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APPENDICES

Appendix A

Vocabulary Level Tests

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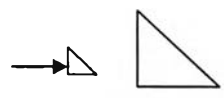
I. 1000 Word Level Test A

[Source: Nation's (1990) Receptive Vocabulary Test published in Nation, I.S.P. (2001) *Learning Vocabulary in Another Language*, pp.412-3. UK: Cambridge University Press.]

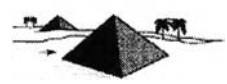
Instructions: There are 39 questions. Tick (✓) "T" if a sentence is true. Tick (✓) "N" if a sentence is not true. Tick (✓) "X" if you do not understand the sentence.

For example: We cut time into minutes, hours, and days.
.. ✓.. T (This is **True.**)
..... N (This is **Not true**.)
..... X (I do **Not understand** the question.)

1. This one is little.
..... T
..... N
..... X



2. You can find these everywhere.
..... T
..... N
..... X



3. Some children call their mother Mama.
..... T
..... N
..... X
4. *Show me the way to do it* means 'show me how to do it.'
..... T
..... N
..... X
5. This country is part of the world.
..... T
..... N
..... X
6. This can keep people away from your house.
..... T
..... N
..... X

7. When something falls, it goes up.
..... T
..... N
..... X
8. Most children go to school at night.
..... T
..... N
..... X

9. It is easy for children to remain still.
   ..... T
   ..... N
   X
10. One person can carry this.
   ..... T
   ..... N
   X

11. A scene is a part of a play.
   ..... T
   ..... N
   X
12. People often think of their home, when they are away from it.
   ..... T
   ..... N
   X
13. There is a mountain in every city.
   ..... T
   ..... N
   X
14. Every month has the same number of days.
   ..... T
   ..... N
   X
15. A chief is the youngest person in a group.
   ..... T
   ..... N
   X
16. Black is a colour.
   ..... T
   ..... N
   X
17. You can use a pen to make marks on paper.
   ..... T
   ..... N
   X
18. A family always has at least two people.
   ..... T
   ..... N
   X
19. You can go by road from London to New York.
   ..... T
   ..... N
   X
20. Silver costs a lot of money.
   ..... T
   ..... N
   X
21. This is a hill.
   ..... T
   ..... N
   X

22. This young person is a girl.

..... T
..... N
..... X

23. We can be sure that one day we will die.
..... T
..... N
..... X

24. A society is made of people living together.
..... T
..... N
..... X

25. An example can help you understand.
..... T
..... N
..... X

26. Some books have pictures in them.
..... T
..... N
..... X

27. When some people attack other people, they try to hurt them.
..... T
..... N
..... X

28. When something is ancient, it is very big.
..... T
..... N
..... X

29. Big ships can sail up a stream.
..... T
..... N
..... X

30. It is good to keep a promise.
..... T
..... N
..... X

31. People often dream when they are sleeping.
..... T
..... N
..... X

32. This is a date – 10 o'clock.
..... T
..... N
..... X

33. When something is impossible, it is easy to do it.
..... T
..... N
..... X

34. Milk is blue.
..... T
..... N
..... X

35. A square has five sides.
    ….. T
    ….. N
    ….. X
36. Boats are made to travel on land.
    ….. T
    ….. N
    ….. X
37. Cars cannot pass each other on a wide road.
    ….. T
    ….. N
    ….. X
38. When you look at something closely, you can see the details.
    ….. T
    ….. N
    ….. X
39. This part is a handle.

    ….. T
    ….. N
    ….. X

II. 2000 Word Level Test A

[Source: Schmitt, Schmitt, and Clapham's (1999) Receptive Vocabulary Test published in Schmitt, N. (2000) *Vocabulary in Language Teaching*, pp.192-4. USA: Cambridge University Press.]

Instructions: Choose the right word to go with each meaning. Write the option of that word in front of its meaning.

For example:

.....f..... part of a house	a. business	d. pencil
.....c..... animal with four legs	b. clock	e. shoe
.....d..... something used for writing	c. horse	f. wall

1. ..... game	a. birth	d. row
2. ..... winning	b. dust	e. sport
3. ..... being born	c. operation	f. victory
4. ..... heat	a. choice	d. salary
5. ..... meat	b. crop	e. secret
6. ..... money paid regularly for doing job	c. flesh	f. temperature
7. ..... teaching and learning	a. cap	d. parent
8. ..... number to measure with	b. education	e. scale
9. ..... going to a far place	c. journey	f. trick
10. ..... gold and silver	a. attack	d. pen
11. ..... pleasing quality	b. charm	e. shadow
12. ..... not having something	c. lack	f. treasure
13. ..... part of milk	a. cream	d. pupil
14. ..... a lot of money	b. factory	e. sacrifice
15. ..... person who is studying	c. nail	f. wealth
16. ..... go up	a. adopt	d. pour
17. ..... look at closely	b. climb	e. satisfy
18. ..... be on every side	c. examine	f. surround
19. ..... join together	a. bake	d. limit
20. ..... walk without purpose	b. connect	e. recognize
21. ..... keep within a certain size	c. inquire	f. wander
22. ..... break open	a. burst	d. fold
23. ..... make better	b. concern	e. improve
24. ..... take something to someone	c. deliver	f. urge
25. ..... first	a. original	d. slow
26. ..... not public	b. private	e. sorry
27. ..... all added together	c. royal	f. total
28. ..... commonly done	a. brave	d. hungry
29. ..... wanting food	b. electric	e. local
30. ..... having no fear	c. firm	f. usual

III. Academic Word Level Test A

[Source: Schmitt, Schmitt, and Clapham's (1999) Receptive Vocabulary Test published in Schmitt, N. (2000) *Vocabulary in Language Teaching*, pp.199-200. USA: Cambridge University Press.]

Instructions: Choose the right word to go with each meaning. Write the option of that word in front of its meaning.

For example:

.....f..... part of a house	a. business	d. pencil
.....c..... animal with four legs	b. clock	e. shoe
.....d..... something used for writing	c. horse	f. wall

1. ..... work	a. benefit	d. principle
2. ..... part of 100	b. labor	e. source
3. ..... general idea used to guide one's actions	c. percent	f. survey
4. ..... money for a special purpose	a. element	d. philosophy
5. ..... skilled way of doing something	b. fund	e. proportion
6. ..... study of the meaning of life	c. layer	f. technique
7. ..... total	a. consent	d. parameter
8. ..... agreement or permission	b. enforcement	e. sum
9. ..... trying to find information about something	c. investigation	f. trend
10. ..... 10 years	a. decade	d. incidence
11. ..... subject of a discussion	b. fee	e. perspective
12. ..... money paid for services	c. file	f. topic
13. ..... action against the law	a. colleague	d. inclination
14. ..... wearing away gradually	b. erosion	e. panel
15. ..... shape or size of something	c. format	f. violation
16. ..... change	a. achieve	d. link
17. ..... connect together	b. conceive	e. modify
18. ..... finish successfully	c. grant	f. offset
19. ..... keep out	a. convert	d. facilitate
20. ..... stay alive	b. design	e. indicate
21. ..... change from one thing into another	c. exclude	f. survive
22. ..... control something skillfully	a. anticipate	d. denote
23. ..... expect something will happen	b. compile	e. manipulate
24. ..... produce books and newspapers	c. convince	f. publish
25. ..... most important	a. equivalent	d. primary
26. ..... concerning sight	b. financial	e. random
27. ..... concerning money	c. forthcoming	f. visual
28. ..... last or most important	a. alternative	d. ethnic
29. ..... something different that can be chosen	b. ambiguous	e. mutual
30. ..... concerning people from a certain nation	c. empirical	f. ultimate

Appendix B

Questionnaire I

.....

Descriptions

The information derived from this questionnaire is useful for improving the lessons in order to make them appropriate for the learners as much as possible. It is not concerned with the evaluation of your studying performance in this semester. Therefore, please give honest answers to all the questions.

The questionnaire consists of 5 parts as follows.

• Part I: General Information	• Part IV: Computer Skills
• Part II: English Previous Study	• Part V: Comments and Suggestions
• Part III: Reading Background	

คำอธิบาย

ข้อมูลที่ได้รับจากแบบสอบถามนี้จะเป็นประโยชน์ในการจัดปรับบทเรียนให้เหมาะสมกับผู้เรียนมากที่สุด ไม่มีผลกระทบต่อการประเมินผลการเรียนของคุณในภาคเรียนนี้แต่ประการใด กรุณาตอบคำถามให้ครบทุกข้อตามความเป็นจริง

แบบสอบถามแบ่งเป็น 5 ส่วนดังนี้

• ตอนที่ 1: รายละเอียดทั่วไป	• ตอนที่ 4: ทักษะทางคอมพิวเตอร์
• ตอนที่ 2: พื้นฐานภาษาอังกฤษ	• ตอนที่ 5: ความเห็นและคำแนะนำ
• ตอนที่ 3: พื้นฐานในการอ่าน	

Instruction: Please give the information by ticking (✓) in appropriate boxes or columns and giving short answers where needed.

(การตอบแบบสอบถาม: กรุณาให้รายละเอียดโดยกรอกข้อมูลที่เกี่ยวข้องและใส่เครื่องหมาย ✓ ลงในกรอบหรือในตาราง ตามความเหมาะสม)

Part I: General Information

1. Name (ชื่อ-นามสกุล) ..... Age (อายุ) .....

2. Faculty (คณะ)..... Field of study (สาขาวิชา) .....

3. Previous school / institution (โรงเรียน / สถาบันศึกษาเดิม)

.....

4. GPA of the last semester (เกรดเฉลี่ยในเทอมสุดท้าย)

☐ Less than (น้อยกว่า) 2 ☐ 2.00 – 2.49 ☐ 2.50 – 2.99

☐ 3.00 – 3.49 ☐ More than (มากกว่า) 3.50

Part II: English Previous Study

1. When did you start learning English? (คุณเริ่มเรียนภาษาอังกฤษเมื่อใด)

   ☐ Kindergarten (อนุบาล)

   ☐ Primary school (ประถมศึกษา)

   ☐ Secondary school (มัธยมศึกษา)

2. How long have you been learning English? (คุณเรียนภาษาอังกฤษมานานเท่าใด)

   ☐ 1-3 years
   ☐ 4-6 years
   ☐ 7-9 years
   ☐ 10-12 years
   ☐ More than 12 years

3. Have you ever stopped studying English in any academic semesters / years? (คุณเคยหยุดเรียนภาษาอังกฤษในบางภาคเรียนหรือปีการศึกษาบ้างหรือไม่)

   ☐ Yes (เคย) Why? (เพราะเหตุใด) .....

   How long? (นานเท่าใด) .....

   ☐ No (ไม่เคย)

4. Have you ever had any English-native teacher? (คุณเคยเรียนกับครูต่างชาติที่เป็นเจ้าของภาษาหรือไม่)

   ☐ Yes (เคย) How long? (นานเท่าใด) .....

   ☐ No (ไม่เคย)

5. What grades did you earn from the last two English courses? Tick two items if they are different. (คุณได้เกรดอะไรในวิชาภาษาอังกฤษสองภาคเรียนสุดท้าย ถ้าเกรดไม่เหมือนกันให้เลือกสองข้อ)

   ☐ A ☐ B ☐ C ☐ D ☐ F

6. Do you like studying English? (คุณชอบเรียนภาษาอังกฤษหรือไม่)

   ☐ Very much (ชอบมากๆ)

   ☐ Much (ชอบมาก)

   ☐ Averagely (ปานกลาง)

   ☐ Not much (ไม่ค่อยชอบ)

   ☐ Not at all (ไม่ชอบเลย)

7. Why do you learn English? Choose 1-2 items closing to your purpose mostly. (ทำไมคุณจึงเรียนภาษาอังกฤษ เลือกที่ตรงกับคุณมากที่สุด 1-2 ข้อ)

   ☐ Because it is a compulsory course. (เพราะเป็นวิชาบังคับ)

   ☐ Because it is fashionable. (เพราะเป็นสิ่งที่ทันสมัย)

   ☐ Because I like studying language. (เพราะชอบเรียนภาษา)

   ☐ Because it helps me to get a good and well-paid job. (เพราะช่วยให้ได้งานดีและมีเงินเดือนดี)

   ☐ Because it helps me to prepare myself for studying in higher education. (เพราะช่วยในการศึกษาต่อ)

   ☐ Because it helps me to get information. (เพราะช่วยในการค้นคว้าข้อมูล)

   ☐ Because it helps me to get pleasure. (เพราะช่วยให้ความเพลิดเพลิน)

☐ Because it is widely spoken in the world today.
(เพราะเป็นภาษาที่พูดกันแพร่หลายทั่วโลกในปัจจุบันนี้)

☐ Because it helps me to be able to communicate with foreigners.
(เพราะช่วยให้ได้สื่อสารกับชาวต่างประเทศ)

☐ No particular reason. (ไม่มีเหตุผลโดยเฉพาะ)

☐ Other reasons. (Please specify.)
(เหตุผลอื่นๆ กรุณาระบุ) .....

8. How often do you do the following activities in previous English courses? Tick (✓) in the appropriate boxes, according to these numbers. (คุณทำกิจกรรมเหล่านี้บ่อยมากน้อยเพียงใดในการเรียนวิชาภาษาอังกฤษที่ผ่านมา ใส่เครื่องหมาย ✓ ลงในช่องที่เหมาะสมตามหมายเลขดังนี้)

- 5 = Always (เสมอ)
- 4 = Often (บ่อยๆ)
- 3 = Sometimes (บางครั้ง)
- 2 = Rarely (นานๆ ครั้ง)
- 1 = Never (ไม่เคย)

Activities	5	4	3	2	1
• Regularly attend English class. (เข้าเรียนวิชาภาษาอังกฤษสม่ำเสมอ)					
• Actively participate in class activities. (ตั้งใจร่วมกิจกรรมระหว่างเรียนเต็มที่)					
• Be absent from class. (ขาดเรียน)					
• Be late from class. (เข้าเรียนสาย)					
• Complete the assignment in time. (ทำงานที่มอบหมายครบและทันตามกำหนด)					
• Have extra English classes. (เรียนพิเศษภาษาอังกฤษ)					
• Practise English on your own. (ฝึกภาษาอังกฤษด้วยตนเอง)					
• Practise listening from cassette tapes. (ฝึกฟังภาษาอังกฤษจากเทป)					
• Practise pronunciation after cassette tapes. (ฝึกออกเสียงตามเทป)					
• Practise speaking English with any foreigner you met. (ฝึกพูดภาษาอังกฤษกับชาวต่างชาติที่พบ)					
• Go to language self-access center after classes. (เข้าศูนย์เรียนรู้ภาษาด้วยตนเองนอกเวลาเรียน)					
• Watch English movies or listen to news / songs in English. (ดูภาพยนต์หรือฟังข่าว/เพลงเป็นภาษาอังกฤษ)					
• Write e-mails or chat via the Internet in English. (เขียนอีเมล์ หรือพูดคุยผ่านอินเตอร์เน็ตเป็นภาษาอังกฤษ)					

9. Do you think how good your English language skills are? Tick (✓) in the appropriate boxes, according to these numbers. (คุณคิดว่าทักษะภาษาอังกฤษของคุณดีมากน้อยเพียงใด กรุณาใส่เครื่องหมาย ✓ ลงในช่องที่เหมาะสมตามหมายเลขดังนี้)

- 5 = Very good (ดีมาก)
- 4 = Good (ดี)
- 3 = Average (ปานกลาง)
- 2 = Poor (อ่อน)
- 1 = Very poor (อ่อนมาก)

Skills (ทักษะ)	5	4	3	2	1
• Speaking skill (ทักษะการพูด)					
• Listening skill (ทักษะการฟัง)					
• Reading skill (ทักษะการอ่าน)					
• Writing skill (ทักษะการเขียน)					

Part III: Reading Background

1. Do you like reading? (คุณชอบการอ่านหรือไม่)

☐ Yes (ชอบ) Why?(เพราะเหตุใด) .....

☐ No (ไม่ชอบ) Why? (เพราะเหตุใด) .....

2. How often do you read any texts in Thai? (คุณอ่านข้อความหรือหนังสือที่เป็นภาษาไทยบ่อยมากน้อยเพียงไร)

☐ Always (เสมอ)

☐ Often (บ่อย)

☐ Sometimes (บางครั้ง)

☐ Rarely (นานๆครั้ง)

☐ Never (ไม่เคยอ่าน)

3. What types of texts do you usually read? Tick (✓) all types of texts you read. (ข้อความประเภทใดที่คุณอ่านเป็นประจำ ใส่เครื่องหมาย ✓ หน้าข้อความทุกประเภทที่คุณอ่าน)

☐ Textbooks (ตำราเรียน) ☐ Fictions (นวนิยาย)

☐ Cartoons (การ์ตูน) ☐ Newspapers (หนังสือพิมพ์)

☐ Comics (ขำขัน/เบาสมอง) ☐ Advertisements (โฆษณา)

☐ Magazines (นิตยสาร) ☐ Journals (วารสารเชิงวิชาการ)

☐ Others, please specify (อื่นๆ โปรดระบุ) .....

☐ None (ไม่เคยอ่าน)

4. How often do you read texts in English? (คุณอ่านข้อความภาษาอังกฤษบ่อยมากน้อยเพียงไร)

☐ Always (เสมอ)

☐ Often (บ่อย)

☐ Sometimes (บางครั้ง)

☐ Rarely (นานๆครั้ง)

☐ Never (ไม่เคย)

5. Have you ever read any piece of texts in English longer than a page at a time? คุณเคยอ่านข้อความเป็นภาษาอังกฤษยาวเกินหนึ่งหน้ากระดาษในครั้งเดียวหรือไม่)

☐ Yes (เคย) What types of texts? (ข้อความแบบใด) .....

☐ No (ไม่เคย)

6. How long of English texts have you ever read? (คุณเคยอ่านข้อความที่เป็นภาษาอังกฤษในระดับความยาวเท่าใด)

☐ Words (อ่านในระดับคำ)

☐ Sentences (อ่านในระดับประโยค)

☐ Paragraphs (อ่านในระดับย่อหน้า)

☐ Pages (อ่านในระดับหน้ากระดาษ)

☐ Chapters (อ่านในระดับบท)

☐ Books (อ่านเป็นเล่ม)

☐ Others, please specify (อื่นๆ โปรดระบุ) .....

7. In engineering courses, have you ever been assigned to read any texts in English? ในวิชาทางวิศวกรรม คุณเคยได้รับมอบหมายให้อ่านตำราหรือบทความเป็นภาษาอังกฤษหรือไม่)

☐ Yes (เคย) In what subjects? (ในวิชาใด) .....

How often? (บ่อยมากน้อยเพียงใด) .....

How long? (ความยาวเท่าใด) .....

☐ No (ไม่เคย)

8. Do you have any difficulties in reading texts in English? (คุณมีปัญหาในการอ่านข้อความเป็นภาษาอังกฤษหรือไม่)

☐ Very much (มีปัญหา เยอะมาก)

☐ Much (มีปัญหามาก)

☐ Some (มีปัญหาบ้าง)

☐ A little (มีปัญหาน้อย)

☐ Very little (มีปัญหาน้อยมาก)

9. Do you think which of the following item is the most difficulty for your reading? (คุณคิดว่าหัวข้อใดต่อไปนี้ ที่เป็นปัญหามากที่สุดในการอ่านของคุณ)

☐ Vocabulary (คำศัพท์)

☐ Grammar (ไวยากรณ์)

☐ Organization (การเรียบเรียงข้อความ)

☐ Writing style (สไตล์ในการเขียน)

☐ Others, please specify (อื่นๆ โปรดระบุ) .....

10. Do you use any reading strategies to solve the reading problems? (คุณเคยใช้เทคนิคการอ่านเพื่อช่วยแก้ปัญหาบ้างหรือไม่)

☐ Yes (เคย) What are they? (เทคนิคแบบใด) .....

☐ No (ไม่เคย)

Part IV: Computer Skills

1. Do you like using a computer? (คุณชอบใช้คอมพิวเตอร์หรือไม่)

☐ Yes (ชอบ)

☐ No (ไม่ชอบ)

2. How often do you access a computer? (คุณใช้คอมพิวเตอร์บ่อยมากน้อยเพียงใด)

☐ Very often (บ่อยมาก)

☐ Often (บ่อย)

☐ Sometimes (บางครั้ง)

☐ Rarely (นานๆครั้ง)

☐ Never (ไม่เคยใช้)

3. Do you have your own computer? (คุณมีคอมพิวเตอร์ของตนเองหรือไม่)

☐ Yes (มี)

☐ No (ไม่มี)

4. Where do you usually access the computer? Tick (✓) all places where you access the computer. (คุณมักใช้คอมพิวเตอร์ที่ใด ใส่เครื่องหมาย ✓ ให้ตรงกับทุกสถานที่ที่คุณใช้คอมพิวเตอร์)

☐ At home (ที่บ้าน)

☐ At the university (ที่มหาวิทยาลัย)

☐ Computer shop (ร้านคอมพิวเตอร์)

☐ Others. Please specify. (อื่นๆ โปรดระบุ).....

