordinate concepts below (Jonassen & Grabowski, 1993: 439). Look at following example of concept map:
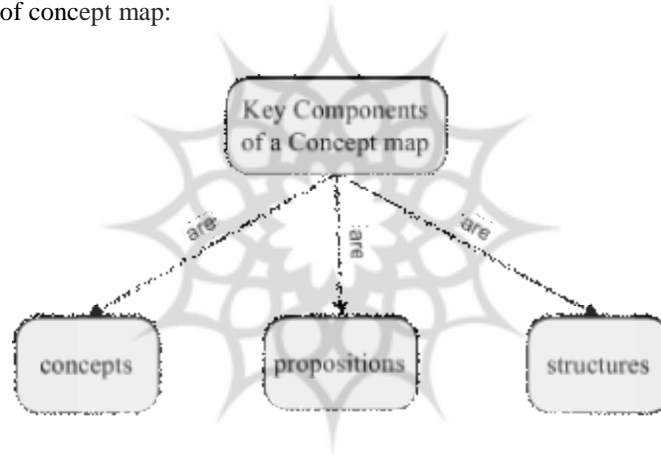
2. Concept mapping as a learning tool

- To summarize reading materials
- To organize knowledge domains
- To organize ideas for writing and research
- To plan your research project and identify the variables in it
- To fix learned materials in long-term memory
- To revise effectively for examination

3. Uses of concept mapping

- Develop an understanding of a body of knowledge

- Explore new information and relationships

- Access prior knowledge

- Gather new knowledge and information

- Share knowledge and information generated

4. How to organize our thoughts through concept mapping

A concept map is simply a way to visually display the concepts and relationships among ideas. This will help you to further organize your ideas and define your topic. It allows you to quickly write down your ideas and then see the organization of your topic. As you map, think about what issues you would like to focus on related to the main idea. Also think about the ways you will collect data and present the material Later you can return to your concept map as you create your outline. You can turn each level of bubbles (main topic, subtopics, etc.) into a level on your outline. This is a way for you to gain exposure to multiple dimensions of a topic that you might not have considered. To create a concept map you have to follow steps 1 through 5.

1. Identify the general/broad topic that you are interested in.

Example: You are interested in the general topic of obesity

2. Brainstorm on the general topic and list all the concepts and themes that are related to the topic on a large piece of paper. Keep the concepts as concise as possible

3. using unlined paper, write the main theme in the center of the page.

4. Take the other concepts identified in the brainstorming and connect them to the center concept. You can use other organizational patterns such as branches, arrows or groups. More important ideas should be put nearer to the center and less important ones closer to the edge. Identify the relationship between the concepts

5. After the map has been created, look at the organizational patterns to see if the pieces fit together and make sense and if there is anything missing. After the map

has been created, look at the organizational patterns to see if the pieces fit together and make sense and if there is anything missing

5. Critical questions

After you created the map, you may ask yourself the following questions:

• What is the central word, concept, research question or problem around which to build the map?

• What are the concepts, items, descriptive words or telling questions that you can associate with the concept, topic, research question or problem?

• What is said about the concepts? Record the quotes or paraphrase.

6. Practice concept mapping

- Think about the sport that you most like. Then try to map out the general and specific ideas on a diagram. Here is an example:
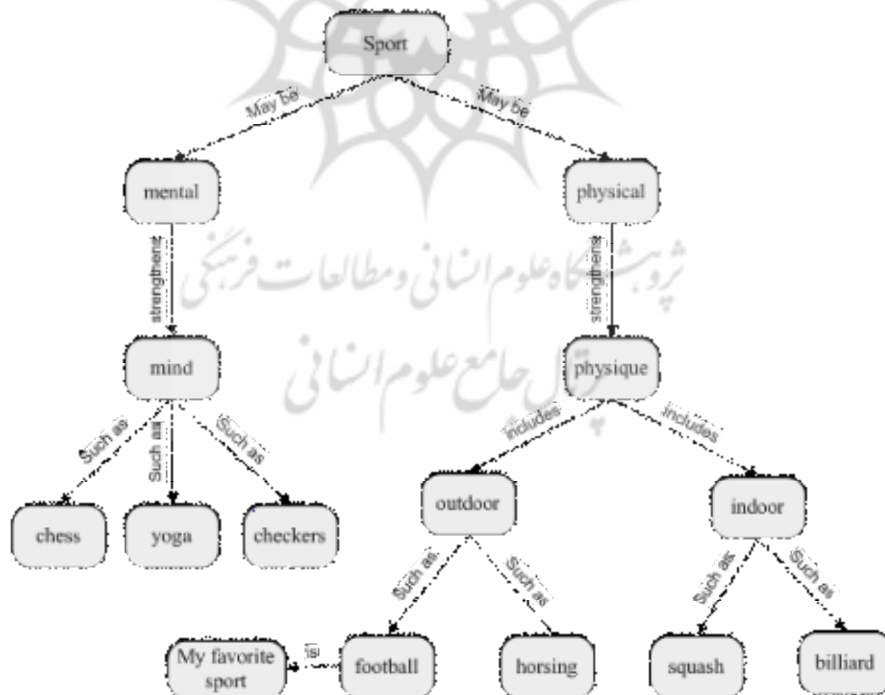
7. Some tips on making concept maps

• Use a top down approach, working from general to specific or use a free association approach by brainstorming nodes and then develop links and relationships. Use different colors and shapes for nodes and links to identify different types of information. Use different colored nodes to identify prior and new information. Use a cloud node to identify a question.

• Gather information to a question in the question node.

8. Final words

Different students may have different ways to represent what they think. Your concept map should reflect your information of a topic. It is always advisable to write down notes describing what you have mapped.

Appendix B.1. Sample Tasks

A. Create concept maps according to the following topics and compare yours with other students.

- travel

- recreation

B. Identify the concepts and fill in the concept map boxes.