

Using Graphic Organizers to Enhance English Reading Instruction: A Case of First-Year Information Technology Students at Thai-Nichi Institute of Technology

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The purposes of this research were 1) to develop and test the efficiency of the graphic organizer technique of English reading instruction; 2) to compare the students' English reading achievement before and after using the reading instruction; and, 3) to survey the students' satisfaction with this type of instruction. 30 first-year Information Technology students at the Thai-Nichi Institute of Technology were taught with eight reading units using a graphic organizer technique, an English reading achievement test, and a questionnaire to survey their satisfaction of the materials. The results were positive: 1) The reading lessons were highly effective, with the students scoring 80.25 on the formative tests and 81.00 on the post-test; 2) The students' reading achievement after the lessons was significantly higher than before, with lessons constructed at 0.05 level; and, 3) The students were very satisfied with all of the reading lessons.

Key words: English reading instruction, Graphic Organizer technique

การใช้กราฟิก ออร์แกไนเซอร์ เพื่อส่งเสริมการสอนอ่านภาษาอังกฤษ: กรณีของนักศึกษาเทคโนโลยีสารสนเทศชั้นปีที่ 1 สถาบันเทคโนโลยีไทย-ญี่ปุ่น

การวิจัยครั้งนี้มีวัตถุประสงค์สามประการคือ 1) เพื่อพัฒนาและหาประสิทธิภาพของบทเรียนการสอนการอ่านภาษาอังกฤษโดยใช้เทคนิคกราฟิก ออร์แกไนเซอร์ 2) เพื่อเปรียบเทียบความสามารถในการอ่านภาษาอังกฤษก่อนและหลังการใช้บทเรียนการอ่านนี้ และ 3) เพื่อสำรวจความพึงพอใจที่มีต่อบทเรียนการอ่านชุดนี้ กลุ่มตัวอย่างคือนักศึกษาคณะเทคโนโลยีสารสนเทศชั้นปีที่ 1 สถาบันเทคโนโลยีไทย-ญี่ปุ่น จำนวน 30 คน เครื่องมือที่ใช้ในการทดลองได้แก่ บทเรียนการอ่านโดยใช้เทคนิคกราฟิกออร์แกไนเซอร์จำนวน 8 บท แบบทดสอบวัดความสามารถในการอ่านก่อนและหลังเรียน และแบบสอบถามความพึงพอใจ ผลการวิจัยพบว่า 1) ประสิทธิภาพของบทเรียนการอ่านนี้ มีค่าเท่ากับ $80.25/81.00$ ซึ่งถือว่าอยู่ในระดับดีมาก 2) ความสามารถในการอ่านโดยใช้กราฟิก ออร์แกไนเซอร์สูงกว่าก่อนการใช้บทเรียนอย่างมีนัยสำคัญที่ระดับ 0.05 3) กลุ่มตัวอย่างมีความพึงพอใจกับบทเรียนที่ผู้วิจัยสร้างขึ้นอยู่ในระดับดีมาก

คำสำคัญ: บทเรียนการอ่านภาษาอังกฤษ, เทคนิคกราฟิก ออร์แกไนเซอร์

Introduction

In recent times, the instructional curriculum for foreign languages taught in Thailand has been based on the National Education Act, B.E. 2542 section 22. This act stipulated that Education shall be based on the principle that all learners are capable of learning and self-development, and that each student should be seen as most important. It further stipulated that the teaching-learning

process should aim at enabling the learners to develop themselves at their own pace and to their full potential. Moreover, section 24 stipulates that, in organizing the learning process, educational institutions and agencies concerned shall provide substance and arrange activities in line with the learners' interests and aptitudes, bear in mind individual differences, provide training in the thinking process, provide proper management, teach students how to face various situations and apply their knowledge in obviating and solving problems, organize activities for learners to draw from authentic experience, drill in practical work for complete mastery, enable learners to think critically and acquire the reading habit and continuous thirst for knowledge, achieve, in all subjects, a balanced integration of subject matter, integrity, values, and desirable attributes; enable instructors to create the ambiance, environment, instructional media, and facilities for learners to learn and be all-round persons, and be able to benefit from research as part of the learning process. In so doing, both learners and teachers may learn together from different types of teaching-learning media and other sources of knowledge, enabling individuals to learn at all times and in all places. Co-operation with parents, guardians, and all parties concerned in the community shall be sought to develop jointly the learners in accord with their potentiality (Ministry of Education 1999, 14)