5. How good is your basic computer skill? (ทักษะพื้นฐานในการใช้คอมพิวเตอร์ของคุณอยู่ในระดับใด)

☐ Very good (ดีมาก)

☐ Good (ดี)

☐ Average (ปานกลาง)

☐ Poor (ไม่ดี)

☐ Very poor (แย่มากๆ)

6. What kinds of computer programs can you use? Tick (✓) all programs you can use. (โปรแกรมคอมพิวเตอร์แบบใดที่คุณใช้เป็น กรุณาใส่เครื่องหมาย ✓ ให้ตรงกับทุกโปรแกรมที่คุณใช้)

☐ Game
☐ Email (Hotmail, Yahoo etc.)
☐ Chat (MSN)
☐ Pirch
☐ Internet Explorer
☐ Search Engine (Yahoo, Google)
☐ Word Processing
☐ Excel
☐ Power Point
☐ CAD program
☐ Dreamweaver
☐ Others, please specify (อื่นๆ โปรดระบุ) .....

7. What types of activities do you usually do with the computer? Tick (✓) all activities you do with the computer? (คุณใช้คอมพิวเตอร์ทำอะไรบ้าง กรุณาใส่เครื่องหมาย ✓ ให้ตรงกับทุกกิจกรรมที่คุณใช้งานคอมพิวเตอร์)

☐ Typing (พิมพ์งาน)

☐ Using the technical programs. (ใช้โปรแกรมทางช่างเทคนิค)

☐ Using self-study programs. (ใช้โปรแกรมเรียนรู้ด้วยตนเอง)

☐ Playing games. (เล่นเกม)

☐ Accessing the Internet for e-mailing and online chatting etc. (ใช้อินเตอร์เน็ตเพื่ออีเมล์และสนทนาออนไลน์ ฯลฯ)

☐ Accessing the Internet for finding information. (ใช้อินเตอร์เน็ตเพื่อค้นคว้าข้อมูล)

☐ Others. Please, specify. (อื่นๆ โปรดระบุ) .....

8. Have you ever used a computer for studying any subjects? (คุณเคยเรียนหรือค้นคว้าวิชาต่างๆ ผ่านคอมพิวเตอร์หรือไม่)

☐ Yes (เคย) What subject? (วิชาใด) .....

☐ No (ไม่เคย)

9. What kinds of computer learning materials have you ever used? Tick (✓) all kinds of materials you have used. (ใช้สื่อการเรียนคอมพิวเตอร์แบบใด กรุณาใส่เครื่องหมาย ✓ให้ตรงกับทุกประเภทของสื่อการเรียนที่คุณเคยใช้)

☐ CD-ROM (ซีดีรอม)

☐ Internet (อินเตอร์เน็ต)

☐ E-mail (อีเมล์)

☐ Others, please specify (อื่นๆ โปรดระบุ) .....

10. Have you ever used a computer for studying English? (คุณเคยเรียนภาษาอังกฤษผ่านคอมพิวเตอร์ บ้างหรือไม่)

☐ Yes (เคย) Where: inside or outside classroom? (ที่ไหน ในหรือนอกชั้นเรียน) .....

☐ No (ไม่เคย)

11. What kinds of computer learning materials have you ever used in studying English? Tick (✓) all kinds of materials you have used. (คุณเคยใช้สื่อการเรียนคอมพิวเตอร์แบบใดในการเรียนภาษาอังกฤษ กรุณาใส่เครื่องหมาย ✓ให้ตรงกับทุกประเภทของสื่อการเรียนที่คุณเคยใช้)

☐ CD-ROM (ซีดีรอม)

☐ Internet (อินเตอร์เน็ต)

☐ E-mail (อีเมล์)

☐ Others, please specify (อื่นๆ โปรดระบุ) .....

12. Have you ever heard anything about a corpus or a concordancer? (คุณเคยได้ยินเกี่ยวกับ corpus หรือ concordancer หรือไม่)

☐ Yes (เคย) What is it? Please specify. .....

☐ No (ไม่เคย)

Part V: Comments and Suggestions

Please give your opinions, comments or suggestions concerning English study or studying English through a computer.
(กรุณาให้ความคิดเห็นหรือคำแนะนำเกี่ยวกับการเรียนภาษาอังกฤษ หรือการเรียนภาษาอังกฤษผ่านคอมพิวเตอร์)

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Thank you for your cooperation.

Appendix C

Pilot Study

Before the main study was conducted, a pilot study was implemented with the aim to try out classroom materials with students similar to the samples of the main study. Since the concordance-based method was completely new in this situation, the classroom materials and activities were tried out so that problems concerning the use of them could be identified and tackled before the implementation of the main study. The results from the pilot study were used for providing a practical framework as well as a set of guidelines for conducting the main study.

1. Samples of the pilot study

The experimental group in the pilot study consisted of 21 students in Electrical Power Engineering whereas the comparison group consisted of 35 students in Mechanical Engineering. All students were males with average ages of about 20-21. They studied in the third year of the engineering programs. As there were much fewer students in the experimental group, all 21 students could be conveniently matched in pairs with the comparison group on nearly the same scores. There were only six pairs whose difference was not more or less than one mark. Therefore, the mean scores between both groups were not significantly different, mean difference = 0.05, t = 0.46, and p = 0.964.

2. The corpus and word selection

At the initial stage, a small corpus of around 100,000 running words was compiled from academic texts relating to engineering fields. In compiling the corpus, various text types were included such as handouts, textbooks, articles, news, manuals and advertisements. Some texts were from sources recommended by engineering instructors in the questionnaire (see Appendix C). The selected texts were mostly from web-based resources such as online magazines and journals, with text topics mostly concerned with news or advancement in Technology. The proportion of text

types and topics were not balanced and the selected texts were not classified while being saved into the corpus.

After the corpus was compiled, a word frequency list was created and checked across West's (1953) General Service List of English Words (GSL) and Coxhead's (2000) Academic Word List (AWL). Both lists were set as '*reference lists*' (see Appendix D). The reference lists were regarded as a lexical threshold for academic reading. In the pilot study, words were selected if they were words in the GSL or the AWL with occurrences in the corpus of not less than 8 times. The lexical words at the top ranks were mainly focused and selected whereas most function words were deleted from the lists, except for words which are often used as discourse markers in reading such as '*despite*', '*however*', '*therefore*', and '*moreover*' etc. Words predicted as students' known words were also omitted whereas words predicted as unknown and useful ones were selected. The resulting wordlist formed a '*target wordlist*' used as a basis for designing the test to assess learning effects of the whole study. The target wordlist consisted of 840 words in total and it was divided into 12 weekly wordlists i.e., 70 words for each. Before the target words were distributed to weekly wordlists, they were grouped in terms of their functions and uses such as parts of speech, polysemies and discourse markers. Each weekly wordlist was a basis for designing weekly lessons and related materials.

3. Classroom materials

The lessons were planned based on the RMUTL course description for Technical English Reading. As mentioned earlier, the focus of the course was reading articles, journals and textbooks related to students' specialized fields for information, and interpretation or inference. Accordingly, the lesson plan was intended to teach strategies and skills to interpret local meaning of texts in sample sentences/concordances and reading passages. The target words were presented in language input, activities and exercises. The whole lesson plan was divided into four main parts: guessing word meanings from words' grammatical functions, word parts and context clues as well as reading comprehension. Then, these four parts were divided into 12 lessons. Each lesson focused on a given weekly wordlist. Table 1 illustrates the outline of the whole lesson plan.

Table 1: Outline of the lesson plan for the pilot study

Week	Lessons		Review Tasks
1	Introduction & Vocabulary Level Test		
2	Questionnaire I & Pretest		
3	Part I: Guessing word meaning from words' grammatical functions	Unit 1: Parts of Speech	
4		Unit 2: Sentence Structures	Review Task 1
5	Part II: Guessing word meaning from word parts	Unit 3: Compound Words	
6		Unit 4: Prefixes I	Review Task 2
7		Unit 5: Prefixes II	
8		Unit 6: Suffixes	Review Task 3
9	Mid-term Exam		
10	Part III: Guessing word meaning from context clues	Unit 7: Definition / Classification Clues	
11		Unit 8: Connector / Discourse Markers Clues	Review Task 4
12		Unit 9: Comparison / Contrast Clues	
13		Unit 10: Cause / Effect Clues	Review Task 5
14	Part IV: Reading Comprehension	Unit 11: Manual / Instruction	
15		Unit 12: Articles / Textbooks	Review Task 6
16	Posttest		
17	Vocabulary Level Tests & Questionnaire II		
18	Final exam		

A number of difficulties occurred in designing and implementing these lessons and materials. Firstly, the process of the corpus compilation did not facilitate the designing practices. Texts had not been balanced and graded before being saved into the corpus so it was very difficult for the students to read the corpus information. All texts were authentic and most of them were aimed at professional reading. Therefore, the corpus data was condensed with technical terms beyond the students' proficiency level. A lot of words in the texts were unknown for them and language patterns used were quite complicated. Moreover, the unbalanced topics in the small size corpus made the texts less focused in particular areas so typical recurrent patterns of the target language were unlikely to be easily observable. This also made it difficult for the teacher to find proper examples on particular language points which were the focuses in the lessons as planned. In addition, some topics from other fields of engineering such as aviation and mining were unexpectedly included in the corpus and such language was clearly irrelevant to the students and did not motivate them.

Secondly, the set number of target words also posed problems. Seventy words became too many to be included in one weekly lesson. Although this number was possible for designing the activities for the concordance-based group, it was rather impractical to contextualize all target words in the materials designed for the other

group. Apart from being difficult in designing parallel lessons, the lessons were consequently too condensed and became an overload for the students.

Thirdly, language presentation in classes did not motivate the students, especially in the concordance-based group. Since the materials did not facilitate learning by linking various aspects of words to be learned together. For example, word senses and functions were learned separately. Therefore, such lexical knowledge was suspected to be memorized as fragments.

Fourthly, learner training was not provided so the students were not properly prepared for the concordance-based method before the lessons started. The method was introduced at the start of the first lesson because it was estimated that a concordancer used in the study was not so complicated so that the students would gradually become familiar with it during the process of language learning. However, the appearance of a concordance format at first sight seemed formidable for them rather than motivating. However, the draft of the handouts did not include enough examples of paper-based concordances so they did not facilitate students' understanding much.

4. Research instruments, data collection and findings

The instruments used in the pilot study included the first set of the questionnaire, the pretest, teacher's field notes and students' logs. The first set of the questionnaire and the pretest were administered at the beginning of the study for collecting students' data before the study. The results of the pretests were used to verify the equality of the groups. Teacher's field notes and students' logs were recorded after four lessons dealing with the concordance-based method. In addition, some students were informally interviewed after the end of the study.

Based on the data collected from teacher's field notes, at the beginning of the first lesson, the teacher observed that the students in the experimental group were fully motivated because they liked using computers and were eager to use them for studying English. When dealing with the texts on the computer screens for linguistic study, however, their motivation was clearly reduced since they tried to read all texts word by word but most of the texts were unknown to them. Therefore, they were suggested to screen out irrelevant information and instead paid attention only to the language points focused at one time. In the following three lessons, students

gradually became more familiar with the operation of the concordancer for accessing a corpus. When they were trained to observe only the contexts of the keywords to get helpful hints for interpreting such words or phrases, they could cope with the tasks somewhat better. However, it was observed that some students were still used to reading all texts without screening irrelevant information and this discouraged them. This suggested that learner training on concordancing skills was needed.

According to the data collected from students' logs and informal interviews, students reported that there was not much difficulty in using the concordancing skills and they were sure that they could operate the program better if it was used for a longer period of time. The difficulties were more on dealing with linguistic information. Unfamiliar words in contexts were so many that they were not helpful for interpreting the texts focused. Most of them thought that the main cause was their insufficient proficiency in English. However, their attitudes towards the concordance-based method were fairly positive. They realized that the method was useful for studying English but they needed longer training before they could deal with it well enough.

5. Suggestions for the main study

According to the difficulties found in the pilot study, a framework and a set of guidelines were suggested for the main study on corpus compilation, the number of target words, lesson plan, the designs of lessons and classroom materials, and test and review tasks.

5.1 Corpus compilation

A corpus had to be carefully re-compiled. It was the starting point of the whole process and also was the main linguistic resource for the designing practices. The unsystematic compilation in the pilot study could not serve the specific needs of the study and even affected various areas of the process. In compiling a new corpus, text selection should facilitate students' comprehension of authentic language by grading texts before storing them in the corpus. Accordingly, text topics should not be concerned much with professional, but fundamental knowledge in engineering since such topics might more conform to students' existing knowledge and level of

proficiency. In addition, text topics should be clustered in particular areas familiar to the students so that language samples somewhat comprehensible for students can be obtained and some recurrent linguistic items and patterns in those areas become noticeable. Regarding this issue, the size of a corpus should also be considered. Although a specialized corpus in language teaching was not necessarily large to prevent overwhelming data, it should be large enough for students to notice recurrent items and patterns. Only language items and patterns often recurring in the target language would be worth studying since they are used often in students' academic texts. Finally, text types should be representative of engineering academic texts.

In conclusion, language to be studied in classrooms should not only be authentic, but also more comprehensible and representative of the target language. In so doing, students' pace in authentic reading could be accelerated, thus allowing them to get the best return for their learning efforts.

5.2 The number of target words

As discussed earlier, the number of target words i.e. 70 words set for each lesson, caused a problem in designing parallel lessons for the two groups. With the concordance-based method, students had a concordancer to facilitate word contextualization whereas it was difficult to contextualize all target words in the lessons designed for the other class using the conventional methods. Although it could be done, it consequently made the lesson too condensed. Therefore, the number of target words in each lesson must be reduced.

5.3 Lesson plan

The whole lesson plan should also be revised. Instead of using strategy-based design, the lesson plan should be based on particular themes in order that various aspects of target words could be learned together. For example, words might be grouped according to the themes of the lessons such as '*cause and effects*'. In this case, words signifying causes and effects could be grouped together such as '*cause*', '*lead to*', '*due to*', '*result*', '*as a result*', '*therefore*', '*thus*', and '*hence*'. Apart from learning word meanings, word functions and typical collocations of each word could be integrated so that different uses of words in the same set could be compared. In addition, a good reading strategy of using cause and effect clues for inferring the

meaning of the texts could also be trained simultaneously. In this way, more than one aspect of a word could be learned accumulatively.

5.4 The designs of lessons and classroom materials

As the corpus had to be re-compiled with different frequency lists, most target words would have to be changed as well. Although many high frequency words in one academic text would likely be on top ranks of another academic corpus, not all words in the first list would be included in the new corpus. The change in target wordlist would in turn lead to the change in the focuses of each lesson. Consequently, new sets of classroom materials, tests and tasks would have to be re-designed accordingly.

It was suggested that all activities in one lesson should be linked together according to a particular theme to facilitate students' understanding as well as to make the lesson more interesting. Moreover, in the concordance-based group, learner training should be provided at the beginning of the study to prepare students for hands-on concordancing activities. Furthermore, handouts used in the first few lessons should include enough examples of paper-based concordances. Finally, the introduction to the concordance-based method should be conducted step by step to prevent students' confusion and discouragement.

Appendix D

The GSL and the AWL

I. West's (1953) General Service List of English Words (GSL)

(Source: Available at http://www.uefap.co.uk/vocab/select/gsl/htm-intro)

GSL Headwords: The original list had about 2000 headwords

a	aloud	asleep	Become	both	canal	class
able	already	association	Bed	bottle	cap	clay
about	also	astonish	Before	bottom	cape	clean
above	although	at	Beg	bound	capital	clear
abroad	altogether	attack	Begin	boundary	captain	clerk
absence	always	attempt	Behave	bow	car	clever
absolutely	ambition	attend	Behind	bowl	card	cliff
accept	among	attract	Being	box	care	climb
accident	amongst	audience	Believe	boy	carriage	clock
accord	amount	August	bell	brain	carry	close
account	amuse	aunt	belong	branch	cart	cloth
accuse	ancient	autumn	below	brass	case	cloud
accustom	an	avenue	belt	brave	castle	club
ache	and	average	bend	bread	cat	coal
across	anger	avoid	beneath	break	catch	coarse
act	angle	awake	berry	breakfast	cattle	coast
actual	angry	away	beside	breath	cause	coat
add	animal	awkward	best	bribe	caution	coffee
address	annoy	axe	better	brick	cave	coin
admire	another	baby	between	bridge	cent	cold
admit	answer	back	beyond	bright	centre	collar
adopt	anxiety	bad	bicycle	bring	century	collect
advance	any	bag	big	broad	ceremony	college
advantage	apart	baggage	bill	brother	certain	colony
adventure	apologise	bake	bind	brown	chain	colour
advertise	appear	balance	bird	brush	chair	comb
advice	applaud	ball	birth	bucket	chalk	combine
aeroplane	apple	band	bit	build	chance	come
affair	apply	bank	bite	bunch	change	comfort
afford	appoint	bar	bitter	bundle	character	command
afraid	approve	barber	black	burn	charge	commerce
after	April	bare	blade	burst	charm	committee
afternoon	arch	bargain	blame	bury	cheap	common
again	argue	barrel	bless	bus	cheat	companion
against	arise	base	blind	bush	check	company
age	arm	basin	block	business	cheer	compare
agent	army	basket	blood	busy	cheese	compete
ago	around	bath	blow	but	cheque	complain
agree	arrange	battle	blue	butter	chest	complete
agriculture	arrest	bay	board	button	chicken	complicated
ahead	arrive	be	boast	buy	chief	compose
aim	arrow	beak	boat	by	child	concern
air	art	beam	body	cage	chimney	condition
alike	article	bean	boil	cake	choose	confess
alive	artificial	bear	bold	calculate	Christmas	confidence
all	as	beard	bone	call	church	confuse
allow	ash	beast	book	calm	circle	congratulate
almost	ashamed	beat	border	camera	city	connect
alone	aside	beauty	born	camp	civilize	conquer
along	ask	because	borrow	can	claim	conscience

GSL Headwords

conscious	current	develop	due	equal	fashion	flower
consider	curse	devil	dull	escape	fast	fly
contain	curtain	diamond	during	especial	fat	fold
content	curve	dictionary	dust	essence	fate	follow
continue	cushion	die	duty	even	father	fond
control	custom	difference	each	evening	fatten	food
convenience	cut	difficult	eager	event	fault	fool
conversation	damage	dig	ear	ever	favour	foot
cook	damp	dinner	early	every	favourite	for
cool	dance	dip	earn	evil	fear	forbid
copper	danger	direct	earnest	exact	feast	force
copy	dare	dirt	earth	examination	feather	foreign
cork	dark	disappoint	ease	example	February	forest
corn	date	discipline	east	excellent	feed	forget
corner	daughter	discover	easy	except	feel	forgive
correct	day	discuss	eat	excess	fellow	fork
cost	dead	disease	edge	excite	female	form
cottage	deaf	disgust	educate	excuse	fence	formal
cotton	deal	dish	effect	exercise	fever	former
cough	dear	dismiss	effort	exist	few	forty
council	debt	distance	egg	expect	field	four
count	decay	distinguish	either	expense	fierce	fourteen
country	deceive	district	eight	experience	fifteen	fortune
courage	December	disturb	eighteen	experiment	fifty	forward
course	decide	ditch	eighty	explain	fight	frame
court	declare	dive	elastic	explode	figure	free
cousin	decrease	divide	elder	explore	fill	freeze
cover	deed	do	elect	express	film	frequency
cow	deep	doctor	electricity	extend	find	frequent
coward	deer	dog	elephant	extra	fine	fresh
crack	defeat	dollar	eleven	extraordinary	finger	friend
crash	defend	donkey	else	extreme	finish	Friday
cream	degree	door	empire	eye	fire	fright
creature	delay	dot	employ	face	firm	from
creep	delicate	double	empty	fact	first	front
crime	delight	doubt	enclose	factory	fish	fruit
critic	deliver	down	encourage	fade	fit	fry
crop	demand	dozen	end	fail	five	full
cross	department	drag	enemy	faint	fix	fun
crowd	depend	draw	engine	fair	flag	funeral
crown	descend	drawer	English	faith	flame	fur
cruel	describe	dream	enjoy	fall	flash	furnish
crush	desert	dress	enough	false	flat	further
cry	deserve	drink	enquire	familiar	flavour	future
cultivate	desire	drive	enter	family	flesh	gain
cup	desk	drop	entertain	famous	float	gallon
cupboard	despair	drown	entire	fan	flood	game
cure	destroy	drum	entrance	fancy	floor	gap
curious	detail	dry	envelope	far	flour	garage
curl	determine	duck	envy	farm	flow	garden