The Thai-Nichi Institute of Technology has been operating under the philosophy of "disseminating knowledge and building the economic base." One of the TNI objectives is to generate human resources who have abilities in the advancement of technology and industrial management. Moreover, the TNI concept of program administration focuses on the students' language skills, so that students will be able to communicate in Japanese and English. In order to achieve the TNI objectives, TNI has provided an English for Communication course which is divided into 3 core courses for students from all faculties, as well as elective courses for students from each faculty (TNI Student Handbook, 2010, 24).

Graphic Organizers (GOs), concept maps, and mind maps are spatial representations of linear textual knowledge in the form of graphics, pictures, and diagrams. GOs visualize thoughts and organize knowledge, providing the reader with a whole picture of the concepts contained in the text, and the relationships between them. The hierarchical organization of concepts in a graphic display not only help avoid rote learning and pure memorization, but also prompt ideas and prepare the reader to articulate ideas in composition, including both major and minor points, and to synthesize newly acquired knowledge. GOs have long been used in learning sciences and have also proved their usefulness in second language learning (Jiang & Grabe, 2007). Some studies (Carrell, Pharis, & Liberto, 1989; Palincsar & Brown, 1989) revealed that non-proficient L1/L2 readers

either do not know any reading strategies, or generally employ bottom-up strategies. The findings suggest that strategy instruction should focus on comprehension monitoring to help non-skilled readers overcome their difficulties. In reading comprehension, research claims that GOs play a particularly valuable role and are recommended as a way to teach students awareness of discourse structuring in texts, an important part of a reader's overall comprehension abilities (Pearson & Fielding, 1991; & Trabasso & Bouchard, 2002). GOs that represent text discourse structures have been more effective in facilitating comprehension and retention of content area reading material than the GOs that do not (Jiang & Grabe, 2007). Review of the available literature on GOs has revealed contradictory findings and thus raised questions about the overall effectiveness of GOs in reading instruction. The first issue is the lack of a clear distinction between the two GO types and understanding of their effectiveness when employed for instructional or research purposes. The second issue regards students' insufficient exposure to differing types of textual discourse structures and the amount of GO training required to teach students this knowledge through visual means. The third problem lies in the lack of GO studies with learners of English as a second/foreign language. It is important to know if GOs will facilitate reading comprehension for these learners who potentially face more language trouble in the academic setting. And finally, previous GO research studies have not investigated the effectiveness of GOs with different groups of learners.

Ellis (2004) provides three reasons language teachers should use GOs in their classrooms. First, learners are considerably more likely to understand and remember the content since GOs help them identify what is important in a text. Second, because the semantic processing demands are minimized, teachers can address the content at more sophisticated or complex levels. Showing how the information is structured might be a powerful aid in understanding. Third, learners are more likely to become strategic readers as they recognize the patterns of thinking, constructing, and using graphic organizers.

TNI students have problems in reading and also tend to lack motivation to read because the content of instructional materials is not interesting. The content is generally not suitable to their culture nor useful in the daily life of TNI students. Moreover, the problem often in teaching reading is that instructional contents are dated and too difficult, and learners are not interested and do not understand the culture in which the language is spoken. Thus, instructional management must depend on the learner's interests and ability, and his motivation to read. A suitable method for use in teaching-learning English for information technology students of TNI is the Graphic Organizer technique, in which images can be used to clarify verbal elaborations. The use of visual imagery is

necessary especially when readers face ambiguous texts as it helps avoid the tendency to rely on personal background and situational cues for interpretation of the text, and encourages the formation of images. The images, evoked by the language in the text, can be used as referent for the language, and guide the encoding of the passage (Bransford, & Johnson, 1972; Grabe, 2004; Oxford, 1990; Sadoski, Paivio, & Goetz, 1991; Trabasso, & Bouchard, 2002).