GSL Headwords

gas	handle	host	intend	last	long	mention
gate	hang	hot	interest	late	look	merchant
gather	happen	hotel	interfere	latter	loose	mercy
gay	happy	hour	international	laugh	lord	mere
general	harbour	house	interrupt	law	lose	merry
generous	hard	how	into	lay	loss	message
gentle	hardly	human	introduce	lazy	lot	metal
get	harm	humble	invent	lead	loud	middle
girl	harvest	hundred	invite	leaf	love	might
give	haste	hunger	inward	lean	low	mild
glad	hat	hunt	iron	learn	loyal	mile
glass	hate	hurrah	island	least	luck	milk
glory	have	hurry	it	leather	lump	mill
go	hay	hurt	its	leave	lunch	mind
goat	he	husband	January	left	lung	mine
god	head	hut	jaw	leg	machine	minister
gold	heal	I	jealous	lend	mad	minute
good	health	ice	jewel	length	mail	mis-
govern	heap	idea	join	less	main	miserable
grace	hear	ideal	joint	lesson	make	miss
gradual	heart	idle	joke	let	male	mistake
grain	heat	if	journey	letter	man	mix
grammar	heaven	ill	joy	level	manage	model
grand	heavy	imagine	judge	liberty	manners	moderate
grass	height	imitate	juice	library	manufacture	modern
grateful	hello	immediate	July	lid	many	modest
grave	help	immense	jump	lie	map	moment
grease	here	important	June	life	March	Monday
great	hesitate	impossible	just	lift	mark	money
greed	hide	improve	keep	light	market	monkey
green	high	in	key	like	marry	month
greet	hill	inch	kick	likely	mass	moon
grey	hinder	include	kill	limb	master	moral
grind	hire	increase	kind	limit	mat	more
ground	his	indeed	king	line	match	moreover
group	history	independent	kiss	lip	material	morning
grow	hit	industry	kitchen	liquid	matter	most
guard	hold	influence	knee	list	May	mother
guess	hole	inform	knife	listen	meal	motion
guest	holiday	ink	knock	literature	mean	motor
guide	hollow	in-law	knot	little	meanwhile	mountain
guilty	holy	inn	know	live	measure	mouse
gun	home	inquire	lack	load	meat	mouth
habit	honest	insect	ladder	loaf	mechanic	move
hair	honour	inside	lady	loan	medicine	much
half	hook	instant	lake	local	meet	mud
hall	hope	instead	lamp	lock	melt	multiply
hammer	horizon	instrument	land	lodging	member	murder
hand	horse	insult	language	log	memory	music
handkerchief	hospital	insure	large	lonely	mend	must

GSL Headwords

my	oar	pale	place	price	race	reproduce
mystery	obey	pan	plain	pride	radio	republic
nail	object	paper	plan	priest	rail	reputation
name	observe	parcel	plant	print	rain	request
narrow	occasion	pardon	plaster	prison	raise	rescue
nation	ocean	parent	plate	private	rake	reserve
native	October	park	play	prize	rank	resign
nature	of	part	please	probable	rapid	resist
near	off	particular	plenty	problem	rare	respect
neat	offend	party	plough	procession	rat	responsible
necessary	offer	pass	plural	produce	rate	rest
neck	office	passage	pocket	profession	rather	restaurant
need	often	past	poet	profit	raw	result
needle	oil	paste	point	programme	ray	retire
neglect	old	path	poison	progress	razor	return
neighbour	omit	patient	police	promise	reach	revenge
neither	on	patriotic	polish	prompt	read	review
nephew	once	pattern	polite	pronounce	ready	reward
nest	one	pause	political	proof	real	ribbon
net	only	paw	pool	proper	reason	rice
never	onto	pay	poor	property	receive	rich
new	open	peace	popular	propose	recent	rid
next	operation	pearl	population	protect	recognise	ride
nice	opinion	peculiar	position	proud	recommend	right
niece	opportunity	pen	possess	prove	record	ring
night	opposite	pencil	possible	provide	red	ripe
nine	or	penny	post	public	reduce	rise
ninety	orange	people	postpone	pull	refer	risk
nineteen	order	per	pot	pump	reflect	rival
no	ordinary	perfect	pound	punctual	refresh	river
noble	organ	perform	pour	punish	refuse	road
noise	organise	perhaps	poverty	pupil	regard	roar
none	origin	permanent	powder	pure	regret	roast
nonsense	ornament	permit	power	purple	regular	rob
noon	other	person	practical	purpose	rejoice	rock
nor	otherwise	persuade	practice	push	relation	rod
north	ought	pet	praise	put	relieve	roll
nose	ounce	photograph	pray	puzzle	religion	roof
not	our	pick	preach	qualify	remain	room
note	out	picture	precious	quality	remark	root
nothing	over	piece	prefer	quantity	remedy	rope
notice	overcome	pig	prejudice	quarrel	remember	rot
noun	owe	pigeon	prepare	quart	remind	rough
November	own	pile	present	quarter	rent	round
now	pack	pin	preserve	queen	repair	row
nowhere	pad	pinch	president	question	repeat	royal
nuisance	page	pink	press	quick	replace	rub
number	pain	pint	pretend	quiet	reply	rubber
nurse	paint	pipe	pretty	quite	report	rubbish
nut	pair	pity	prevent	rabbit	represent	rude

GSL Headwords

rug	seem	show	solid	steal	summer	test
ruin	seize	shower	solve	steam	sun	than
rule	seldom	shut	some	steel	Sunday	thank
ruler	self	sick	son	steep	supper	that
run	sell	side	soon	steer	supply	the
rush	send	sight	sore	stem	support	theatre
rust	sense	sign	sorrow	step	suppose	their
sacred	sentence	signal	sorry	stick	sure	then
sacrifice	separate	silence	sort	stiff	surface	there
sad	September	silk	soul	still	surprise	therefore
saddle	serious	silver	sound	sting	surround	these
safe	serve	simple	soup	stir	suspect	they
sail	set	since	sour	stock	swallow	thick
sake	settle	sincere	south	stocking	swear	thief
salary	seven	sing	sow	stomach	sweat	thin
sale	seventeen	single	space	stone	sweep	thing
salt	seventy	sir	spade	stop	sweet	think
same	several	six	spare	store	swell	thirst
sample	severe	sixty	speak	storm	swim	thirteen
sand	sew	sixteen	special	story	swing	thirty
satisfy	shade	sister	speed	stove	sword	this
Saturday	shadow	sit	spell	straight	sympathy	thorn
sauce	shake	situation	spend	strange	system	thorough
saucer	shall	size	spill	strap	table	those
save	shallow	skill	spin	straw	tail	though
saw	shame	skin	spirit	stream	tailor	thought
say	shape	skirt	spit	street	take	thousand
scale	share	sky	spite	strength	talk	Thursday
scarce	sharp	slave	splendid	stretch	tall	thread
scatter	shave	sleep	split	strict	tame	threaten
scene	she	slide	spoil	strike	tap	three
scent	sheep	slight	spoon	string	taste	throat
school	sheet	slip	sport	strip	tax	through
science	shelf	slope	spot	stripe	taxi	throw
scissors	shell	slow	spread	strong	tea	thumb
scold	shelter	small	spring	struggle	teach	thunder
scorn	shield	smell	square	study	tear	thus
scrape	shilling	smile	staff	stuff	telegraph	ticket
scratch	shine	smoke	stage	stupid	telephone	tide
screen	ship	smooth	stain	subject	tell	tidy
screw	shirt	snake	stair	substance	temper	tie
sea	shock	snow	stamp	succeed	temperature	tight
search	shoe	so	stand	success	temple	till
season	shoot	soap	standard	such	tempt	time
seat	shop	society	star	suck	tend	tin
second	shore	sock	start	sudden	tender	tip
secret	short	soft	state	suffer	tent	tire
secretary	should	soil	station	sugar	ten	title
see	shoulder	soldier	stay	suggest	term	to
seed	shout	solemn	steady	suit	terrible	tobacco

GSL Headwords

today	umbrella	watch	wise
toe	uncle	water	wish
together	under	wave	with
tomorrow	understand	wax	within
ton	union	way	without
tongue	universe	we	witness
tonight	university	weak	woman
too	unless	wealth	wonder
tool	until	weapon	wood
tooth	up	wear	wool
top	upon	weather	word
total	upper	weave	work
touch	upright	Wednesday	world
tough	upset	weed	worm
tour	upward	week	worry
toward	urge	weigh	worse
towel	use	welcome	worship
tower	usual	well	worst
town	vain	west	worth
toy	valley	wet	would
track	value	what	wound
trade	various	wheat	wrap
train	veil	wheel	wreck
translate	verb	when	wrist
trap	verse	where	write
travel	very	whether	wrong
tray	vessel	which	yard
treasure	victory	while	year
treat	view	whip	yellow
tree	village	whisper	yes
tremble	violent	whistle	yesterday
trial	virtue	white	yet
tribe	visit	who	yield
trick	voice	whole	you
trip	vote	whose	young
trouble	vowel	why	youth
true	voyage	wicked	zero
trunk	wage	wide	
trust	waist	widow	
try	wait	wife	
tube	wake	wild	
Tuesday	walk	will	
tune	wall	win	
turn	wander	wind	
twelve	want	window	
twenty	war	wine	
twist	warm	wing	
two	warn	winter	
type	wash	wipe	
ugly	waste	wire	

II. Coxhead's (2000) Academic Word List (AWL)

(Source: Available at http://www.uefap.co.uk/vocab/select/awl/htm-intro)

AWL Headwords: There are 570 headwords. The most frequency words are in italics.

abandon	*author*	*concept*	define	equip	goal
abstract	*authority*	conclude	*definite*	*equivalent*	*grade*
academy	automate	*concurrent*	*demonstrate*	erode	grant
access	*available*	*conduct*	*denote*	*error*	*guarantee*
accommodate	*aware*	confer	*deny*	establish	guideline
accompany	*behalf*	confine	depress	*estate*	*hence*
accumulate	*benefit*	confirm	derive	*estimate*	hierarchy
accurate	*bias*	*conflict*	*design*	ethic	highlight
achieve	*bond*	conform	*despite*	*ethnic*	*hypothesis*
acknowledge	*brief*	*consent*	detect	evaluate	*identical*
acquire	*bulk*	consequent	deviate	eventual	identify
adapt	*capable*	*considerable*	*device*	evident	*ideology*
adequate	*capacity*	consist	devote	evolve	ignorant
adjacent	category	*constant*	differentiate	*exceed*	illustrate
adjust	cease	constitute	dimension	exclude	*image*
administrate	*challenge*	constrain	diminish	*exhibit*	immigrate
adult	*channel*	construct	discrete	expand	*impact*
advocate	*chapter*	consult	discriminate	*expert*	implement
affect	*chart*	consume	displace	*explicit*	implicate
aggregate	*chemical*	*contact*	*display*	exploit	*implicit*
aid	circumstance	*contemporary*	dispose	*export*	imply
albeit	cite	*context*	distinct	expose	impose
allocate	*civil*	*contract*	distort	*external*	*incentive*
alter	clarify	contradict	distribute	*extract*	*incidence*
alternative	classic	*contrary*	diverse	*facilitate*	incline
ambiguous	*clause*	*contrast*	*document*	factor	*income*
amend	*code*	contribute	*domain*	feature	incorporate
analogy	coherent	*controversy*	*domestic*	*federal*	*index*
analyse	*coincide*	convene	dominate	fee	*indicate*
annual	*collapse*	converse	*draft*	*file*	*individual*
anticipate	colleague	convert	drama	*final*	induce
apparent	commence	convince	*duration*	finance	inevitable
append	comment	cooperate	*dynamic*	*finite*	infer
appreciate	*commission*	coordinate	economy	flexible	*infrastructure*
approach	commit	*core*	edit	fluctuate	*inherent*
appropriate	*commodity*	*corporate*	element	*focus*	inhibit
approximate	communicate	correspond	*eliminate*	*format*	*initial*
arbitrary	*community*	*couple*	emerge	*formula*	initiate
area	compatible	*create*	*emphasis*	*forthcoming*	injure
aspect	compensate	*credit*	*empirical*	found	innovate
assemble	compile	*criteria*	*enable*	*foundation*	*input*
assess	*complement*	*crucial*	encounter	*framework*	*insert*
assign	*complex*	culture	*energy*	*function*	insight
assist	component	*currency*	enforce	fund	inspect
assume	compound	*cycle*	enhance	*fundamental*	*instance*
assure	*comprehensive*	*data*	*enormous*	*furthermore*	*institute*
attach	*comprise*	*debate*	*ensure*	*gender*	instruct
attain	compute	decade	entity	generate	*integral*
attitude	conceive	*decline*	*environment*	*generation*	integrate
attribute	concentrate	deduce	equate	globe	*integrity*

AWL Headwords

intelligent	*minimum*	*plus*	relax	*status*	*uniform*
intense	*ministry*	*policy*	*release*	*straightforward*	unify
interact	minor	*portion*	*relevant*	strategy	*unique*
intermediate	*mode*	pose	reluctance	*stress*	utilise
internal	modify	*positive*	rely	*structure*	valid
interpret	monitor	*potential*	remove	style	vary
interval	motive	practitioner	require	submit	*vehicle*
intervene	*mutual*	precede	*research*	*subordinate*	*version*
intrinsic	negate	*precise*	reside	*subsequent*	*via*
invest	*network*	predict	resolve	subsidy	violate
investigate	*neutral*	predominant	resource	substitute	virtual
invoke	*nevertheless*	*preliminary*	respond	successor	*visible*
involve	*nonetheless*	presume	*restore*	*sufficient*	*vision*
isolate	norm	*previous*	restrain	*sum*	*visual*
issue	*normal*	*primary*	restrict	*summary*	*volume*
item	*notion*	*prime*	retain	supplement	*voluntary*
job	*notwithstanding*	*principal*	reveal	*survey*	*welfare*
journal	*nuclear*	*principle*	*revenue*	*survive*	*whereas*
justify	*objective*	*prior*	*reverse*	suspend	*whereby*
label	obtain	*priority*	revise	sustain	*widespread*
labour	*obvious*	proceed	*revolution*	symbol	
layer	occupy	*process*	*rigid*	tape	
lecture	*occur*	*professional*	*role*	*target*	
legal	*odd*	prohibit	*route*	*task*	
legislate	*offset*	*project*	*scenario*	*team*	
levy	*ongoing*	*promote*	*schedule*	*technical*	
liberal	*option*	*proportion*	*scheme*	technique	
licence	orient	*prospect*	*scope*	*technology*	
likewise	outcome	*protocol*	*section*	*temporary*	
link	*output*	*psychology*	*sector*	tense	
locate	*overall*	*publication*	secure	terminate	
logic	*overlap*	publish	seek	*text*	
maintain	*overseas*	*purchase*	*select*	*theme*	
major	*panel*	*pursue*	*sequence*	*theory*	
manipulate	*paradigm*	*qualitative*	*series*	*thereby*	
manual	*paragraph*	quote	*sex*	*thesis*	
margin	*parallel*	*radical*	*shift*	*topic*	
mature	parameter	*random*	*significant*	*trace*	
maximise	participate	*range*	*similar*	tradition	
mechanism	partner	*ratio*	simulate	*transfer*	
media	*passive*	*rational*	*site*	transform	
mediate	perceive	react	*so-called*	transit	
medical	*percent*	recover	sole	transmit	
medium	*period*	*refine*	*somewhat*	*transport*	
mental	persist	*regime*	*source*	*trend*	
method	*perspective*	*region*	*specific*	*trigger*	
migrate	*phase*	register	specify	ultimate	
military	*phenomenon*	regulate	*sphere*	*undergo*	
minimal	*philosophy*	reinforce	stable	underlie	
minimise	*physical*	reject	statistic	undertake	

Appendix E

Questionnaire for Engineering Instructors

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Please fill the information in the blanks or tick (✓) in appropriate boxes ☐. If any available spaces are not enough, please use the blank sheets at the back of paper.
(กรุณากรอกข้อมูลในช่องว่าง หรือใส่เครื่องหมาย ✓ ในกรอบ ☐ ที่กำหนดให้ ถ้าช่องว่างใดมีเนื้อที่ไม่เพียงพอ กรุณาเขียนลงบนกระดาษเปล่าด้านหลัง)

Part I: Personal Information (ข้อมูลเกี่ยวกับผู้กรอกแบบสอบถาม)

Name (ชื่อ-นามสกุล) ..... Age (อายุ) .....

Working in the Department of (สังกัดแผนก / คณะ).....

Teaching experience (ประสบการณ์การสอน) ..... years (ปี)

Teaching courses (วิชาที่สอน) :

1. ..... Level (สอนระดับ) ☐ diploma (ปวส.) / ☐ undergraduate (ปริญญาตรี)
2. .....Level (สอนระดับ) ☐ diploma (ปวส.) / ☐ undergraduate (ปริญญาตรี)
3. .....Level (สอนระดับ) ☐ diploma (ปวส.) / ☐ undergraduate (ปริญญาตรี)
4. .....Level (สอนระดับ) ☐ diploma (ปวส.) / ☐ undergraduate (ปริญญาตรี)

Part II: Questionnaire (แบบสอบถาม)

1. Do you assign students to read any related academic textbooks, journals, magazines, newspapers, or reports in English? If yes, please specify the names of the publication, the titles of the chapters or articles, and the published years. (ท่านได้มอบหมายให้นักศึกษาอ่านตำรา วารสาร นิตยสาร หนังสือพิมพ์ หรือรายงานเชิงวิชาการที่เกี่ยวข้องกับวิชาที่สอน เป็นภาษาอังกฤษ บ้างหรือไม่ ถ้าเคยมอบหมาย กรุณาระบุชื่อหนังสือ ชื่อบท / บทความ และปีที่พิมพ์)

1. Name of publication (ชื่อหนังสือ) .....
   Title (ชื่อบท / บทความ) ..... Year (ปีที่พิมพ์) .....
2. Name of publication (ชื่อหนังสือ) .....
   Title (ชื่อบท / บทความ) ..... Year (ปีที่พิมพ์) .....
3. Name of publication (ชื่อหนังสือ) .....
   Title (ชื่อบท / บทความ) ..... Year (ปีที่พิมพ์) .....
4. Name of publication (ชื่อหนังสือ) .....
   Title (ชื่อบท / บทความ) ..... Year (ปีที่พิมพ์) .....
5. Name of publication (ชื่อหนังสือ) .....
   Title (ชื่อบท / บทความ) ..... Year (ปีที่พิมพ์) .....

2. Are there any published texts on the Internet that you assign students to read? If yes, please specify the website address and the titles of the articles. (ท่านได้มอบหมายให้นักศึกษาอ่านบทความที่เผยแพร่ทางอินเตอร์เน็ตบ้างหรือไม่ ถ้าเคยมอบหมาย กรุณาระบุเว็บไซต์และชื่อบทความ)

1. http://www.....
   Title (ชื่อบทความ) .....
2. http://www.....
   Title (ชื่อบทความ) .....
3. http://www.....
   Title (ชื่อบทความ) .....
4. http://www.....
   Title (ชื่อบทความ) .....
5. http://www.....
   Title (ชื่อบทความ) .....

3. Are there any English published texts which you do not assign students to read but you think they are interesting for both instructors and students in your field of study? Please recommend. (มีสิ่งพิมพ์หรือบทความใด ตีพิมพ์เป็นภาษาอังกฤษที่ท่านไม่เคยมอบหมายให้นักศึกษาอ่าน แต่ท่านคิดว่าเป็นหนังสือหรือบทความที่น่าสนใจสำหรับ อาจารย์และ นักศึกษาในสาขาวิชาของ ท่าน กรุณาแนะนำ)

3.1 Textbooks (ตำราเรียน หรือหนังสืออ่านประกอบการเรียน)

1. Name of publication (ชื่อหนังสือ) .....
   Title (ชื่อบท / บทความ) ..... Year (ปีที่พิมพ์) .....
2. Name of publication (ชื่อหนังสือ) .....
   Title (ชื่อบท / บทความ) ..... Year (ปีที่พิมพ์) .....
3. Name of publication (ชื่อหนังสือ) .....
   Title (ชื่อบท / บทความ) ..... Year (ปีที่พิมพ์) .....
4. Name of publication (ชื่อหนังสือ) .....
   Title (ชื่อบท / บทความ) ..... Year (ปีที่พิมพ์) .....
5. Name of publication (ชื่อหนังสือ) .....
   Title (ชื่อบท / บทความ) ..... Year (ปีที่พิมพ์) .....

3.2 Journals/Magazines/Newspapers/Reports (วารสาร/นิตยสาร/หนังสือพิมพ์/รายงาน)

1. Name of publication (ชื่อสิ่งพิมพ์) .....
2. Name of publication (ชื่อสิ่งพิมพ์) .....
3. Name of publication (ชื่อสิ่งพิมพ์) .....
4. Name of publication (ชื่อสิ่งพิมพ์) .....
5. Name of publication (ชื่อสิ่งพิมพ์) .....

3.3 The websites of Journals/Magazines/Newspapers/Reports (เว็บไซค์ของวารสาร/นิตยสาร/หนังสือพิมพ์/รายงาน)

1. http://www.....
   Name (ชื่อหนังสือ) .....
2. http://www.....
   Name (ชื่อหนังสือ) .....
3. http://www.....
   Name (ชื่อหนังสือ) .....
4. http://www.....
   Name (ชื่อหนังสือ) .....
5. http://www.....
   Name (ชื่อหนังสือ) .....

.....

Thank you for your cooperation.