In conclusion, the researcher created English reading instruction based on the graphic organizer technique which was then checked by experts in order to improve the study of reading for TNI students in the second semester, academic year 2010. The results derived from this research will provide guidelines for improvement and development of instruction and instructional materials for future courses.

Research objectives

There are three main objectives of the research as follows:

- 1) To develop and determine the effectiveness of English reading instruction using a graphic organizer techniques for first year Information Technology students, Thai-Nichi Institute of Technology, Bangkok.
- 2) To compare the ability in English reading of the students before and after instruction.
- 3) To study student satisfaction with these English reading instruction materials.

Research Design

The data was gathered and analyzed as follows:

1. Population and sampling

- 1.1 The population is second year Information Technology students at Thai-Nichi Institute of Technology, Bangkok, second semester of academic year 2010. There were 120 students from four classes.
- 1.2 The sample consisted of 30 students, and was derived from a simple random sampling technique.

2. Contents used in experiment

The topics consisted of Design, Education, Advertising, Business, Work, Language, Trends, and Arts and Media which were chosen based on a survey of needs questionnaire.

3. Duration in experiment

The experiment ran for 16 weeks (1 hour per week)

4. Variables

Variables in this study were as follows:

- 4.1 The English reading ability of first year Information Technology students before and after the class.
- 4.2 The satisfaction of first year Information Technology students with graphic-organizer based English reading instruction.

5. Research Instruments

- 5.1 Eight lessons of English reading instruction using graphic organizers.
- 5.2 A 1-hour English reading proficiency test (30 items: 30 scores).
- 5.3 A questionnaire constructed by the researcher assessing satisfaction with English reading instruction using graphic organizers.

6. Construction and Development of Research Instruments

The researcher constructed the English reading instruction and the proficiency tests in the following way:

First, the researcher studied the objectives of English reading instruction, and focused on English reading skills and strategies. Emphasis was placed on reading for main ideas, reading for topic sentences, reading for pronoun references, reading for facts and opinions, reading for sequencing events, reading for author's purposes, reading for inference, reading using a graphic organizer, and concept mapping.

Second, the researcher derived eight topics from the survey of needs questionnaire and interviewed the participants regarding topics required for first year Information Technology students. The topics were as follows:

Rank	Topic	Mean	S.D	Meaning
1	Design	4.80	0.45	Strongly agree
2	Education	4.73	0.50	Strongly agree
3	Advertising	4.71	0.55	Strongly agree
4	Business	4.65	0.60	Strongly agree
5	Work	4.62	0.58	Strongly agree
6	Language	4.59	0.72	Strongly agree
7	Trends	4.52	0.69	Strongly agree
8	Arts and media	4.49	0.77	Strongly agree

Third, these eight topics were modified to suit first year Information Technology students by giving the students vocabulary guidelines and meanings, simplifying structures of language, finding pictures, and applying the contents to English reading instruction. Then, the table of contents specification was designed by determining the objectives, contents, topics, desired reading skills, reading activities, and evaluation.

Last, the constructed table was examined for IOC by experts and lesson plans were written for all 8 lessons. Each lesson plan was composed of learning objectives, topics and contents, and reading activities consisting of a pre-reading activity, a while-reading activity and a post-reading activity.

The pre-reading activity included presenting pictures and answering the questions in order to lead the students to lessons and matching vocabulary with pictures.

While-reading was categorized into 5 groups: True/False; Yes/No Question; Information gap; Matching; and Sequencing events.

Post-reading activities were divided into several types: semantic maps, information tables, concept mapping, graphics, pictures, and diagrams.

The lesson test consisted of a multiple choice test, sequencing events, information gap, question answering, concept mapping, and diagrams.

Proficiency test

Students were given pre- and post-class proficiency tests. The tests had the same format and consisted of 30 items (30 scores). The duration of each test was 60 minutes. The researcher used the textbook, journal articles and related research as an outline to create the test. The researcher

also, created a table of specifications including reading skills and goals for each lesson, and then created one set of proficiency tests following this table of test specifications. The researcher derived the difficulty and discrimination of the tests (P-R value) from standard criteria consisting of 30 items. Five experts examined, corrected and improved the accuracy, validity and reliability of the language and contents of the test. The test had a difficulty level between 0.20-0.80 and a rank of discrimination at 0.20 or over. The calculation of the test reliability was used K-R 20 by Kuder-Richardson (Cited in Boonriang Khajonsil, 2000, 165). Then, the proficiency test was used to sampling of the research.

Satisfaction Questionnaire

The researcher created a questionnaire to investigate student satisfaction with this type of reading instruction. The questionnaire was constructed using both closed-end and opened-end questions based on Best (1981, 168-183). The answer to each question was separated into five rating scales as demonstrated by Likert. The rating scales in the questionnaire were

5	refers to	strongly agree
4	refers to	agree
3	refers to	moderate
2	refers to	disagree
1	refers to	strongly disagree

There were four components of satisfaction which were content, instructional design, teaching-learning activities and instructor. The data from the experts was applied with the following formula:

$$\text{IOC} = \frac{\sum R}{N}$$

IOC	replaces	Index of item-Objective Congruence
R	replaces	Experts' opinions
N	replaces	Number of experts

Questions rated less than 0.5 by the experts were considered and improved. The data obtained from a small group experiment was analyzed to find reliability by using α -Coefficient formula stated by Cronbach (1974: 161). Coefficient of reliability was 0.82.

Data Collection

The program was first tested on a single student, and then on a small group of students, before being used on an actual class. Therefore, there were three phases of data collection:

Phase 1

One TNI student who was not included in the test group went through the English reading instruction using graphic organizers, and took the 30-question pre- and post-tests. This enabled the researcher to investigate behavior, listen to the student's point of view, answer questions, and troubleshoot problems with the 8 units and the proficiency tests.

The student scored 63 out of 80 on the 8 lesson tests, or 78.75%. On the post-test, the student scored 23 out of 30, or 83.33%. The effectiveness of the instruction was 78.75/83.33. The highest score was on lesson 3 Advertising (90%), and the lowest on lesson 4, Business (70 %).

Phase 2

A small group of 9 students then took the English reading instruction, with tests after each lesson, and took the post-test. In this phase, the researcher recorded the problems and suggestions in order to improve the effectiveness of the lessons. The scores derived from each lesson and scores from the ability posttest were calculated as 77.77/79.62. These nine students scored 560 out of 720 (77.77 %) on the lesson tests. On the post-test, the students scored 215 out of 270, or 79.62%. Hence, the effectiveness of the English reading instruction was 77.77/79.62. The highest scores were from lesson 1 (82.45%), the lowest from lesson 5 (71 %).

Phase 3

Next, 30 students took the reading course and the post-test. The scores derived from each lesson and scores from the posttest were calculated at 80.25/81.00. Students scored 1926 out of 2,400 (80.25 %) on the lesson tests. On the posttest, the students scored 729 out of 900, 81.00%, with an improvement of .75%. The highest scores were from lesson 1 (81.00%), the lowest from lesson 4 (70 %).

Statistic Used in Data Analysis

1. The lesson effectiveness was determined by using E1/E2 formula followed 75/75 criteria.
2. The comparison between the pretest and posttest was done using t-test, which was calculated by SPSS/PC for Windows XP.

3. The data from the questionnaire were rated to find the mean and standard deviation and then translated based on criteria developed by Best (1981) as follows:

- 1.00 $\leq \bar{x} < 1.50$ indicates the lowest satisfaction
- 1.50 $\leq \bar{x} < 2.50$ indicates low satisfaction
- 2.50 $\leq \bar{x} < 3.50$ indicates moderate satisfaction
- 3.50 $\leq \bar{x} < 4.50$ indicates high satisfaction
- 4.50 $\leq \bar{x} \leq 5.00$ indicates the highest satisfaction

Results of data analysis

Phase 1: Tests were given to all 30 students after each of the eight units. The statistics used in the data analysis consisted of mean (\bar{x}), standard deviation (S.D), percentage and rank order of scores in each unit. The lesson tests got a mean score over 75% for each unit. The highest score came from unit 8, *Arts and media* (88%). Unit 4, *Business*, received the lowest score.