Appendix F

Details in the Engineering Corpus

	Topics / Types	Common Interests		Electrical Power & Electronics	Mechanics & Automotives	Computers & IT
1	Textbooks & handouts		50 files	50 files	50 files	50 files
		Engineering	Engineering	Basic concepts	Machine and engine	Computer
			Electrical Engineering	Electric power basics	Simple machine	PC: a personal computer
			Power Engineering	Basic electronics	Mechanical bearing	Computer applications
			Electronic Engineering	Basic electronic passive components	Gear	Introduction to computer
			Mechanical Engineering	Electricity	Screw	Introduction to computer systems
			Mechanical Engineering2	Ground – electricity	Lever	Electricity and computer
			Industrial Engineering	What is electricity?	Spring	Computer Hardware
			Computer Engineering	What is electricity?2	Inclined plane - wedge	Computer Software
			Computer Science	Circuit	Wheel	Computer Networks
			Nature of Work	Circuits	Pulley	Motherboard
			Working conditions & employment	Electric power	Winch	CPU: the central processing unit
			Training qualification advancement	Electric current	Gas compressor	Microprocessor
			Introduction to industrial engineering	Electric filed	Pump	64-bit component
		Physics	What is physics	Electrical wiring	External & internal combustion engine	Computer storage
			Atoms & molecules	Electromagnetism	Turbine	Data storage device
			Mass	Manetic fields and force	Gasoline engine	Computability
			Force	TCI electrical module	Diesel engine	Programming
			Torque	AC-alternating current	Four-stroke cycle	Programming language
			Power	Measurement of currents	Two-stroke cycle	Operating system
			Work	AC-DC measurement	Wankel engine	Microsoft Windows
			Motion	Voltage	Steam engine	Word Processor
			Force and motion	Voltage regulation	Stirling engine	Microsoft Word
			Fundamental force	Electrical generator	Gas turbine	Web Browser
			Energy	Electric motor	Steam turbine	Internet Explorer
			What is energy?	Three phase	Water turbine	Data
			Energy forms	Conductors and insulators of electricity	Windmill	Database
			Energy types	Electrical conduction	Robot - automated machine	Data processing
			Potential & kinetic energy	Electricity generation	Industrial robot	Data networking
			Alternative energy sources	Electric power transmission	Pressure	Internet
			Work, energy & power	Power transmission	Dynamics and thermodynamics	World Wide Web
			Electromechanical devices and mechatronics	Electricity distribution	Introduction to dynamic system	Freeware

	Topics / Types	Common Interests		Electrical Power & Electronics	Mechanics & Automotives	Computers & IT
		Materials	Materials	Power conversion	Introduction to dynamic systems	Shareware
			Materials types	Electricity markets	TCI mechanical module	Adware
			Material-structure-property-processing	Transmission line	TCI thermal expansion and fluid module	Spyware
			Material-effects-design-selection	Transformer	Motor car	Spyware and virus
			TCI material module	Semiconductor	Engine system	Computer virus
			Strength of materials	Fuse - circuit breaker	Engine configurations	Firewall and virus protecttion
		Drawing	Drafting: technical drawing	Insulators	Electrical systems in automobiles	Performance tuning
			Engineering drawing	Resistor	Automotive batteries	Web cams
			CAD	Resistors	Causes of battery failure	IT
			AutoCAD	Transistor	Mechanical advantage	Information
			General Characteristics of AutoCad	Electronic circuit	Machine tool	Information processing system
		General	Calculus	PCB: Printed circuit board	CNC	Information technology
			Practical calculus	Analogue circuit	What is CNC?	Globalization
			Production & manufacturing	Digital circuit	What is CNC machine?	Globalisation
			CAE - Computer-aided engineering	IC: Intergrated Circuit	CNC introduction	Telecommunication
			CAM - Computer-adied manufacturing	Introduction to integrated circuit devices	Basic CNC - introduction	Communication technology
			Quality control	Introduction to IC technology	Drill-lathe-milling machine	CMC: computer-mediated communicaiton
			Engineering management study	Intro to switching-mode power supply	CNC lathe equipment	Artificial Intelligence
			Engineering within ecological constraints	Potential difference	CNC mill equipment	Technological contexts of engineering
2	Advertisements		35 files	35 files	35 files	35 files
	Engineering	Education	NTE - Online engineering program	Electrical safety handbook	SMB bearing	Desktop-tower
			Multidisciplinary Engineering Program	Electrician tool sets	Ball bearings	IBM computer hardware
			CNC Lathe Training	Flexible circuit manufacture	Hydraulic tools for bearing mounting	Procom DVD tower
			Electrical power training	Circuit analyzer	Worm gear speed reducer	PC case
			AutoCad Training Online	Magnet	Gear - Onsite training	Motherboard
		Jobs	Engineers	Magnetic field products	Stainless steel deck screws	Microprocessors
			Engineers – TAI	DC Electromagnet	Pro-kit springs	Intel Pentium4 CPU
			Electrical Engineer	AC voltage & current detector	Coil springs	Computer power supply
			Mechanic Machine Engineer	Digital multimeter	Compression springs	Fujitsu hard drive
			Automotive Engineer	nanoVolt, micro-Ohm Meter	Tire-wheel package	Lava PCI computer bus
		Announcement	IEEE electrical engineering conference	Generator	CL20 wheel	USB
			Automotive Engineering Asia 2005	Electric motors	Pulleys and sprockets	Com monitor
			Machine tools conference	Motor-generator maintainance & troubleshooting	Gearbelt pulley	Keyboard
	Product	Physics	Liberta Digital Pocket Scale	Resistors	Power hydraulic pump	Modem
			Torque measurement	Fuses	Fluid dynamic siphon	Printer
			Force guage	Circuit breakers	HYSPEC - Hydraulic component systems	Scanner
			Rotary torque	Transformer	Model car engine	CD-DVD duplicator
			Testing instruments	Step-down converter	Model engine builder	OEM software
			Kill a watt kWh monitor	Adapter and surge protector	V-8 combustion engine	Backup software

	Topics / Types		Common Interests	Electrical Power & Electronics	Mechanics & Automotives	Computers & IT
			Batteries	World electric adapter set	Combustion analyzer	Window XP package
			Energy machine	Mobile air-conditioner	Turbonator - supercharger	Window server
		Materials	HTS-2000 Aluminum Repair	Cables	Auto & marine batteries	Microsoft office
			Rotor bar - Foundry - Copper Fabrication	Transmission lines	Performance meter	Microsoft office visio
			Insulating materials product	Wire management products	Disc brake pads	Tweaker
			Reinforcement materials	RFQ ElectronICs	Products for carwash business	Photoshop graphic software
			Silicon carbide elements	Power Meter	Corded drill	Dreamweaver - web building software
			Online metals	Conductor bar	Multi-drill	McAfee Internet security
			Allmetal works	Green power - solar electric	Cutting tool	Virus scan
			Thermoprene – polymer	Phase converter	Lead screw tapping machines	Virus scan
			Rubber extrusion	Three phase transformer	Industrial robotics	Spyware removal software
		Drawing	Technical drawing kit	Motor-generator sets	EPSON robots	Network cabling
			Tech Drawing tools for CorelDRAW	PCB manufacture	CNC lathe	Optical wireless ROI
			3D MCAD software	Voltage inverter	CNC milling	System management server
			SmartDraw	Ics for automotive markets	CD-Rom CNC course	UTP remote minibridge
			CADPro-4	Power Ics	Virtual Gibbs CAM System	NETGEAR firewall
3	Manuals & handbooks		35 files	35 files	35 files	35 fiels
		Engineering	How to find a job	How to deal with electric utilities	Safety in battery diagnosis and testing	How to build a PC
			Hot tips for engineering job seekers	How to read a schematic	Adjusting worm shaft bearing	How to buy a computer
			Tips for job interview	How to draw schematic diagram	How to service steerin gears	How to choose a desktop computer
			How to write a resume / CV	Build a series circuit	Measuring sector shaft gear	How to choose the right processors
			Memory Techniques	Build a parallel circuit	Adjusting sector gear lash	How to choose the right amount of RAM
		Physics	How to study physics	Xcircuit compile and install	How to replace coil spring	Set up a PC
			How to solve physics problem	Using Xcircuit	Tire-wheel installation	Install motherboard
			Calculating the amount of work by force	How to build a zapper circuit	Wheel cover installabion instruction	Install RAM
			Lab on work energy power	Circles of magnetism I	Wheel lug nut torquing	Install an internal drive
			Driving more efficiently	Circles of magnetism IV	How to make a simple pulley	Troubleshoot a hard drive
			How to save energy	Manetic line of force	Culculating pulley speeds	Troubleshoot an un-starting computer
			Tips for buying an air-conditioner	Electrical flea	Fluid dynamic siphon installation	Troubleshoot a crashing computer
			Engineer's tips on fuel economy	Motor effect	How to clean your pump	Protect your PC
			How to measure small force	Stripped down motor	Lab on heat transfer and thermodynamics	Computer maintenance tips
			Demonstrate atmospheric pressure	How to make electric motor	Maintenance vehicles checklist	Install computer program safely
			Demonstrating principles of hydraulics	How to build an electric motor in 10 minutes	Checking the coolant	Uninstall a window program safely
		Materials	Material classification - testing	Build reed switch motor	How to maintain a car	Use TWEAK to customize a computer
			HTS-2000 Aluminum repair	Measuring voltage & current in a motor	How to diagnose an engine problem	Tweaking Windows
			HTS-528 Cast iron repair	Troubleshooting guides: electric motor	How to cool an overheated engine	Securing Windows
			Choosing materials	Test conductor or insulators	How to measure the drag on a car	Resize the task bar
			How to make a composite tube	Finding a value of a resistor	How to make biodiesel	Virus protection

	Topics / Types	Common Interests		Electrical Power & Electronics	Mechanics & Automotives	Computers & IT
			How to make copper rings	Short circuit	How to check brakes	How to use VirusScan
			How to make ceramic tile	Safety survey	Brake inspection	How to keep computer from hurting your eyes
			Cutting glass circle	Electrical and electronic safety	Proper speed for maximum fuel efficiency	Get Internet access
			How to make metal wrench chime	Hand battery	How to replace a car battery	Understand domain name systems
		Drawing	Creating CAD isometric projection	How to make a transformer	How to replace an electrical fuse in a car	Understand TCP/IP
			Tips and tricks for tech CorelDRAW	Transformer safety instruction	How to check automatic transmission fluid	Speed up Internet connection
			How to draw UML diagrams	How to wire a power supply	How to use the turbine table	Troubleshoot an Internet connection
			Using AutoCAD to draw a polyline	Working with battery	How to drill glass	Establish a web presence
			How to draw an arc	IC lab sheet	How to build a simple robot	Network your computer
			Designing an automobile with CAD	IC assembly instruction	Mitsubishi M64 CNC	Choose a computer network hub
		General	Principles of product development	PCB milling	Training manual - CNC safety	Install wireless communication cards
			Steps in production process	PCB instruction sheet	Build your own CNC machine	Convert a computer into a file server
			How to use an engineering statistic handbooks	How to make PCBs	How to mount stock and change tooling	Connect computers to a network
			Managing CAD/CAM/CAE	Electrical industrial troubleshooting	How to use AUTOSKETCH- in CNC mills	Share files between two computers
4	Articles & News		35 files	35 files	35 files	35 files
		Engineering	A skill all its own	Electric Outlook	IMechE	64-Bit CPU
			Quality engineering education	Green Power	The future of mechanical engineering	Reasons to use 64-bit CPUs
			On course principles	World electric guide	Employment in automotive industry	A guide to buy a new computer
			Informational interview	Future energies: Superconducting cables	The secret of the force machine	Computer hardware and software
			Engineers for developing countries	Internal electricity markets	How bearing works	Athlon 64 microprocessor
		Physics	Obtaining reliable torque data	IEEE	Gear from scratch	Intel introduces new processors
			Torque and Horsepower	Wiring error investigation	Moving up a gear	IBM develops autonomous chips
			Joint torque and power	Beginner's guide to potentiometer	Breaking in your tires	IBM exits PC business
			Energy Star	Basic electronic tools and techniques	Wheel construction	Automate Windows Installation
			High-efficiency energy conversion systems	How an electric motor works	Alloy wheels you choose	IT - industry focus
			Energy - something from nothing	How air-conditionters work	Brakes 101	Microsoft wants to serve your software
			Experiment confirm zero point energy	50 years of transistors	How brakes work	Microsoft and Sun difficult dance
			Energy economics	Solar electric cells	How car engines work	Microsoft & Autodesk
			How battries work	Plug in power	Memory for cars	Exploring the new world
			How force, toque, power & energy work	The right choice of magnet	How Harley-Davidson work	Power direct
		Materials	Best application for a new material	Fibre link – transmission	How hydraulic machine work	Grid middleware
			Composite fibres light up	Power management	The operation of fluid dynamic siphon	Testing time for software
			Making cheaper supercrystals	Power management for FPGAs	Child starts engines	Sketch and search
			Alsic - silicon carbide reinforced aluminum	Mini generator packs	Rebuilt engine guide	Distributed computing toolbox
			Metal matrix composites	Ultra thin PCB	How to get maximum acceleration	Bluetooth software
			Growth opportunity for composites	Strong resistance in a little package	Mazda RX-8 performance	1GHz power PC on VME
			Plastic fantastic	Battery connector goes mobile	Biodiesel recipe	VME with power PC
			Prototype from powder	Power converter	Engine overhall goes to Germany	Closing the loop

	Topics / Types	Common Interests		Electrical Power & Electronics	Mechanics & Automotives	Computers & IT
			Material science & engineering for 1990s	Siemens to modernise power supply	Stuck in low gear	Big hard drive is small
		Drawing	Drafting	Testing times for transistors	New motor line	Multi-media comes to PMC markets
			CAD problems with WinXP SP2	World's smallest nanotube transistor	Lightweight diesel on parade	Uniting incompatible databanks
			New betas of CAD software	Semiconductor sales rise	New Partners for engine programme	Fully funtioning PC card adapters
			CAD takes on new roles	Boom time for batteries	Hi Robot	300 Gbyte hard drives
		General	A vision of the future	RF power detector	New horizons for robotics	Putting I/O on PC104
			Engineering management studies	Doped dioades	Robot investment on the up	Network security
			Management skill training	Faster smarter testing	Fundamental of CNC concepts	Handheld drive interface
			Deltegating management skill training	High-power blue LEDs	CNC programming for beginner	Computer health check
			Professional skill	Oscillator family branches out	CNC tip-jaw chucks	Improving interfaces
			OEE - Overall equipment effectiveness	Two-phase PWM controller	Homemade CNC milling machine	Network could operate 100 times faster
			Effective teamwork	Alternatives to wirewound resistors	Latest CNC technology	Computer brains
5	Abstracts		35 files	35 files	35 files	35 files
		Engineering	Engineering technology bibliography	Simulation of electrohydraulic system	Oil-free thrust bearings	Effective distributed requirement engineering
			Simple and effective engineering control	Miniature hybrid power supplies	High torque power engine	Computer viruses
			Quality engineering education	Analogue circuit design	Moveable roller control	Trends in high perfomance computers
			Engineering management study	A means of minimizing power dissipation	Fluid dynamic behavior - rotary pump	Multidimensional integration
		Physics	Physics and current understanding	High-speed links technology	Torque analysis of rotary seals	Automated extraction
			Kinetic energy supported electrically	Power performance efficiency	Control of integrated servo actuator	High rate Li-on batteries
			Joint torque and power	Advance in circuit technology	Bearing performance in gear pump	DMFC-Battery hybrid
			Physics of episodic quantized redshift	Future of electrical backpane	Modelling & simulation in mobile hydraulics	Wireless LAN
			Enhanced alternative kinetic energy	Systems and circuits	On cavitation in fluid power	Challenges in microprocessor design
			Innovative energy generation	Analog - Digital converter	Chaotic oscillation in pnuematic cylinder	Recent advances in CMOS technology
			Comparison of energy	Low power circuit and technology	Hydraulic servo-system	IBM global technology outlook
			Energy decay	Recent advances in SOI circuit design	Hydraulic servo drives	Web engineering
		Materials	Semicondutor to metallic transition	Training RF circuit design	Lubricating gaps of displacement machines	Storage area network
			Glass-ceramic superconductor	LC-tuned oscillator	Fluid flow pulsations in hydraulic system	Global outsourcing on IT providers
			Concrete-like materials	Blue laser diode and LED	Single-stage electrohydraulic servovalve	Web and web security
			Development of reinforced materials	Power supply instability	Control of pneumatic servosystem	Spyware: the ghost in the machine
			Heavy alloy kinetic energy penatrators	Sinusoid to currrent control	Hydraulic filter performance	Intelligent agents
			Joining metals and ceramics	Optimization of electric power system	Control of mobile hydraulic cranes	Wireless communication
			Process to produce titanium alloy	Microengineered electrically circuit breaker	Heat transfer characteristics	Global diffusion of the Internet
			Ceramic-based composite	Electrical contact resistance	Effects of valve wheel sizes	Growth of computer and Internet
			Alsic - silicon carbide reinforced aluminum	Enhanced transmission lines	Dynamic modelling of a robot	Computer simulation
			New silver-metal oxide graded composite	Electromagnetic interfereance reduction	Minimum fuel powered dynamic	How long before superintelligence?
			Plasticity - strength of superconductivity	Defects in shielded cables	Magnetic bearings	Afraid of virtual world
		General	Computer-aided drafting	Optical magnetic field probe	Starter motor sizing for gas turbine	Website delays
			The engineer in the enterprise	Antenna pattern synthesis	Gas Turbine performance	Humor in computer-mediated communicaiton
			Macroergonomics in manufacturing	Double exponential pulses	Centrifugal process compressors	Complexity of computer

	Topics / Types		Common Interests	Electrical Power & Electronics	Mechanics & Automotives	Computers & IT
			ANSI/IEEE and system engineerings	Electric vehicles	Stress evaluation in rotating machinery	Putting innovation to work
			Safety-based incident investigation	Hybrid electric vehicles	Cooling and lubrication of helical gears	Overview of supercomputer
			Assignment of safety system	Basic of power factor measurement	Maintenance and diagnostic of gearboxes	Design for validation
			Computer supports engineering courses	Power delivery system	Flow recirculation in centrifugal pumps	Computer science supports engineering
			Microprocessor for industrial engineering	Transmission systems	Screw gas compressors	What computer scientists teach engineers
			Human performance engineering	Changes in power industry	Effeciency improvement on steam turbine	Design of neural networks
			Waste minimization technique	Transistor feedback capacitance	Turbine overhall frequency	Teach programming principles
			Multi project management	Wireless transmission	System thermodynamics	Packing software process
			Learning styles of engineering students	Robotic sensor agents	Velocity measurement of flow	What is document?