Phase 2: The comparison of the before and after tests for the 30 students were as follows:

Test	Total score	(\bar{x})	S.D	(\bar{D})	S.D. (\bar{D})	t	Sig
Pretest	30	11.41	2.57	12.29	2.47	25.613*	0.000
Posttest	30	23.70	2.38				

* Statistical significance at 0.05 level

The post-test scores were higher than the pretest scores by 0.05 (Sig = 0.000 < 0.05). The mean score of the posttest was 23.70, higher than the pretest (11.41 out of 30). The difference between the pre-test and post-test scores was 12.29, and for the t-test it was 25.613. Results indicated that students reading ability was improved by the course, affirming hypothesis 2.

Phase 3: The results of the student satisfaction questionnaire were as follows:

The mean scores of all eight units was 4.52 (S.D. = 0.49). The highest mean score was on unit 1 ($\bar{x} = 4.69$, S.D. = 0.61). The second highest mean score was on unit 8 ($\bar{x} = 4.62$, S.D. = 0.53). The lowest mean score was on unit 5 ($\bar{x} = 4.39$, S.D. = 0.62). The overall mean score of eight units was 4.52 (S.D. = 0.49). The results indicate high student satisfaction with the course, affirming hypothesis 3.

Discussion

The results of the study indicate that:

1. The efficiency of English reading instruction using graphic organizers was higher than the determined criteria. This may be on account of following:

1.1 The English reading instruction using graphic organizers used general English contents which the TNI students were able to analyze critically, and students had the necessary background knowledge to understand the contents. This is advocated by Sadoski, Paivio, & Goetz (1991) who stated that background knowledge has played an important role in reading comprehension development for two decades. The effectiveness of background knowledge in improving reading comprehension indicates the constructive nature of comprehension, and the critical role of the reader's prior knowledge in that construction. In addition, the TNI information technology students were already familiar with the contents of the instruction because they had background knowledge about it which would make it easier to understand (Goodman, 1994).

1.2 The teaching-learning activity in each unit was constructed according to an English reading theory developed by Freebody & Luke (1992), Harris & Sipay (1979), and Williams (1994). They started learners with easy activities, progressing to more difficult activities for pre-reading, and asking question in while-reading activities to check the students' understanding. In the post-reading stage, the researcher created semantic maps and information charts to help the learners fill in information in the correct way. Moreover, the learners used graphic organizers to aid in reading comprehension (Blachowicz & Ogle, 2001; Grabe, 2003; Gunning, 2003; Jones, Pierce, & Hunter, 1988-1989; Mohan, 1986; Pearson & Fielding, 1991; Threster, 2004; Trabasso & Bouchard, 2002).

1.3 The course was designed in accordance with experts' views on objective learning, pre-reading, while-reading, and post-reading activities. The contents fell in the category of general English. The learners were able to use a reading strategy in learning because comprehending textual discourse structures is an important aspect of a reader's overall reading abilities (Grabe, 2004; Kintsch & Rawson, 2005; Trabasso & Bouchard, 2002). Further, the importance of GOs in reading comprehension is made clear when we understand the role of knowledge on text structure in reading research. Text structure can be understood as knowledge-structures or basic rhetorical patterns in texts (Grabe, 2003), or the organization of ideas in text (Taylor, 1992), or the way ideas in the text are interrelated to convey a message to the reader (Meyer & Rice, 1984).

2. The students reading ability improved at the 0.05 level. This may be accounted for by the learners' satisfaction with, and interest in the required contents. The course integrated teaching English reading with visual aids, semantic maps, spider maps, and charts which were familiar to TNI students. The use of GOs increased students' comprehension, retention and retrieval of knowledge as indicated by encoding and note-taking (Kulhavy, Stock, Woodard, & Haygood, 1993).
3. Survey results indicated students were highly satisfied with the course, confirming hypothesis 3. This seemed to be because they understood and applied reading strategies. Results also confirmed statements of the educational theorist, Honsefeld (1977), who reported that skilled readers tend to keep the meaning of the passage in mind, read in broad phrases, skip words, and read with confidence. Moreover, the knowledge of graphic organizer and textual awareness can enhance comprehension, and students can be trained to improve their reading ability (Carrell, 1984; Ghaith & Harkouss, 2003; Jiang & Grabe, 2007; Kintsch & Yarbrough, 1982; Koda, 2005; Martinez 2002; Taylor, 1992).