Appendix G

Target Wordlist & all Distributed Wordlists

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I. A target wordlist

There were 480 words in total. All target words were:

- words in the lists of GSL & AWL
- words frequency occurring at least 15 times in the Engineering Corpus

No.	Target Wordlist		F	No.	Target Wordlist		F	No.	Target Wordlist		F
1	ability	GSL	142	51	avoid	GSL	79	101	conventional	AWL	80
2	able	GSL	147	52	aware	AWL	31	102	convert	AWL	139
3	absolute	GSL	32	53	become	GSL	294	103	corporate	AWL	34
4	academic	AWL	54	54	behavior	GSL	79	104	correct	GSL	133
5	accept	GSL	61	55	bend	GSL	52	105	cover	GSL	171
6	access	AWL	178	56	benefit	AWL	86	106	create	AWL	387
7	according	GSL	100	57	boundary	GSL	35	107	criteria	AWL	27
8	accuracy	AWL	32	58	brief	AWL	36	108	critical	GSL	64
9	achieve	AWL	134	59	bring	GSL	120	109	current	GSL	973
10	active	GSL	63	60	calculate	GSL	117	110	damage	GSL	267
11	activity	GSL	83	61	capability	AWL	119	111	dangerous	GSL	34
12	actual	GSL	165	62	capacity	AWL	102	112	deal	GSL	67
13	addition	GSL	128	63	carry	GSL	126	113	decision	GSL	50
14	adjust	AWL	30	64	case	GSL	319	114	decrease	GSL	48
15	advance	GSL	128	65	category	AWL	35	115	define	GSL	180
16	advantage	GSL	143	66	cause	GSL	326	116	deliver	GSL	93
17	advice	GSL	17	67	certain	GSL	138	117	demand	GSL	93
18	affect	AWL	63	68	challenge	AWL	59	118	demonstrate	AWL	57
19	aid	AWL	72	69	characteristics	GSL	97	119	depend	GSL	152
20	aim	GSL	39	70	choose	GSL	150	120	derive	AWL	46
21	allow	GSL	470	71	classify	GSL	25	121	describe	GSL	228
22	alternate	AWL	81	72	combine	GSL	84	122	desire	GSL	56
23	alternative	AWL	71	73	comfortable	GSL	26	123	despite	AWL	25
24	although	GSL	159	74	common	GSL	438	124	detail	GSL	155
25	amount	GSL	222	75	compare	GSL	145	125	detect	AWL	43
26	analysis	AWL	155	76	compatible	AWL	36	126	determine	GSL	189
27	angle	GSL	139	77	compensate	AWL	20	127	develop	GSL	355
28	another	GSL	259	78	competitive	GSL	52	128	device	AWL	544
29	appear	GSL	129	79	complete	GSL	243	129	different	GSL	400
30	application	GSL	592	80	complex	AWL	121	130	difficult	GSL	77
31	apply	GSL	290	81	complicate	GSL	33	131	dimension	AWL	83
32	approach	AWL	134	82	component	AWL	431	132	direct	AWL	276
33	appropriate	AWL	77	83	compose	GSL	20	133	direction	AWL	226
34	approximate	AWL	65	84	compute	AWL	127	134	discipline	GSL	50
35	area	AWL	321	85	concept	AWL	151	135	discover	GSL	39
36	arrange	GSL	52	86	concern	GSL	79	136	discuss	GSL	104
37	artificial	GSL	56	87	condition	GSL	138	137	distance	GSL	166
38	as	GSL	3315	88	conduction	AWL	55	138	distortion	AWL	31
39	aspect	AWL	61	89	consequence	AWL	25	139	distribute	AWL	74
40	assembly	AWL	82	90	consider	GSL	205	140	divide	GSL	109
41	assessment	AWL	28	91	considerable	AWL	41	141	document	AWL	76
42	assist	AWL	28	92	consist	AWL	76	142	domestic	AWL	18
43	assume	AWL	75	93	constant	AWL	152	143	drag	GSL	55
44	attach	AWL	143	94	consume	AWL	36	144	due	GSL	153
45	attempt	GSL	59	95	contact	AWL	241	145	during	GSL	224
46	attention	GSL	34	96	contain	GSL	172	146	duty	GSL	28
47	attract	GSL	34	97	context	AWL	41	147	economical	AWL	175
48	automate	AWL	41	98	continue	GSL	120	148	edge	GSL	72
49	available	AWL	382	99	contrast	AWL	49	149	education	GSL	111
50	average	GSL	96	100	convenient	GSL	31	150	effect	GSL	162

Target Wordlist

No.	Target Wordlist		F	No.	Target Wordlist		F	No.	Target Wordlist		F
151	effective	GSL	151	211	foundation	AWL	27	271	like	GSL	452
152	efficient	GSL	130	212	frequent	GSL	32	272	like	GSL	61
153	effort	AWL	63	213	fundamental	AWL	88	273	local	GSL	72
154	element	AWL	141	214	furthermore	AWL	24	274	locate	AWL	77
155	eliminate	AWL	54	215	gain	GSL	77	275	maintain	AWL	88
156	emphasis	AWL	29	216	general	GSL	332	276	manual	AWL	117
157	energy	AWL	1014	217	generate	AWL	166	277	manufacture	GSL	284
158	enhance	AWL	61	218	generation	AWL	101	278	matter	GSL	85
159	ensure	AWL	107	219	goal	AWL	72	279	maximum	AWL	127
160	entire	GSL	97	220	gradual	GSL	19	280	mean	GSL	354
161	environment	AWL	138	221	handle	GSL	124	281	measure	GSL	306
162	equal	GSL	165	222	hence	AWL	30	282	mechanical	GSL	380
163	equation	AWL	167	223	horizontal	GSL	54	283	medium	AWL	64
164	equip	AWL	22	224	however	GSL	261	284	mention	GSL	34
165	equipment	AWL	238	225	ideal	GSL	83	285	mere	GSL	21
166	equivalent	AWL	65	226	identical	AWL	23	286	method	AWL	261
167	error	AWL	83	227	identify	AWL	81	287	minimize	AWL	36
168	especial	GSL	112	228	image	AWL	136	288	mixture	GSL	62
169	essential	GSL	83	229	imagine	GSL	30	289	mode	AWL	78
170	establish	AWL	68	230	immediate	GSL	46	290	model	GSL	394
171	estimate	AWL	27	231	impact	AWL	39	291	modify	GSL	56
172	evaluate	AWL	33	232	implement	AWL	47	292	motion	GSL	236
173	even	GSL	355	233	implication	AWL	21	293	multiple	GSL	88
174	eventual	AWL	35	234	important	GSL	291	294	necessary	GSL	139
175	evidence	AWL	26	235	improve	GSL	185	295	need	GSL	745
176	exact	GSL	66	236	include	GSL	592	296	neutral	AWL	45
177	exceed	AWL	52	237	increase	GSL	102	297	normal	AWL	178
178	except	GSL	36	238	independent	GSL	51	298	notice	GSL	50
179	excess	GSL	31	239	indicate	AWL	99	299	object	GSL	396
180	exist	GSL	168	240	individual	AWL	98	300	observe	GSL	51
181	expand	AWL	56	241	induce	AWL	31	301	obtain	GSL	83
182	expansion	AWL	43	242	influence	GSL	36	302	obvious	AWL	49
183	expect	GSL	115	243	injury	GSL	20	303	occasional	GSL	22
184	experience	GSL	195	244	innovation	AWL	40	304	occur	AWL	103
185	experiment	GSL	70	245	insert	AWL	59	305	offer	GSL	245
186	explain	GSL	93	246	inspection	AWL	33	306	opportunity	GSL	72
187	explicit	AWL	26	247	instance	AWL	70	307	oppose	GSL	28
188	explode	GSL	49	248	instant	GSL	38	308	option	AWL	135
189	expose	AWL	34	249	instead	GSL	97	309	order	GSL	311
190	express	GSL	69	250	instruction	AWL	176	310	ordinary	GSL	20
191	extend	GSL	72	251	instrument	GSL	53	311	organization	GSL	95
192	extension	GSL	31	252	integrate	AWL	177	312	original	GSL	113
193	extensive	GSL	40	253	intelligence	AWL	69	313	other	GSL	1050
194	extreme	GSL	106	254	intend	GSL	54	314	overall	AWL	142
195	facility	AWL	49	255	intensive	AWL	23	315	overcome	GSL	28
196	fact	GSL	112	256	interact	AWL	30	316	pad	GSL	79
197	failure	GSL	49	257	interest	GSL	126	317	paradigm	AWL	21
198	fair	GSL	28	258	introduce	GSL	87	318	parallel	AWL	135
199	familiar	GSL	33	259	invent	GSL	44	319	particular	GSL	191
200	faulty	GSL	57	260	investigate	AWL	29	320	passive	AWL	25
201	feature	AWL	285	261	investment	AWL	42	321	perfect	GSL	56
202	feed	GSL	53	262	involve	AWL	126	322	performance	GSL	325
203	field	GSL	383	263	issue	AWL	130	323	permanent	GSL	40
204	figure	GSL	208	264	item	AWL	81	324	perspective	AWL	31
205	find	GSL	235	265	kind	GSL	112	325	phenomenon	AWL	50
206	firm	GSL	75	266	label	AWL	50	326	physical	AWL	156
207	flexible	AWL	50	267	lack	GSL	44	327	place	GSL	299
208	follow	GSL	286	268	law	GSL	160	328	plant	GSL	99
209	form	GSL	382	269	layer	AWL	162	329	plus	AWL	56
210	formula	AWL	66	270	light	GSL	247	330	position	GSL	233

Target Wordlist

No.	Target Wordlist		F	No.	Target Wordlist		F	No.	Target Wordlist		F
331	potential	AWL	313	381	remain	GSL	62	431	straight	GSL	51
332	practical	GSL	91	382	remove	AWL	221	432	strip	GSL	50
333	practice	GSL	135	383	repeat	GSL	47	433	stripe	GSL	39
334	precise	AWL	62	384	replace	GSL	185	434	substantial	GSL	21
335	prefer	GSL	43	385	represent	GSL	123	435	such	GSL	805
336	prepare	GSL	69	386	require	AWL	461	436	sufficient	AWL	43
337	present	GSL	153	387	research	AWL	180	437	suggest	GSL	72
338	press	GSL	105	388	resource	AWL	94	438	suitable	GSL	59
339	prevent	GSL	118	389	response	AWL	99	439	supply	GSL	369
340	previous	AWL	66	390	responsible	GSL	33	440	support	GSL	302
341	primary	AWL	146	391	result	GSL	381	441	surface	GSL	185
342	principle	AWL	116	392	reverse	AWL	59	442	symbol	AWL	91
343	prior	AWL	41	393	review	GSL	68	443	target	AWL	45
344	procedure	AWL	81	394	revolve	AWL	55	444	task	AWL	157
345	produce	GSL	139	395	rigid	AWL	27	445	tension	AWL	23
346	professional	AWL	111	396	risk	GSL	45	446	term	GSL	294
347	proper	GSL	119	397	satisfy	GSL	26	447	terminal	AWL	96
348	property	GSL	164	398	science	GSL	204	448	theory	AWL	138
349	proportional	AWL	47	399	search	GSL	101	449	therefore	GSL	113
350	propose	GSL	41	400	section	AWL	167	450	though	GSL	99
351	protect	GSL	82	401	secure	AWL	60	451	thus	GSL	145
352	prove	GSL	46	402	select	AWL	149	452	tight	GSL	46
353	provide	GSL	513	403	sense	GSL	107	453	traditional	AWL	61
354	publish	AWL	102	404	separate	GSL	106	454	transfer	AWL	94
355	purchase	AWL	66	405	sequence	AWL	39	455	transform	AWL	35
356	purpose	GSL	163	406	series	AWL	203	456	transmit	AWL	63
357	qualify	GSL	36	407	severe	GSL	24	457	trial	GSL	35
358	quality	GSL	238	408	shift	AWL	96	458	typical	GSL	223
359	quantity	GSL	131	409	sign	GSL	47	459	unique	AWL	70
360	quite	GSL	91	410	significant	AWL	134	460	universal	GSL	32
361	random	AWL	30	411	similar	AWL	169	461	unless	GSL	53
362	range	AWL	280	412	simple]	GSL	440	462	useful	GSL	108
363	rapid	GSL	87	413	since	GSL	284	463	usual	GSL	334
364	rather	GSL	137	414	site	AWL	210	464	utility	AWL	106
365	ratio	AWL	132	415	situation	GSL	56	465	value	AWL	405
366	reach	GSL	116	416	skill	GSL	285	466	various	GSL	134
367	react	AWL	81	417	slight	GSL	51	467	vary	AWL	108
368	reason	GSL	106	418	solution	GSL	187	468	version	AWL	213
369	receive	GSL	69	419	sort	GSL	45	469	via	AWL	79
370	recent	GSL	112	420	special	GSL	163	470	virtual	AWL	101
371	recognize	GSL	50	421	specific	AWL	168	471	visible	AWL	16
372	recommend	GSL	68	422	specify	AWL	119	472	vision	AWL	45
373	reduce	GSL	260	423	spend	GSL	48	473	visual	AWL	33
374	refer	GSL	152	424	spin	GSL	97	474	volume	AWL	139
375	reflect	GSL	38	425	split	GSL	31	475	warn	GSL	46
376	regular	GSL	48	426	spread	GSL	35	476	waste	GSL	76
377	relate	GSL	154	427	stable	GSL	25	477	wear	GSL	76
378	release	AWL	114	428	state	GSL	283	478	whereas	AWL	20
379	relevant	AWL	23	429	steady	GSL	36	479	whether	GSL	108
380	reliable	AWL	53	430	stiff	GSL	20	480	wrap	GSL	46

II. Weekly Wordlists

Weekly Wordlists 1-6: There were 40 words per list.

No.	Wordlist 1	Wordlist 2	Wordlist 3	Wordlist 4	Wordlist 5	Wordlist 6
1	academic	allow	ability	accept	able	active
2	application	alternate	aid	advance	actual	activity
3	approach	angle	another	advantage	addition	aim
4	assembly	apply	artificial	as	amount	arrange
5	attempt	area	assist	correct	aspect	attach
6	component	boundary	automate	define	category	attention
7	concept	bring	become	demonstrate	certain	average
8	concern	carry	calculate	describe	characteristics	case
9	condition	consider	capacity	during	classify	combine
10	context	contain	complete	essential	compare	compose
11	current	convert	compute	exist	conduction	consist
12	deal	create	continue	express	consume	contact
13	device	demand	dangerous	general	divide	cover
14	discipline	desire	decrease	imagine	energy	environment
15	education	develop	direct	important	equal	equip
16	element	dimension	effective	instance	equation	expand
17	equipment	direction	efficient	interest	exact	expansion
18	experience	distance	gradual	introduce	extend	expect
19	fact	edge	handle	invent	familiar	flexible
20	field	establish	implement	like	figure	goal
21	firm	experiment	increase	maintain	formula	intend
22	fundamental	extension	integrate	mean	frequent	item
23	include	feature	intelligence	mixture	kind	label
24	instrument	follow	interact	motion	matter	layer
25	law	form	manual	necessary	multiple	locate
26	manufacture	generate	mechanical	original	obvious	medium
27	method	generation	other	prepare	occasional	mode
28	object	identify	physical	primary	parallel	model
29	order	indicate	potential	provide	plus	neutral
30	organization	involve	practical	react	precise	passive
31	phenomenon	light	property	refer	quantity	position
32	plant	measure	rapid	represent	ratio	purpose
33	principle	mention	relate	revolve	reduce	rigid
34	science	need	reliable	significant	regular	series
35	site	produce	repeat	simple	separate	state
36	situation	recognize	replace	such	sort	stiff
37	skill	require	special	term	split	strip
38	solution	section	typical	traditional	straight	stripe
39	task	surface	various	useful	supply	target
40	theory	value	virtual	usual	symbol	via

Weekly Wordlists 7-12: There were 40 words per list.

No.	Wordlist 7	Wordlist 8	Wordlist 9	Wordlist 10	Wordlist 11	Wordlist 12
1	accuracy	achieve	adjust	absolute	according	analysis
2	alternative	appear	advice	access	affect	approximate
3	appropriate	attract	avoid	although	assume	assessment
4	available	common	aware	behavior	cause	benefit
5	choose	constant	bend	brief	challenge	compensate
6	comfortable	deliver	conventional	capability	consequence	complex
7	compatible	derive	detect	considerable	critical	complicate
8	competitive	distribute	discover	contrast	depend	criteria
9	convenient	domestic	discuss	despite	distortion	damage
10	corporate	explode	drag	different	due	decision
11	detail	expose	eliminate	difficult	effect	determine
12	duty	gain	ensure	entire	effort	document
13	economical	individual	feed	equivalent	error	emphasis
14	enhance	induce	find	especially	except	estimate
15	facility	local	horizontal	even	failure	evaluate
16	ideal	normal	immediate	exceed	faulty	eventual
17	image	obtain	improve	excess	hence	evidence
18	influence	occur	instant	extensive	impact	explain
19	maximum	ordinary	instruction	extreme	independent	explicit
20	minimize	overcome	modify	fair	injury	foundation
21	offer	practice	notice	furthermore	inspection	implication
22	option	present	pad	however	instead	innovation
23	perfect	previous	place	identical	investigate	investment
24	prefer	prior	press	insert	lack	issue
25	proper	procedure	quite	intensive	purchase	observe
26	propose	reach	random	likely	rather	opportunity
27	prove	receive	recommend	mere	reason	overall
28	quality	reverse	remove	oppose	recent	paradigm
29	range	sequence	review	particular	reflect	perspective
30	release	spin	search	performance	remain	prevent
31	satisfy	spread	sense	permanent	resource	professional
32	secure	stable	shift	proportional	response	protect
33	select	steady	sign	relevant	result	publish
34	sufficient	terminal	specify	responsible	risk	qualify
35	suitable	transfer	spend	similar	severe	research
36	support	transform	suggest	slight	since	tension
37	trial	transmit	tight	specific	therefore	visible
38	unique	unless	warn	substantial	thus	vision
39	universal	utility	wear	though	waste	visual
40	version	vary	wrap	whereas	whether	volume

III. A list of the tested words in the pretest/posttest and delayed test

There were 101 words in total: 51 words in Definition Part and 50 words in Cloze Part.

Definition Part	No.	Tested Words	F	No.	Tested Words	F
	1	advantage	143	27	issue	130
	2	although	159	28	manually	117
	3	area	321	29	mechanically	380
	4	average	96	30	obtain	83
	5	capacity	102	31	overall	142
	6	case	319	32	particularly	191
	7	complex	121	33	position	223
	8	concept	151	34	practice	135
	9	constantly	152	35	prevent	118
	10	damage	267	36	properly	119
	11	describe	228	37	provide	513
	12	discuss	104	38	publish	102
	13	distance	166	39	quantity	131
	14	divide	109	40	reach	116
	15	during	224	41	search	101
	16	economic	175	42	section	167
	17	Energy	1014	43	separate	106
	18	environment	138	44	shift	96
	19	especially	112	45	since	284
	20	extreme	106	46	specify	119
	21	Figure	208	47	surface	185
	22	Ideal	83	48	symbol	91
	23	important	291	49	vary	108
	24	improve	185	50	version	213
	25	individual	98	51	volume	139
	26	interest	126			
Cloze Part	**No.**	**Tested Words**	**F**	**No.**	**Tested Words**	**F**
	1	Able		26	firm	
	2	accuracy		27	include	
	3	Aid		28	instruction	
	4	amount		29	intensive	
	5	Appear		30	invent	
	6	available		31	measure	
	7	combine		32	necessary	
	8	component		33	need	
	9	Cover		34	notice	
	10	Current		35	organization	
	11	dangerous		36	place	
	12	despite		37	produce	
	13	Device		38	professional	
	14	different		39	range	
	15	direction		40	rather	
	16	discipline		41	relate	
	17	Due		42	resource	
	18	Effect		43	result	
	19	efficient		44	select	
	20	Equal		45	special	
	21	Except		46	support	
	22	Excess		47	terminal	
	23	expand		48	unless	
	24	field		49	virtual	
	25	find		50	whereas	
Total of tested words		**101**				

IV. Lists of the reviewed words in the review tasks

In each list, there were 30 words in total: 15 words in Definition Part and another 15 words in Cloze Part.

		Task 1		Task 2		Task 3		Task 4	
Definition Part	**No.**	**Reviewed Words**	**F**	**Reviewed Words**	**F**	**Reviewed Words**	**F**	**Reviewed Words**	**F**
	1	allow	470	activity	83	achieve	134	access	178
	2	artificial	56	actual	165	appropriate	77	according	100
	3	contain	172	certain	138	avoid	79	assume	75
	4	continue	120	compare	145	conventional	155	behavior	80
	5	effective	151	equation	167	detail	97	difficult	77
	6	experience	195	expect	50	image	136	document	76
	7	fact	112	flexible	66	local	72	entire	115
	8	increase	102	item	81	modify	56	error	83
	9	indicate	99	locate	77	normal	178	insert	59
	10	integrate	177	purpose	163	procedure	81	observe	51
	11	object	396	reduce	260	quite	91	protect	82
	12	physical	156	series	203	release	114	recent	112
	13	principle	116	state	283	secure	60	remain	62
	14	property	164	supply	369	spin	97	research	54
	15	task	157	term	294	suggest	72	similar	169
Cloze Part	**No.**	**Reviewed Words**	**F**	**Reviewed Words**	**F**	**Reviewed Words**	**F**	**Reviewed Words**	**F**
	1	another		as		adjust		benefit	
	2	application		attach		choose		capability	
	3	become		classified		distribute		cause	
	4	create		conduction		ensure		challenge	
	5	develop		consist		explode		criteria	
	6	form		define		immediate		determine	
	7	identify		general		maximum		explain	
	8	involve		instance		minimize		however	
	9	light		kind		occur		innovation	
	10	manufacture		mean		option		instead	
	11	plant		motion		quality		performance	
	12	require		original		remove		purchase	
	13	solution		parallel		transfer		qualify	
	14	theory		revolution		transform		response	
	15	typical		simple		wear		specific	
Total		**30**		**30**		**30**		**30**	

Appendix H

Detailed Outline of the Lesson Plan

Lessons	Themes	Vocabulary	Language Points & Skills	Reading Texts
1	Engineering Fields	Words referring to contexts, objects, workplaces, studies and practices	• Homonyms and Polysemies • Collocations	Engineering Fields
2	Engineering Drawing	Words concerning with technical drawing	Grammar Revision: • Noun Phrases • Verb Phrases	Engineering Drawing Computer-aided Design (CAD)
3	Computers in Engineering	Words concerning with computers, their ability and features	Grammar Revision: Modifiers • Adjectives • Adverbs	Computer-aided Engineering (CAE): CAD & CAM
4	Machines and Engines	Words used for giving definitions and examples	• Contexts Clues • Word Formation: - Compounds - Affixes	Machine and Engines Combustion engines
5	Energy and Electricity	Words concerning with calculation and ways of grouping things	Classification	Electrical Energy
6	Electrical Systems in Automobiles	Words used for describing equipment's parts, components, position, material property and ways of putting things together	Nouns and Adjectives	Electrical systems in automobiles
7	Engineering Products	Common words in advertisements for describing good features of products	Reading advertisements	Advertisements
8	Power Transmission	Words used for describing processes	• Active and passive forms • Sequence markers	Electrical power transmission
9	How to build an Electric Motor	Words used for giving instructions, suggestions and warning as well as for emphasizing instructions	• Imperative • Actions verbs • Adverbs of manners	How to build an electric motor
10	Latest Technology	Words used for comparison and contrast	• Intensifiers • Discourse makers	Industrial Robots
11	Causes of Failure	Words used for describing causes and effects, concerning with damage and malfunction	Discourse markers	Causes of battery failure
12	Electric Vehicles	Words concerning with estimation and publication	Reading abstracts	Electric vehicles

Appendix I

A Sample Plan for One Lesson

Lesson Plan 4
Machines & Engines

Objectives:

1. To study 40 target words from the Weekly Wordlist 4
2. To study context clues: definition, description and example clues
3. To study word formation: suffixes

Contents:

- 40 target words from the Weekly Wordlist 4

Weekly Wordlist 4

accept	demonstrate	general	invent	necessary	refer	term
advance	describe	imagine	like	original	represent	traditional
advantage	during	important	maintain	prepare	revolve	useful
as	essential	instance	mean	primary	significant	usual
correct	exist	interest	mixture	provide	simple	
define	express	introduce	motion	react	such	

- Context Clues from definitions, descriptions, and examples
- Word Formation: Suffixes

Language and Skill Focus:

- Skill of guessing word meaning from definition, description and example clues
- Skill of guessing word meaning from word parts i.e. suffixes

Duration: 150 minutes

Materials:

1. Handout 4 for classroom material
2. Task sheet 4 assigned as homework
3. CDs containing a corpus and a concordancer for the concordancing group

Method of teaching:

- Paper-based activities (including some hands-on activities for the concordancing group)
- Plenary discussion
- Teacher's demonstration and explanation
- Students' practice

Procedure:

Part I: Warm Up (10 minutes)

(Raising awareness on using context clues to guess word meaning)

- The students look at some given technical terms and discuss how well they know these terms.
- They are asked to read the given concordances / sentences having the highlighted target words '*term*', '*mean*' and '*refers*' as clues.
- Then they discuss whether they can find the meaning of these terms from contexts.