Conclusion

According to the study and data analysis, the results of this study were as follows.

1. The efficiency of English reading instruction using graphic organizers for first year Information Technology students in this experiment was 80.25/81.00 which was higher than determined criteria (75/75). It was demonstrated that English reading instruction using graphic organizers for this group of L2 learners was very effective, confirming hypothesis 1.
2. Ability in English reading after learning by this method of instruction was improved at statistical significance at 0.05 level, confirming hypothesis 2.
3. These L2 learners indicated high satisfaction with English reading instruction using graphic organizers, confirming hypothesis 3.

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Appendix A

Overall plan of Unit 1

Unit	Objectives	Text Type	Theme	Language Focus	Reading Skills	Reading Activities	Evaluation
1	<ul style="list-style-type: none"> - Read design to identify the details, then describe it - Skim or scan-read in order to get the main idea and details - Sequence the events about design - Be able to identify kinds of design - Be able to describe about design. - Be able to use graphic organizers with reading passage 	Passage about design	Design	Vocabulary: <ul style="list-style-type: none"> - definition - manufacturers - combine - desirable - fulfill - innovative - impressive - a toaster - misconceptions 	<ul style="list-style-type: none"> - Skimming and Scanning main idea and details - Sequencing the events about design - Identifying meaning from pronoun reference <p>Language focus:</p> <ul style="list-style-type: none"> - Modal verbs - Present simple <p>Function:</p> <ul style="list-style-type: none"> - describe details and identify kind of design 	<p>Pre-reading</p> <ul style="list-style-type: none"> - Look at the picture and answer the questions - Match the words with pictures - Study the language focus <p>While-reading</p> <ul style="list-style-type: none"> - Check the statements True/False - Answer the questions with Yes/No - Answer the questions <p>Intensive reading</p> <ul style="list-style-type: none"> - Choose the best answer <p>Post-reading</p> <ul style="list-style-type: none"> - Put the information into the table - Put the information into the semantic map 	10 items M/C 5 Information Gap 5

Appendix B

Example of English reading instruction

Unit 1: Design

Warm-up

Instructions: Look at the picture and answer the questions. The picture below shows an event of a story.



1. What is happening in the picture?

.....

2. What do you think of when you see this picture?

.....

3. What is this?

.....

Pre-reading

Directions: Look at the list of words and match each word with the pictures.



impressive

a toaster

manufacturers

misconceptions

combine

innovative

While-reading

What is design?

The word *design* means things to different people. One definition given by designer Richard Seymour is ‘making things better for people’.

Questions: 1. Who gives definition of design?
2. What is definition of design?



Scientists can invent technologies, manufacturers can make products, engineers can make them work and salespeople can sell them. However, only designers can combine all these things. Designers turn an idea into something that is desirable, commercially successful and adds value to people’s lives.

Questions: 3. Who can make products?
4. Who can turn an idea into desirable something?

Good design begins with the needs of the user. A good design fulfils a user’s need. A design doesn’t have to be new, different or impressive to be successful in the market place, but it must fulfil a need. However, it is also true that design methods often lead to innovative products and services.

Questions: 5. Does good design begin with needs of the user?.....
6. Do design methods only lead to innovative products?.....



Many people have misconceptions about design. Magazines often use the word design when they mean style or fashion. For example, when they show a toaster or bottle opener which is well designed, the result is that people think that design is only about how things look. Design is also about how things work. In reality, the way a product looks is something which happens at the end of a product development process.



Questions: 7. Why magazines use the word design?.....
8. What do people think about design?.....
9. Is design also about how things develop?.....