Part II: Presentation and Practice (130 minutes)

Note: A is an abbreviation of 'Activity'.
T is an abbreviation of 'Time'.
P is an abbreviation of 'Language Presentation'.

A	T	The Comparison Group	A	T	The Experimental Group
P	5	• The students are pointed out that many technical terms frequently occurring in academic texts are mostly defined and the meanings of such terms can possibly be found from the contexts without referring to a dictionary. • Some words typically used for giving definitions and descriptions of these terms are provided.	P	5	• The students are pointed out that many technical terms frequently occurring in academic texts are mostly defined and the meanings of such terms can possibly be found from the contexts without referring to a dictionary. • Some words typically used for giving definitions and descriptions of these terms are provided.
1	20	• The focus of this activity is on studying definition clues i.e. '*mean*', '*define*' and '*refer*' in terms of their meaning, collocations and uses as definitions clues. • In Activity 1.1, a short reading passage entitled 'Machine' is given for students to notice the definition clues while reading	1	20	• The focus of this activity is on studying definition clues i.e. '*mean*', '*define*' and '*refer*' in terms of their meaning, collocations and uses as definitions clues. • In Activity 1.1, students are assigned to search the target words in the corpus to answer the given questions about the mostly

		and then to answer the following questions used for comprehension checks as well as for raising their awareness on using these target words as definition clues. • In Activity 1.2, students study different collocations of the target words from the given sentences, match some technical terms with their definitions, and then practise making up sentences by using the typical collocations of the target words. • In Activity 1.3, students practise observing the immediate contexts of the omitted words in the given sentences and then fix the target words in the right places.			used form of each target word as well as to observe their different collocations. • In Activity 1.2, students continue searching the information of the target words in the corpus in order to complete the given concordances and practise reading these concordances containing word definitions. • In Activity 1.3, students practise observing immediate contexts of the omitted words in the given sets of concordances to identify the typical collocations of each word omitted in each set of concordances. Then they fix the target words in the right places.
2	20	• The focus is shifted to the target words '*represent*', '*express*' and '*describe*' to study description clues. • In Activity 2.1, students study different collocation from different uses of '*represent*' as active or passive forms in the given sentences and then fix the words to complete the given sentences. • In Activity 2.2, students observed typical collocations of '*express*' and '*describe*' in the given sentences and then fix the words to complete the given sentences.	2	20	• The focus is shifted to the target words '*represent*', '*express*' and '*describe*' to study description clues. • In Activity 2.1, students observe different collocations of the target words from finding the information of the target words to answer the given questions. • In Activity 2.2, students complete the given concordances by finding information from the corpus and then practise reading the concordances containing word descriptions. • In Activity 2.3, students practise observing immediate contexts of the omitted words in the given concordances to identify the typical collocation of each omitted word and then fix the target words in the right places.
P	5	• Words used for giving examples are provided.	P	5	• Words used for giving examples are provided.
3	20	• The focus is on studying the example clues i.e. '*like*', '*instance*', and '*such as*'. • In Activity 3.1, students read the given sentences and then identify the examples of the given keywords. • In Activity 3.2, students are asked to observe the typical collocation of the target words from the given sentences in Activity 3.1 and then fix these target words in the blanks of the given sentences in Activity 3.2.	3	20	• The focus is on studying the example clues i.e. '*like*', '*instance*', and '*such as*'. • In Activity 3.1, students practise how to deduce the meaning of the target words in the given concordances and then find two example sentences of each target word from the corpus. • In Activity 3.2, students fix the target words in the right sets of concordances.

-	-	----------	P	5	• The concept of word formation concerning affixes is introduced.
4	15	• In this activity, students identify the definition and example clues after reading the given sentences concerning with 'Engines'.	4.	15	• In Activity 4.1, students use a wildcard search to find the noun type of the target verbs as well as to break these nouns into parts. Then, they inferred the typical suffixes i.e. '*-ion*' of the verbs when changing into nouns. • In Activity 4.2, students repeat the practice as in Activity 4.1 but focus on another typical suffixes i.e. '*-ce*'.
P	5	• The concept of word formation concerning affixes is introduced.	-	-	----------
5	15	• In Activity 5.1, students study the given pairs of verbs and nouns and then guess the nouns of the other given verbs. They check their guesses from a dictionary before breaking the resulting nouns into parts. Then, they inferred the typical suffixes i.e. '*-ion*' of verbs when changing into nouns. • In Activity 5.2, students repeat the practice as in Activity 5.1 but focus on another typical suffixes i.e. '*-ce*'.	5	15	• The Activity 5 is similar to Activity 4 on the practice to infer the typical suffixes of the given words but the Activity 5 shifts the focus on the suffixes of adjectives when changing into nouns and adverbs.
6	15	• The Activity 6 is like the Activity 5 on the practice to infer the typical suffixes of the given words. However, the Activity 6 shifts the focus on the suffixes of adjectives when changing into nouns and adverbs.	6	15	• Students pracise to interpret the different meaning of three target words in the given concordances.

Part III: Application (15 minutes)

(Retrieving words in new contexts)

This activity in this part is similar in both groups of students in order for them to retrieve words just learnt in the lessons for using in reading. Two cloze passages were available: one is entitled '*Machine*' and the other one is '*Engine*'. Some sentences in the passages have been found earlier in the lesson in order to reduce the difficulty in reading as well as to recycle word and sentence encounters. In the passages, target words just learnt in the lessons were omitted but given at the top of each passage as options. Target words which have been learnt from previous lessons were highlighted to encourage students to recall them. In this activity, students are assigned to complete the cloze passages with the given target words. As the time limitation, the first passage is expected to be done during class activity whereas the other passage is for working on outside class.

Appendix J

A Sample Handout for the Experimental Group

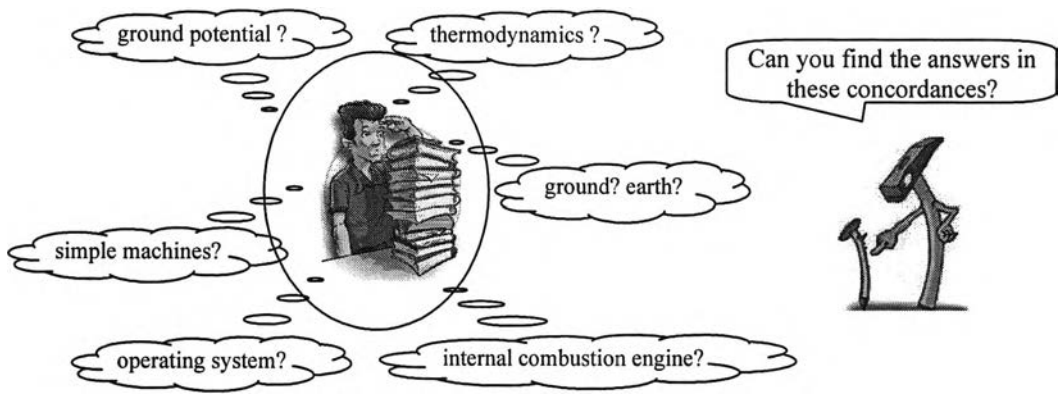
Lesson 4
Machines & Engines

Target Wordlist 4

accept	demonstrate	general	invent	necessary	Refer	term
advance	describe	imagine	like	original	represent	traditional
advantage	during	important	maintain	prepare	revolve	useful
as	essential	instance	mean	primary	significant	usual
correct	exist	interest	mixture	provide	simple	
define	express	introduce	motion	react	Such	

Warm Up

What do these words mean?



The	**term**	"*thermodynamics*" usually **refers to** the physical study of the state of a system.
The	**term**	"*internal combustion engine*" normally **refers to** any engine operating by burning fuel inside.
The	**term**	"*operating system*" **means** a computer software used for the direct control of basic system operation.
The	**term**	"*ground* (**or** *earth*)" usually **means** a common return in circuits.
The	**term**	"*ground potential*" **means** there is no difference in potential between a circuit point and earth.
The	**term**	"*simple machines*" **means** any devices required only a single force to work.

Presentation & Practice

I. Context Clues

In academic texts, technical terms are frequently used. When introducing new words or technical terms, writers often include other words or phrases to facilitate readers' understanding of the new words. The words surrounding an unfamiliar word are called '*contexts*'. They are built into the sentences around the difficult words. These surrounding words provide clues to the meaning of an unfamiliar word.

If the readers are aware of using the contexts surrounding unknown words to reveal the meaning, they will be able to make logical guesses about the meanings of many words. Moreover, learning the meaning of words from the contexts is a very useful strategy to increase our reading comprehension. There are many types of context clues. In this lesson, the definition and example context clues are introduced.

II. Definition Clues

Definition clues are direct clues to give the meaning of particular words. They are often used in subject area reading such as physics, calculus, computer science, and engineering materials etc. when new technical terms are introduced. For example:

- The **term** '*ground (***or** *earth)*' usually **means** a common return in circuits.
- The '*potential difference*' **is defined as** the amount of work per charge needed to move electric charge from the second point to the first.

The terms '*ground*', '*earth*', and '*potential difference*' have particular meaning in engineering and their meanings are different from those in general English. In these examples, the **bold words** are used to directly tell the particular meaning of these terms as in the underlined phrases. This kind of context clues is called '***definition clues***'.

Definition clues which are often used are as follows.

- To give the meaning or information of something

o is, are	o defined as	o referred to as	o expressed as
o means	o refer(s) to	o described as	o i.e.

- To say the (other) name of something

o called	o stand for	o or
o known as	o represent(s)	o i.e.
	o represented by	

These words have close meanings as in the following definitions.

o mean	=	indicate, say what something is
o define	=	give the meaning to something
o refer to	=	have a meaning of
o describe	=	tell about something
o express	=	make something known
o represent	=	stand for, show or give a picture or symbol

Activity 1: Studying context clues of definitions

Access the sub-corpus '*Textbook*' to get the information for doing the following activities.

Activity 1.1: Search the words '*refer**', '*define**', and '*mean**' to find the answers to the following questions.

1. Which form of each searched word, active or passive, is mostly used? .....
2. Which keyword is often followed by '*to*'? .....
3. Which keywords are often followed by '*as*'? .....
4. When is '*as*' used after these searched words? .....
5. What are typical collocations of these searched words?

mean = ...
define = ...
refer = ...

Activity 1.2: Complete the definitions of the given words in the following concordances, using the information from the corpus. Then guess the meaning of the technical terms highlighted in ***italics***.

1	Microfarad	means	millionths of a Farad.
2	Kinetic energy	means	movement .....
3	In RF circuits, Fo	means	.....
4	AutoCAD is	defined	as interactive drawing .....
5	Power is	defined	formerly as ..... per unit time.
6	Energy is	defined	as '.....'.
7	Currents	refer	to .....
8	Primary storages	refer	to .....
9	Engineering drawing	refer	to .....
10	The flow of electrons is	referred	to as ..... .
11	A CPU designs is often	referred	to as ..... .
12	A semiconductor is	referred	to as a ..... that may act as a conductor or insulator.

Activity 1.3: Each set of the given concordances has the same keywords which are missing from the lines. Read the concordances and determine which given keyword is missing from each set.

	means	defined	referred
Set 1	Q is	.....	as the frequency divided by the bandwidth, measured f
	One horsepower was	.....	as the amount of power needed to lift 33,000 pounds
	The volt was	.....	as the potential difference across a conductor when a
	The potential difference is	.....	as the amount of work per change.
Set 2	"Q = 0.5 C"	.....	the quantity of electric charge is 0.
	An intangible thing	.....	a thing you can't grab it and throw it against the wall.
	Work	.....	moving something, lifting something, warming something,
	The term 'ground potential'	.....	there is no difference in potential (voltage) between a circuit
Set 3	Historically, 'memory'	.....	to "magnetic core memory" in the 1950s.
	Engineering drawing are	.....	to as "blue prints'.
	Such circuits are	.....	to as 'conventional' current as opposed to electron flow.
	A family of CPU designs is	.....	to as a CPU architecture

Activity 2: Studying and practising with context clues of examples

Access the sub-corpus '*Textbook*' to get the information for doing the following activities.

Activity 2.1: Search the words '*descri**', '*express**', and '*represent**' to find the answers to the following questions.

1. Which form of each searched word, active or passive, is mostly used? .....
2. Which words often come after '*be described*'? .....
3. Which words often come after '*be expressed*'? .....
4. Which words often come after '*be represented*'? .....
5. Is there any word often come after '*represent*' and '*represents*'? .....
5. What are typical collocations of these searched words?

described = ...
expressed = ...
represented = ...
represent(s) = ...

Activity 2.2: Complete the definitions of the given words in the following concordances, using the information from the corpus. Then guess the meaning of the technical terms highlighted in ***italics***.

1	A ***kilowatt***	represents	..... watts.
2	***Main memory***	represents	.....
3	***Current*** is	represented	by ....., and is measured in amperes.
4	Any ***value*** can also be	represented	by ..... digits.
5	***Circuit*** can be	described	as ..... conductors.
6	***Electric power***, is often	described	as power or ....., involves the generation of electricity.
7	***Vector*** may be	described	by .....
8	***Conductions*** are often	described	by .....
9	***Acceleration values*** are	expressed	in .....
10	Sometimes, ***gravity*** is also	expressed	in .....
11	***Voltage*** is	expressed	as: .....
12	***Potential energy*** can be	expressed	as .....

Activity 2.3: Each set of the given concordances has the same keywords which are missing from the lines. Read the concordances and determine which given keyword is missing from each set.

	described	expressed	represents/represented
Set 1	Voltage is	.....	as the force which causes current to flow
	A computer architecture is	.....	as '64 bit'.
	The motion of objects may be	.....	by distance, speed, displacement etc.
	The dynamic system can be	.....	by partial differential equations (PDE).
Set 2	A mathematical model	.....	a system.
	A BTU	.....	British thermal Unit.
	Zero volts can be	.....	by binary 0.
	Voltage is	.....	by the symbol V.
Set 3	Current is	.....	in Amperes, or amp for short.
	Power value may be	.....	in horsepower.
	The velocity of an object is	.....	as: KE = ½ mv2.
	Mathematically, power is	.....	as P = W/Dt.

III. Example Clues

Another clue is an '***example clue***'. This kind of context clues does not tell the meaning of the word directly but the examples of an unknown word can give clues to its meaning. If the reader knows the given samples, he/she has more chance to guess the meaning of the unknown word correctly. For example:

- *Electronic devices* **such as** transistors, diodes, capacitor and resistors form the basis of the modern computer.
- A *two-state device*, **like** a switch on the wall, can be in only one of two possible states.

If you are familiar with the examples in the underlined words, it is likely that you can somewhat guess the meaning of the things to which these examples belong.

Example clues which are often used are as follows.

- To give examples of something

o as	o (for) example
o such as	o (for) instance
o like	o e.g.

Activity 3: Studying context clues of examples

Access the sub-corpus '*Textbook*' to get the information for doing the following activities.

Activity 3.1: Guess the meaning of the ***bold italic words*** in the given concordances by using the context clues. Discuss in groups to check the answers.

1	A ***browser***	**such as**	*Internet Explorer* or *Netscape Navigator* is a program.
2	Some common ***inductive components***	**such as**	*transformers* are not often used in audio.
3	An ***operating system***	**such as**	*Microsoft Window* or *MacIntosh*).
4	Sometimes ***secondary memory devices***	**like**	the *hard disk* are called I/O devices.
5	Interest in robotics entered many large ***firms***	**like**	*General Electric* and *General Motor*.
6	An	**instance**	of ***operating systems*** is *MS-DOS*.
7	Different useful ***form of energy*** (**for**	**instance**	, *heat*, *light*, or *motion*) is converted into power.

- Access the corpus to find two more example sentences of each keyword or phrase used for giving examples.

1. such as .....
   .....
2. like .....
   .....
3. instance .....
   .....

Activity 3.2: Each set of the given concordances has the same keywords which are missing from the lines. Read the contexts of each line in the set. Determine which given keyword is missing from each set. Complete each set of the concordances with the right word.

	like	*such*	*instance*
Set 1	A browser,		as Internet Explorer or Netscape Navigator is a program
	Some operating systems,		as Linux, extend this logical computation.
	Previous word processors,		as WordStar and Word Perfect, used text-only display
	The first electronic computers,		as the ENIAC were huge devices.
	Engineers process raw materials		as petroleum and natural gas to create new things.
Set 2	The best		of WAN is the Internet.
	A Ludobot is an		of a social robot for entertainment.
	Springs are a special		of a device which can store elastic potential energy.
	On many wheeled vehicles (for		, automobiles) a wheel does not directly contact with su
	The operating machine tools, for		lathe and mill are now integrated with CNC programs.
	AutoCAD can do drafting tasks (for		, draw a dot on screen).
Set 3	Big manufacturers,		Hewlett-Packard, have sold the Athlon 64-bits machines
	The evaporation of a refrigerant,		Freon, is used to provide cooling.
	Japanese motorcycle manufacturers		Honda, Yamaha and Kawasaki increase production.
	Data are transferred to PC applications		Microsoft Office Excel and Word.
	Some data are kept in optical disks		CD-ROM, CD-R, CD-RW, DVD-Rom, DVD-R etc.

Guessing word meaning from word parts: Affixes

In English, the basic part of a word is called a '*base form*' or '*root*'. The root contains the basic meaning of the word. Many words in English are formed by adding other words or word parts to the root words. An **affix** is a letter or a group of letters added to the beginning or the end of a word to form a new word.

The affix is divided into '**prefix**' or '**suffix**'.

- ❖ A **prefix** is a group of letters added to the *beginning* of a root and changes its meaning.
- ❖ A **suffix** is a group of letters added to the *end* of a root and changes its grammatical function.

Since many English words are formed in these ways, learning about word formation is helpful when dealing with new or unknown words during reading. It is possible for the reader to guess the meaning of an unknown word when one knows the meaning of its root and uses the knowledge of prefix and suffixes to assist the guess.

With a wildcard search, a concordancer can quickly display various forms of each word. The practice of observing word parts will help us remember some regular affixes, recognize when they are combined with other words, identify such word function in different contexts, and interpret their meanings.

For example: From searching '**advantage** in the Engineering Corpus, some of its related forms are displayed as in the following concordances. If you know the meaning of the root i.e., '*advantage*', you can use knowledge of word formation to somewhat identify the particular functions and meaning of its related forms as follows. Try to use the definitions of the root '*advantage*' to interpret its related forms.

Definition: advantage = (n.) a good feature, benefit

- o advantages = advantage + -s = its plural form
- o advantageous = advantage + -ous = its adjective form
- o disadvantage = dis + advantage = a noun with opposite meaning

1	The	**advantage**	of hydrogen is that it combustion produces only water.
2	Their main	**advantage**	is the ability to be turned on and off within minutes.
3	Its	**advantages**	are its short length, heavy crankshaft, attractive body.
4	There are two	**advantages**	of this approach: space saving and ease of redefinition.
5	Hydraulic robots are	**advantageous**	in applications such as spray painting.
6	The change in direction may be	**advantageous**	for other reasons.
7	The big	**disadvantage**	of 64-bit architectures is that the data is slightly larger.
8	The primary	**disadvantage**	of analog signaling is that any system has noise in it.

Activity 4: Observing the verbs with noun suffixes

- Search the given verbs with a wildcard (*) as shown in the '*searched words*' column of the tables.
- Complete the table below with the related forms of the searched words.
- Divide the **roots** from the **suffixes**. The first searched word has been done as examples.
- Use the information from the search to answer the following questions and match the words with their definitions.

Activity 4.1

Searched Words	Roots (Verbs)	Noun	Roots + suffixes
*defin**	**define**	definition	defin(e) + -ition
*demonstrat**	**demonstrate**		+
*descri**	**describe**		+
*express**	**express**		+
*introduce**	**introduce**		+
*correct**	**correct**		+
*imagin**	**imagine**		+
*invent**	**invent**		+
*prepar**	**prepare**		+
*react**	**react**		+
*represent**	**represent**		+
*revol**	**revolve**		+

- o What **suffixes** are often found to change word functions from verbs to nouns?

.....

Match the words with their definitions.

..... 1. demonstrate	a. turn around
.....2. introduce	b. create a new thing
.....3. imagine	c. act against something
.....4. correct	c. make something ready
..... 5. invent	d. show something by doing
..... 6. prepare	e. make something right, not wrong
..... 7. react	f. form a picture or idea in one's mind
.....8. revolve	g. make something known for the first time

Activity 4.2

Searched Words	Roots (Verbs)	Noun	Roots + suffixes
*accept**	**accept**	acceptance	accept + -ance
*maint**	**maintain**		
*provid**	**provide**	providence	provid(e) + -ence
*Exist**	**exist**		+
*Refer**	**refer**		+

- What **suffixes** are often found to change word functions from verbs to nouns?

  .....

Match the words with their definitions.

.....1. accept	a. give
.....2. maintain	b. have a meaning of
..... 3. provide	c. happen, be present
..... 4. exist	d. take something, agree to
..... 5. refer	e. keep something continue or in good condition

Activity 5: Observing the adjectives with noun and adverb suffixes

- Search the given verbs with a wildcard (*) as shown in the '*searched words*' column of the tables.
- Complete the table below with the related forms of the searched words.
- Divide the **roots** from the **suffixes**. The first searched word has been done as examples.
- Use the information from the search to answer the following questions and match the words with their definitions.

Activity 5.1: Words concerning '*needed*'

Definitions

- essential = needed, basic, fundamental
- important = needed, meaningful
- necessary = needed
- useful = needed, able to be used
- primary = first, main, basic, needed part of something

Searched Words	Adverb	Roots (Adjective)	Noun	Roots + noun suffixes
*essen**		**essential**	essence	essen(tial) + -ce
*importan**		**important**		+
*necess**		**necessary**		+
*useful**		**useful**	usefulness	+
*primar**		**primary**		+

- What **suffixes** are often found to change word functions from verbs to nouns?

  .....

Activity 5.2: Words concerning '*typical*', '*plain*', '*old practice*' and '*earliest*'

Definitions

- general = typical, including everything, having all
- overall = typical, including everything, having all
- usual = typical, happening often
- simple = plain, easy
- traditional = doing in a group of people for a long time without changing
- original = first, earliest

Searched Words	Adverb	Roots (Adjective)	Noun	Roots + noun suffixes
*general**	generally	**general**	generalization	general + -ization
*overall**	---		---	+
usual	---			+
*simpl**				
*traditional**				
*original**				

Activity 6: Identifying the meanings of homonyms and polysemies

- Study different definitions and grammatical functions of each given word.
- Match its definitions and functions of the given words with the right concordance by writing a letter in front of each concordance line.

Activity 6.1 '*advance*'

Definitions of '*advance*'

a. (n.) before a particular time
b. (n.) new invention, improvement
c. (v.) go forward, move something forward
d. (v.) make something very much better
e. (adj.) highly developed

.....1	This	**advance**	led to the development of the first stored-program.
.....2	Engineers may	**advance**	to become technical specialists or a supervisor.
.....3	Prof. Ted and his research team	**advance**	the use of one laser beam.
.....4	AGM is a major	**advance**	in battery design.
.....5	The power supplies use	**advance**	technology to produce superior performance.
.....6	By answering questions in	**advance**	, you will be able to make use of the features.
.....7	To know in	**advance**	that you will use it.
.....8	Another important	**advance**	in the technology was Micros' Java program.

Activity 6.2: '*means*'

Definitions of '*means*'

a). (n.) a method or way of doing something
b). (v.) give meaning, stand for

.....1	The most useful	**means**	of storing them for CNC is dxf. format.
.....2	The earth connection also	**means**	that the round building is at the same voltage.
.....3	The term 'mF' almost certainly	**means**	uF – especially if the source is the US.
.....4	Electric field lines provide a	**means**	of viewing the electric field.
.....5	In air cooling of engine, various	**means**	are used to give the heat an outlet and carry it off.
.....6	The nature of computer development	**means**	new uses for computers are frequently.
.....7	A piston is connected to the crankshaft by	**means**	of a link known as a 'connecting rod'.
.....8	AC power system is still the primary	**means**	of delivering electrical energy to consumers,

Activity 6.3: '*interest*'

Definitions of '*interest*'

a. (n.) attention
b. (v.) pay attention
c. (n.) good feature, benefit

.....1		**Interest**	in industrial robotics expanded in the late 1970s.
.....2		**Interest**	in car should be fixed in the mind of mechanics.
.....3	Work experience is of	**interest**	to any engineers.
.....4	This improved method gives	**interest**	to the development of new materials.
.....5	A new concept gets great	**interest**	in Japan.
.....6	Manufacturers must take care of the	**interest**	of their customers.

Application

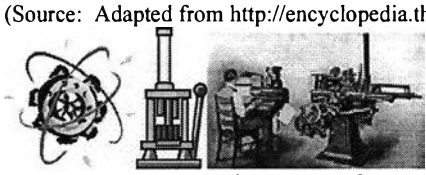
Retrieving words in new contexts

- Read the following passages and then complete the gaps with the words given above each passage.
- Pay attention to the *italic words* which are the words learned in this and previous lessons.
- Assess yourself how well you can remember and use these words.

Passage 1: *as* *generally* *primary* *term*

Machine

(Source: Adapted from http://encyclopedia.thefreedictionary.com/engine)



A **machine** is any *mechanical* or electrical *device* that sends or *converts* energy to work or *assist* in *implementing tasks*. *Mechanical* mechanisms and machines have been (1)..... used to *increase* the *abilities* of *human* beings. The (2)..... difference between *simple* tools and *simple* mechanisms *or* machines is a power source and an operation. The (3)..... 'machine' *typically applies* to an *assembly* of *parts* operating together to do work. *Generally* these *devices increase* intensity of *applied force*, changing *direction* of *force*, or changing one *form* of motion or energy into *another*.

The mechanical advantage of a machine is the ratio between the resistance or load, and the *force required* to overcome it, although this ratio is not *completely* accurate *as force* is *required* to overcome friction, *as* well. To compensate for this, mechanical advantage is *calculated as* the ratio between the *distance* moved by the *force applied*, and the *distance* moved by the resistance.

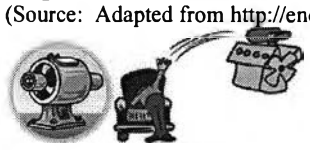
Efficiency of a machine is the degree or percentage to which a machine can complete the work it could *potentially* do, without the restrictions of friction.

Modern power tools, *automated* machine tools, and *human* operated power machinery make this *definition* change. Machines used to send heat or *other* energy into *mechanical* energy are known (4)..... engines.

2. *definition* *describe* *described* *like* *meanings* *referred*

Engine

(Source: Adapted from http://encyclopedia.thefreedictionary.com/engine)



An **engine** is *defined as* a *device* that *produces* some effect from a given input. The origin of engineering was the working of engines. There is an overlap in English between two (5)..... of the word "engineer": 'those who operate engines' and 'those who design and *construct* new *objects'*.

In the first *definition*, an engine was (6)..... *as* any sort of *mechanical device*. *Practically* every *device* from the industrial *revolution* was (7)..... to *as* an engine, and this is where the steam engine got its name. This *form* of the *term* has recently come into use again in computer *science*, where *terms* (8)..... "search engine", "3-D graphics rendering engine" and "text-to-speech engine" are common.

In more recent (9)....., the *term* is *typically* used to (10)..... *devices* that *produce mechanical* work, follow-ons to the steam engine. In most cases the work is supplied *as* torque, which is used to operate *other* machinery, *generate* electricity, pump water or compress gas.

Appendix K

A Sample Handout for the Comparison Group

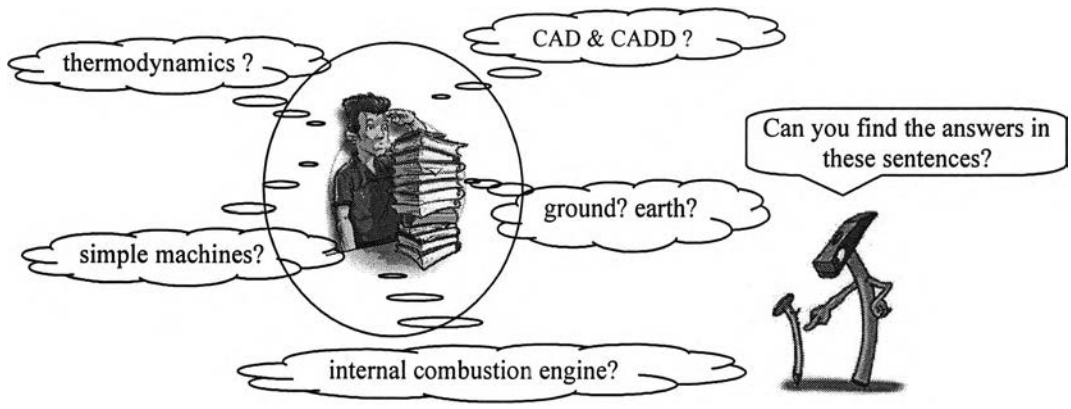
Lesson 4
Machines & Engines

Target Wordlist 4

accept	demonstrate	general	invent	necessary	refer	term
advance	describe	imagine	like	original	represent	traditional
advantage	during	important	maintain	prepare	revolve	useful
as	essential	instance	mean	primary	significant	usual
correct	exist	interest	mixture	provide	simple	
define	express	introduce	motion	react	such	

Warm Up

What do these words mean?



From the following sentences, discuss the meanings of the **bold** and *italic* words.

- The ***term*** "*thermodynamics*" usually **refers to** the physical study of the state of a system.
- The ***term*** "*internal combustion engine*" **refers to** any engine operating by burning fuel inside.
- All these ***terms*** , "*CAD and CADD*", **refer to** the designing and technical drawing.
- The ***term*** "*ground* (**or** *earth*)" usually **means** a common return in circuits.
- The ***term*** "*simple machines*" **means** any devices or mechanical components required only a single force to work.

Presentation & Practice

I. Context Clues

In academic texts, technical terms are frequently used. When introducing new words or technical terms, writers often include other words or phrases to facilitate readers' understanding of the new words. The words surrounding an unfamiliar word are called '*contexts*'. They are built into the sentences around the difficult words. These surrounding words provide clues to the meaning of an unfamiliar word.

If the readers are aware of using the contexts surrounding unknown words to reveal the meaning, they will be able to make logical guesses about the meanings of many words. Moreover, learning the meaning of words from the contexts is a very useful strategy to increase our reading comprehension. There are many types of context clues. In this lesson, the definition and example context clues are introduced.

II. Definition Clues

Definition clues are direct clues to give the meaning of particular words. They are often used in subject area reading such as physics, calculus, computer science, and engineering materials etc. when new technical terms are introduced. For example:

- The **term** '*ground (***or** *earth)*' usually **means** a common return in circuits.
- The '*potential difference'* **is defined as** the amount of work per charge needed to move electric charge from the second point to the first.

The terms '*ground*', '*earth*', and '*potential difference'* have particular meaning in engineering and their meanings are different from those in general English. In these examples, the **bold words** are used to directly tell the particular meaning of these terms as in the underlined phrases. This kind of context clues is called '***definition clues***'.

Definition clues which are often used are as follows.

- To give the meaning or information of something

o verb to be	o define as	o described as	o i.e.
o mean	o refer to (as)	o expressed as	

- To say the (other) name of something

o called	o stand for	o or
o known as	o represent	o i.e.

These words have close meanings as in the following definitions.

o mean	=	indicate, say what something is
o define	=	give the meaning to something
o refer to	=	have a meaning of
o describe	=	tell about something
o express	=	make something known
o represent	=	stand for, show or give a picture or symbol

Activity 1: Studying context clues of definitions

Activity 1.1: Read the following passage and answer the questions.

1. How many words are defined in the following passage?
2. What are they?

Machines

The *term* 'machine' *means* an assembly of parts operating together to perform work. A machine *is* generally *referred to* any mechanical or electrical device that transmits or modifies energy to perform or assist in the performance of tasks.

A simple machine is *defined as* a mechanical component *such as* bearing, gear, lever, screw whereas a machine tool is *defined as* a powered mechanical device *such as* lathe, mill, drill etc. The term 'machine tool' is usually *referred* to tools that used a power source.

A computer-controlled machine *is known as* a computer-numerical-controlled (CNC) machine. A CNC machine *refers* specifically *to* the machine tools which are controlled by computers in manufacturing work. It *is* sometimes *called* machine intelligence or artificial intelligence. In one sense, CNC machines may be said to *represent* special industrial robot systems.

Answer the following questions.

1. What is a machine?
2. What is a simple machine?
3. What are examples of a simple machine?
4. What is a machine tool?
5. What are examples of a machine tool?
6. What is a CNC machine?
7. What is another name of a CNC machine?
8. What does a CNC machine stand for?

Activity 1.2: Study the following sentences.

- A machine **means** an assembly of parts operating together to perform work.
- A machine **is defined as** an assembly of parts operating together to perform work.
- A machine **is referred to** as an assembly of parts operating together to perform work.

Match the words in column A with their definitions in column B. Then make up sentences as in the above sentences.

A	B
..... Power	a. movement energy
..... Energy	b. an electric current.
..... Kinetic energy	c. an ability to do work.
..... A semiconductor	d. units of energy per unit time
..... The flow of electron	e. a material that may act as a conductor or as an insulator.

Activity 1.3: Complete the following sentences with the given words.

means *defined* *referred*

1. 'Binary', coming from the Latin, ... twice or two.
2. In this context, data is ..... as a collection of numbers or characters.
3. A device from the industrial revolution was ..... to as an engine.
4. Technology ..... the study and science of techniques.
5. Random Access Memory (RAM) ..... that the memory cells can be accessed in any order.
6. Artificial intelligence is .....as intelligence shown by anything manufactured by humans.
7. One AMP is .....as 625,000,000,000,000,000,000 electrons moving across a circuit every second!

Activity 2: Studying context clues of description

Activity 2.1: Study the following sentences.

- A CNC machine **represents** a special industrial robot system.
- A special industrial robot system can **be represented by** a CNC machine.

Complete the following sentences with the given words.

represent *represented*

1. A kilowatt ..... s 1,000 watts.
2. Voltage is ..... by the symbol V.
3. A mathematical model ..... a system.
4. Computer instructions are ..... by binary digits.

Activity 2.2: Study the following set of sentences.

- Power value may **be expressed in** horsepower.
- The velocity of an object **is expressed as** KE = ½ mv2.

- A dynamic system **is described by** partial differential equations. (PDE).
- Molecules **are** best **described as** objects.

Complete the following sentences with the given words.

expressed *described*

1. Sometimes, gravity is also ..... in N/kg.
2. Mathematically, power is ..... as P=W/Dt.
3. A computer architecture is ..... as '64-bit'.
4. Potential energy is mathematically .....as PE = mgh.
5. de Fermat is sometimes ..... as the 'father' of differential calculus.
6. Thickness of the edge is ..... in millimeters.
7. Acceleration values are ..... in units of velocity per time.
8. The motion of objects can be .....by distance, speed, displacement etc.

III. Example Clues

Another clue is an '***example clue***'. This kind of context clues does not tell the meaning of the word directly but the examples of an unknown word can give clues to its meaning. If the reader knows the given samples, he/she has more chance to guess the meaning of the unknown word correctly. For example:

- *Electronic devices* **such as** transistors, diodes, capacitor and resistors form the basis of the modern computer.
- A *two-state device*, **like** a switch on the wall, can be in only one of two possible states.

If you are familiar with the examples in the underlined words, it is likely that you can somewhat guess the meaning of the things to which these examples belong.

Example clues which are often used are as follows.

- To give examples of something

o as	o (for) example
o such as	o (for) instance
o like	o e.g.

Activity 3: Studying and practising with context clues of examples

Activity 3.1: From the following sentences, identify the examples of the objects.

1. Examples of operating systems are MS-DOS, Linum, Mac,OS.
2. A browser such as Internet Explorer or Netscape Navigator is a program.
3. Sometimes secondary memory devices like the hard disk are called I/O devices.
4. The word 'gratisware' as a synonym for 'freeware' makes the distinction clearer.
5. This is important for an operating system (e.g. Microsoft Window or MacIntosh).
6. Interest in robotics entered many large firms like General Electric and General Motor.
7. Some common inductive components such as transformers are not often used in audio.
8. Different forms of energy (for instance, heat, light or motion) can be converted into power.

Write the examples of the given objects.

Objects	Examples
1. Operating system	.....
2. A browser	.....
3. Secondary memory devices	.....
4. Gratisware	.....
5. An operating system	.....
6. Large firms	.....
7. Inductive components	.....
8. Forms of energy	.....

Activity 3.2: Complete the following sentences with the given words.

like *such* *instance*

1. The best ..... of WAN is the Internet.
2. AutoCAD can do drafting tasks (for ....., draw a dot on screen).
3. Big manufacturers, ... Hewlett-Packard, produce the Athlon 64-bits machines.
4. A browser, ... as Internet Explorer or Netscape Navigator is a program.
5. Springs are a special ..... of a device which can store elastic potential energy.
6. Data can be transferred to PC applications ..... Microsoft Office Excel and Word.
7. Engineers process raw materials .....as petroleum and gas to create new things.
8. On many wheeled vehicles (for ....., automobiles) a wheel does not directly contact with surface.
9. The operating machine tools, for ..... lathe and mill are now integrated with CNC programs.
10. Japanese motorcycle manufacturers ..... Honda and Yamaha increase production.

Activity 4: Identifying context clues

- Read the following sentences about '*Engines*' and identify context clues helpful for getting information.

Engine
1. An engine is defined as a device that produces some effect from a given input.
2. The word 'engineer' means those who operate engines and design new objects.
3. An engine was described as any sort of mechanical device.
4. Every device from the industrial revolution was referred to as an engine.
5. The term 'engine' has recently been used in computer science where the terms like 'search engine' and '3-D graphic rendering engine' are common.
6. In most recent definition, the term is typically used to describe devices that produce mechanical work.

Answer the questions.

1. How many definitions of 'engine' are given in the text?
2. Which sentences do not define 'engine'?
3. Which definition is the oldest?
4. Which definition is the newest?
5. Which sentences give examples?

Guessing word meaning from word parts: Affixes

In English, the basic part of a word is called a '*base form*' or '*root*'. The root contains the basic meaning of the word. Many words in English are formed by adding other words or word parts to the root words. An **affix** is a letter or a group of letters added to the beginning or the end of a word to form a new word.

The affix is divided into **'prefix'** or **'suffix'**.

- A **prefix** is a group of letters added to the *beginning* of a root and changes its meaning.
- A **suffix** is a group of letters added to the *end* of a root and changes its grammatical function.

Since many English words are formed in these ways, learning about word formation is helpful when dealing with new or unknown words during reading. It is possible for the reader to guess the meaning of an unknown word when one knows the meaning of its root and uses the knowledge of prefix and suffixes to assist the guess. The practice of observing word parts will help us remember some regular affixes, recognize when they are combined with other words, identify such word function in different contexts, and interpret their meanings.

For example:

If you know the meaning of the root i.e., '*advantage*', you can use knowledge of word formation to somewhat identify the particular functions and meaning of its related forms as follows. Try to use the definitions of the root '*advantage*' to interpret its related forms.

Definition: advantage = (n.) a good feature, benefit

- advantages = advantage + -s = its plural form
- advantageous = advantage + -ous = its adjective form
- disadvantage = dis + advantage = a noun with opposite meaning

Activity 5: Studying the verbs with noun suffixes

- From some examples in the table below, guess the related nouns of the given verbs.
- Complete the tables with the related nouns of the given verbs.
- Check your guesses by consulting the dictionary.
- Divide the **roots** from the **suffixes** as in the examples.

Activity 5.1:

Roots (Verbs)	Noun	Roots + suffixes
define	definition	defin(e) + -ition
demonstrate	demonstration	demonstrat(e) + - ion
describe	description	descri(be) + -ption
express	expression	express + - ion
introduce		+
correct		+
imagine		+
invent		+
prepare		+
react		+
represent		+
revolve		+

- What **suffixes** are often found when verbs changes to nouns?

  .....

❖ Use a dictionary, if needed, to match the given verbs with their definitions.