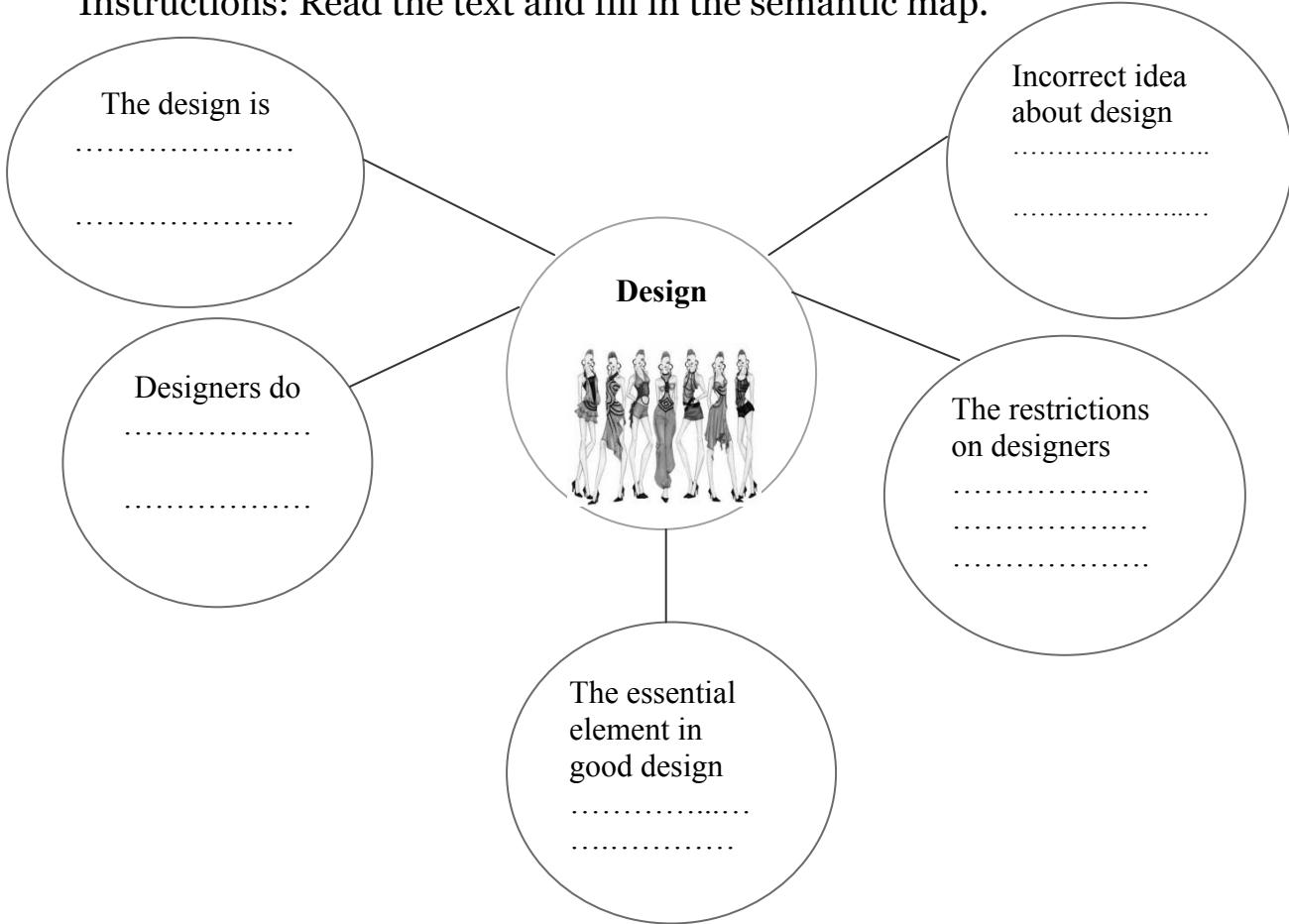
Designers, unlike artists, can’t simply follow their creative feelings. They work in a commercial environment, which means there are many points to consider. Designers have to ask themselves questions such as: ‘Is the product really wanted?’, ‘How is it different from everything else on the market?’, ‘Does it fulfil a need?’, ‘Will it cost too much to manufacture?’ and ‘Is it safe?’

Questions: 10. Who works in a commercial environment?.....
11. What is the questions of designers to ask themselves?.....
12. Why do they consider to fulfil a need?



Post-reading

Instructions: Read the text and fill in the semantic map.



Biodata

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