..... 1. demonstrate	a. turn around
.....2. introduce	b. create a new thing
.....3. imagine	c. act against something
.....4. correct	c. make something ready
..... 5. invent	d. show something by doing
..... 6. prepare	e. make something right, not wrong
..... 7. react	f. form a picture or idea in one's mind
.....8. revolve	g. make something known for the first time

Activity 5.2:

Roots (Verbs)	Noun	Roots + suffixes
accept	acceptance	accept + -ance
maintain		
provide	providence	provid(e) + -ence
exist		+
refer		+

- What **suffixes** are often found when this group of verbs changes to nouns?

  .....

❖ Use a dictionary, if needed, to match the given verbs with their definitions.

.....1. accept	a. give
.....2. maintain	b. have a meaning of
..... 3. provide	c. happen, be present
..... 4. exist	d. take something, agree to
..... 5. refer	e. keep something continue or in good condition

Activity 6: Studying the adjectives with noun and adverb suffixes

- From some examples in the table below, guess the related nouns and adverbs of the given adjectives.
- Complete the tables with the related nouns and adverbs of the given adjectives.
- Divide the **roots** from the **noun suffixes** as in the examples.

Activity 6.1: Words concerning '*needed*'

Definitions

- essential = needed, basic, fundamental
- important = needed, meaningful
- significant = needed, meaningful
- necessary = needed
- useful = needed, able to be used
- primary = first, main, basic, needed part of something

Adverb	Roots (Adjective)	Noun	Roots + noun suffixes
	essential	essence	essen(tial) + -ce
	important		+
	significant		+
	necessary		+
	useful	usefulness	+
	primary	primary	---

- What **suffixes** are often found to change word functions from verbs to nouns?

.....

Activity 6.2: Words concerning '*typical*', '*plain*', '*old practice*' and '*earliest*'

Definitions

- usual = typical, happening often
- general = typical, including everything, having all
- overall = typical, including everything, having all
- simple = plain, easy
- traditional = doing in a group of people for a long time without changing
- original = first, earliest

Roots (Adjective)	Adverb	Roots + adverb suffixes
usual		+
general	generally	general + ly
overall	-----	-----
simple		+
traditional		+
original		+

Application

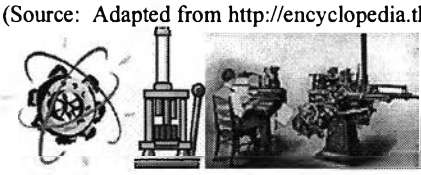
Retrieving words in new contexts

- Read the following passages and then complete the gaps with the words given above each passage.
- Pay attention to the *italic words* which are the words learned in this and previous lessons.
- Assess yourself how well you can remember and use these words.

Passage 1: *as* *generally* *primary* *term*

Machine

(Source: Adapted from http://encyclopedia.thefreedictionary.com/engine)



A **machine** is any *mechanical* or electrical *device* that sends or *converts* energy to work or *assist* in *implementing tasks*. *Mechanical* mechanisms and machines have been (1)..... used to *increase* the *abilities* of *human* beings. The (2)..... difference between *simple* tools and *simple* mechanisms *or* machines is a power source and an operation. The (3)..... 'machine' *typically applies* to an *assembly* of *parts* operating together to do work. *Generally* these *devices increase* intensity of *applied force*, changing *direction* of *force*, or changing one *form* of motion or energy into *another*.

The mechanical advantage of a machine is the ratio between the resistance or load, and the *force required* to overcome it, although this ratio is not *completely* accurate *as force* is *required* to overcome friction, *as* well. To compensate for this, mechanical advantage is *calculated as* the ratio between the *distance* moved by the *force applied*, and the *distance* moved by the resistance.

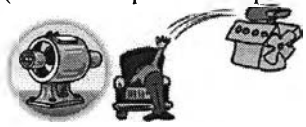
Efficiency of a machine is the degree or percentage to which a machine can complete the work it could *potentially* do, without the restrictions of friction.

Modern power tools, *automated* machine tools, and *human* operated power machinery make this *definition* change. Machines used to send heat or *other* energy into *mechanical* energy are known (4)..... engines.

2. *definition* *describe* *described* *like* *meanings* *referred*

Engine

(Source: Adapted from http://encyclopedia.thefreedictionary.com/engine)



An **engine** is *defined as* a *device* that *produces* some effect from a given input. The origin of engineering was the working of engines. There is an overlap in English between two (5)..... of the word "engineer": 'those who operate engines' and 'those who design and *construct* new *objects'*.

In the first *definition*, an engine was (6)..... *as* any sort of *mechanical device*. *Practically* every *device* from the industrial *revolution* was (7)..... to *as* an engine, and this is where the steam engine got its name. This *form* of the *term* has recently come into use again in computer *science*, where *terms* (8)..... "search engine", "3-D graphics rendering engine" and "text-to-speech engine" are common.

In more recent (9)....., the *term* is *typically* used to (10)..... *devices* that *produce mechanical* work, follow-ons to the steam engine. In most cases the work is supplied *as* torque, which is used to operate *other* machinery, *generate* electricity, pump water or compress gas.

Appendix L

Checklist and Results for Validating the Classroom materials

This checklist is used for assessing classroom materials. Each set of the materials includes a lesson plan, a handout and a task sheet. The checklist consisted of three main parts.

1. A checklist for assessing each activity in each lesson.
2. A checklist for assessing the whole lesson in overall.
3. An open-ended part for giving other comments or suggestions.

PART I: A CHECKLIST FOR ASSESSING EACH ACTIVITY IN EACH LESSON

1. In the following table, please give comments whether each activity is justified or not according to the following issues.
   - objectives = serving the objectives of the lesson
   - contents = appropriate contents
   - instruction = clear instruction
   - design = appropriate design of activity
   - time = appropriate of estimated time in the lesson plan
2. Please use the following symbols for giving comments in the checklists.
   - ✓ = Yes
   - X = No
   - ? = Unsure
3. If needed, please give comments in the available column, write directly in the materials / lesson plans, or use a separate piece of paper.

Lesson	Activity	Lesson Parallels	For the Comparison Group					For the Experimental Group				
			Objectives	Contents	Instruction	Design	Time	Objectives	Contents	Instruction	Design	Time
Introduction	Warm Up											
	Activity 1	---										
	Activity 2	---										
	Activity 3	---										

	Activity 4	---										
	Activity 5	---										
	Activity 6	---	---	---	---	---	---					
	Activity 7	---	---	---	---	---	---					
	Activity 8	---	---	---	---	---	---					
	Activity 9	---	---	---	---	---	---					
	Application	---										
	Task 1	---										
	Task 2	---										
	Task 3	---	---	---	---	---	---					
Comments and Suggestions for Introduction Lesson												

Lesson	**Activity**	**Lesson Parallels**	**For the Comparison Group**					**For the Experimental Group**				
			Objectives	**Contents**	**Instruction**	**Design**	**Time**	**Objectives**	**Contents**	**Instruction**	**Design**	**Time**
Lesson 1	Warm Up											
	Activity 1											
	Activity 2											
	Activity 3											
	Activity 4											
	Activity 5											
	Activity 6							---	---	---	---	---
	Application											
	Task 1											
	Task 2											
	Task 3											
Comments and Suggestions for Lesson 1												

Lesson	Activity	Lesson Parallels	For the Comparison Group					For the Experimental Group				
			Objectives	Contents	Instruction	Design	Time	Objectives	Contents	Instruction	Design	Time
Lesson 2	Warm Up											
	Activity 1											
	Activity 2											
	Activity 3											
	Activity 4											
	Activity 5											
	Activity 6											
	Application											
	Task 1											
	Task 2											
	Task 3											
	Task 4											
	Task 5											
	Task 6											
Comments and Suggestions for Lesson 2												

Lesson	Activity	Lesson Parallels	For the Comparison Group					For the Experimental Group				
			Objectives	Contents	Instruction	Design	Time	Objectives	Contents	Instruction	Design	Time
Lesson 3	Warm Up											
	Activity 1											
	Activity 2											
	Activity 3											
	Activity 4											
	Activity 5											
	Activity 6											

	Activity 7											
	Activity 8							---	---	---	---	---
	Application											
	Task 1											
	Task 2											
	Task 3											
	Task 4											
	Task 5											
Comments and Suggestions for Lesson 3												

Lesson	**Activity**	**Lesson Parallels**	**For the Comparison Group**					**For the Experimental Group**				
			Objectives	**Contents**	**Instruction**	**Design**	**Time**	**Objectives**	**Contents**	**Instruction**	**Design**	**Time**
Lesson 4	Warm Up											
	Activity 1											
	Activity 2											
	Activity 3											
	Activity 4											
	Activity 5											
	Activity 6											
	Application											
	Task 1											
	Task 2											
	Task 3											
	Task 4											
	Task 5											
	Task 6											
Comments and Suggestions for Lesson 4												

Lesson	Activity	Lesson Parallels	For the Comparison Group					For the Experimental Group				
			Objectives	Contents	Instruction	Design	Time	Objectives	Contents	Instruction	Design	Time
Lesson 5	Warm Up											
	Activity 1											
	Activity 2											
	Activity 3											
	Activity 4											
	Activity 5											
	Activity 6											
	Activity 7											
	Activity 8											
	Application											
	Task 1											
	Task 2											
	Task 3											
	Task 4											
	Task 5											
	Task 6											
	Task 7											
Comments and Suggestions for Lesson 5												

PART II: A CHECKLIST FOR ASSESSING THE WHOLE LESSON IN OVERALL

1. In the following tables, please give comments whether the given issues are justified or not.
2. Please use the following symbols for giving comments in the checklists.
   - ✓ = Yes
   - X = No
   - ? = Unsure
3. If needed, please give comments in the available column, or write in a separate piece of paper.

Table 1: Please give comments whether the given issues are justified or not <u>for teaching engineering students at an undergraduate level</u>.

Issues	Yes / No / Unsure	Comments and Suggestions
1. Contents		
1.1. Topics		
1.2. Difficulty level		
1.3. Order of contents		
2. Activities		
2.1. Design format		
2.2. Clear instruction		
2.3. Length of time		
3. Parallel of activities between both groups		
4. Others (if any)		

Table 2: Please give comments whether the given issues are justified or not <u>for serving the objectives of the study</u>.

Issues	Yes / No / Unsure	Comments and Suggestions
1. Contents		
2. Activity Design		

PART III: AN OPEN-ENDED PART TO GIVE OTHER COMMENTS OR SUGGESTIONS

.....
.....
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.....

Thank you very much for your time and assistance.

Results from the checklists for validating classroom materials

To validate the classroom materials, three experts were consulted and they gave their opinions in the checklists on the issues of contents selection, activity design and consistency to the objectives of the study.

To calculate the data from the checklists, the items marked with agreement on justification is rated 1, those with disagreement is -1, and those with unsure is 0. Then, these results are calculated for means and the overall results were shown in the following table. The issues are considered justified if the mean values are over 0.5.

	N	Minimum	Maximum	Mean	Std. Deviation
Contents selection – topics	3	1	1	1.00	.000
Contents selection – difficulty level	3	0	1	.67	.577
Contents selection – order of contents	3	1	1	1.00	.000
Activity design – design format	3	1	1	1.00	.000
Activity design – clear instruction	3	1	1	1.00	.000
Activity design – length of time	3	0	0	.00	.000
Activity design – parallel in both groups	3	1	1	1.00	.000
Consistency to the objectives – contents	3	1	1	1.00	.000
Consistency to the objectives – activity design	3	1	1	1.00	.000

Appendix M

Four Review Tasks

Review Task 1

Description:

1. The task consists of two parts: the definition part and the cloze-passage part.
2. Thirty items of words are totally reviewed i.e. 15 items in each part.
3. The time for doing the task is 1 hour.

Part I: Match the words with the right definitions in the same set as in the following example.

For example:

Definitions	Words	
.....f..... part of a house	a. business	d. pencil
.....c..... animal with four legs	b. clock	e. shoe
.....d..... something used for writing	c. horse	f. wall

	Definitions	Words	
.....1	a thing	a. fact	d. task
.....2	Information	b. edge	e. condition
.....3	a piece of work	c. object	f. organization
.....4	a basic idea or rule	a. property	d. experience
.....5	quality in material	b. attention	e. principle
.....6	knowledge or skill getting through doing	c. human	f. equipment
.....7	hold within	a. research	d. convert
.....8	Make bigger or larger	b. increase	e. allow
.....9	let something happening	c. attract	f. contain
.....10	keep doing	a. continue	d. prepare
.....11	join things together	b. consume	e. indicate
.....12	show or make clear	c. integrate	f. receive
.....13	related to body or material	a. effective	d. physical
.....14	Made by man, not by nature	b. artificial	e. gradual
.....15	able to do things successfully	c. direct	f. traditional

Part II: Fill the given words into the gaps of the passages. For each passage, there are more given words than needed.

I. Engineers: Nature of Work

(Source: Adapted from the document of US Department Labor, available at http://stats.bls.gov/oco/ocos027.htm)

applications attach develop expand force plants solutions theories

Most engineers work in offices, laboratories, or industrial (1)..... . Others may spend time outdoors at construction sites, mines, and oil or gas production sites. Some engineers travel regularly to plants or worksites.

Engineers apply the (2)..... and principles of science and mathematics to research and develop (3)..... to technical problems. Their work is the link between social needs and commercial (4)..... . Engineers design products, machinery, factories, and the systems. They take out, process, and use raw materials. They also (5)..... new materials that both improve the performance of products and take advantage of advances in technology.

II. Energy Types

(Source: Adapted from the passage on http://www.energyquest.ca.gov/story/chapter01.html)

another applied becomes created follows form light various

Energy causes things to happen around us. During the day, the sun gives out light and heat energy. At night, street lamps use electrical energy to (6)..... our way.

Energy makes everything happen and can be divided into two types:

* Stored energy is called potential energy.
* Moving energy is called kinetic energy.

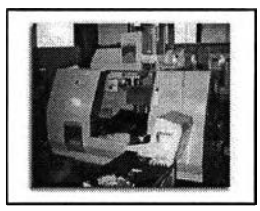
Energy can be transformed into another sort of energy. But it cannot be (7)..... AND it cannot be destroyed. Energy has always existed in one form or (8)..... . For example, stored energy in a flashlight's batteries (9)..... light energy when the flashlight is turned on. A television changes electrical energy into light and sound energy.

There are also many different forms of energy. Heat is one (10)..... of energy. Heat is used for warming our homes, cooking our food, heating hot water.

III. CNC Machines

(Source: Adapted from 'CNC Concepts, Inc. by Mike Lynch, at http://www.cncci.com/)

alternating briefly edit involve manufacturing identified required typically



CNC stands for **C**omputer **N**umerical **C**ontrol and has been around since the early 1970's. CNC has been used in almost every form of manufacturing process in one way or another. If you work in manufacturing, it's likely that you will (11)..... with CNC on a regular basis.

CNC machines (12)..... replace (or work together with) some existing manufacturing processes. Take one of the simplest (13)..... processes, drilling holes, for example.

Before CNC, a drill press can be used to make holes. As you can easily see, there is a lot of manual operation required to use a drill press to drill holes. A person is (14)..... to do something almost every step along the way! The machines without CNC like this are often (15)..... as the *conventional* machine.

By comparison, the CNC drilling machine can be programmed to perform this operation in a much more automatic fashion. Everything that the drill press operator was doing manually can now be done by the CNC machine.

Review Task 2

Description:

1. The task consists of two parts: the definition part and the cloze-passage part.
2. Thirty items of words are totally reviewed i.e. 15 items in each part.
3. The time for doing the task is 1 hour.

Part I: Match the words with the right definitions in the same set as in the following example.

For example:

Definitions	Words	
.....f..... part of a house	a. business	d. pencil
.....c..... animal with four legs	b. clock	e. shoe
.....d..... something used for writing	c. horse	f. wall

	Definitions	Words	
.....1	a word or vocabulary	a. demand	d. series
.....2	a group of similar things placed in order	b. term	e. behavior
.....3	a mathematical statement that two amounts are equal	c. equation	f. desire
.....4	an aim	a. purpose	d. impact
.....5	a thing	b. progress	e. item
.....6	a happening action	c. delay	f. activity
.....7	say formally	a. reduce	d. state
.....8	make smaller	b. replace	e. locate
.....9	find out where something is	c. satisfy	f. sense
.....10	give something that is wanted	a. list	d. rise
.....11	think that something will happen	b. supply	e. influence
....12	look for similarity or difference between things	c. expect	f. compare
.....13	Real	a. brief	d. suitable
.....14	sure to happen	b. regular	e. certain
....15	able to change or bend	c. actual	f. flexible

Part II: Fill the given words into the gaps of the passage. For each passage, there are more given words than needed.

I. Electric Current

(Source: Adapted from a passage available at http://encyclopedia.thefreedictionary.com)

advantage as conduction corrected defined internal means original

Electric current is any flow of charge, usually through some electrical conductors. In the past, current was (1)..... in the history of electrical science (2)..... a flow of positive charge. However, in the case of metallic (3)....., current is caused by a flow of negatively charged electrons in the opposite direction. Despite this misunderstanding, the (4)..... definition of current still stands.

The symbol *'I'* is typically used for the amount of current or charge flowing per unit of time. Historically, the symbol for current, *I*, came from the German word *Intensität*, which (5)..... *'intensity'*. The SI unit of electrical current is called the *ampere*.

II. Mechanical Bearing

(Source: Adapted from a passage available at http://encyclopedia.thefreedictionary.com)

classified general influences kinds motion compatible proved revolution

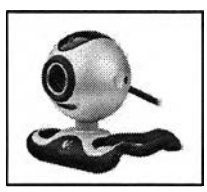
A **bearing** is a component used to reduce friction in a machine. Bearings may be (6)..... broadly according to the motions they allow and according to their principle of operation.

(7)..... motions include linear and rotary. A linear bearing allows motion along a straight line, for example, a drawer being pulled out and pushed in. A rotary bearing allows (8)..... about a center, such as a wheel on a shaft or a shaft through a housing. Common (9)..... of rotary motion include both one-direction rotation and oscillation where the motion only goes through part of a (10)..... .

III. Webcams

(Source: Adapted from an article written by Marshall Brian available at http://computer.howstuffworks.com/webcam.htm)

attached consists depends instance parallel replaces sequence simple



Webcams let you monitor your home, share live video with friends and show the world what's going on in your fridge. Webcams, like most things, range from (11)..... to complex. Let's start with simple.

A simple Webcam (12)..... of a *digital camera.* This camera is (13)..... to your computer. Cameras like these have dropped well below $100 and they are easy to connect through a USB port (earlier cameras connected through a card or the (14)..... port).

A piece of software connects to the camera and grabs a frame from it periodically. For (15)....., the software might grab a still image from the camera once every 30 seconds. The software then turns that image into a normal JPG file and uploads it to your Web server. The JPG image can be placed on any Web page.

Review Task 3

Description:
1. The task consists of two parts: the definition part and the cloze-passage part.
2. Thirty items of words are totally reviewed i.e. 15 items in each part.
3. The time for doing the task is 1 hour.

Part I: Match the words with the right definitions in the same set as in the following example.

For example:

Definitions	Words	
.....f..... part of a house	a. business	d. pencil
.....c..... animal with four legs	b. clock	e. shoe
.....d..... something used for writing	c. horse	f. wall

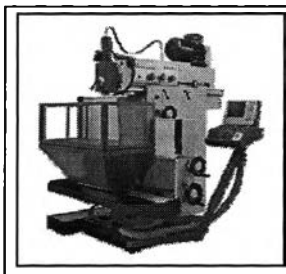
	Definitions	Words	
.....1	a picture	a. lack	d. track
.....2	a method of doing something	b. detail	e. procedure
.....3	a part of information about something	c. schedule	f. image
.....4	let something out	a. label	d. reverse
.....5	turn around quickly	b. release	e. achieve
.....6	finish doing something successfully	c. spin	f. adjust
.....7	make change	a. prefer	d. suggest
.....8	stay away from	b. modify	e. avoid
.....9	give an idea for someone to think about	c. deliver	f. repeat
.....10	Usual	a. secure	d. normal
.....11	safe from danger	b. relevant	e. passive
.....12	very much, to a great extent	c. previous	f. quite
.....13	Suitable	a. appropriate	d. local
.....14	in a nearby area	b. active	e. perfect
.....15	in a usual and acceptable way of doing	c. public	f. conventional

Part II: Fill the given words into the gaps of the passage. For each passage, there are more given words than needed.

I. CNC Milling: EMCOMILL FB-6

(Source: Adapted from a passage available at http://www.emco.at/fb6.php?changelang=en)

active choose deliver ensure maximum neutral option quality



The FB-6 model is the continuation of the FB-4's global success story. The most important of the new features are hydraulic tool clamping and an external coolant system.

You can (1)..... your system preference of controllers for our milling machines – the (2)..... ranges from 3-axis digital display to 3-axis continuous path control. The right controller for the job. And all of the best (3)..... .

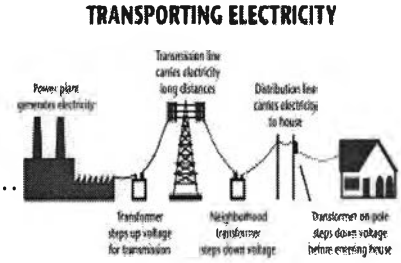
This CNC milling is full of state-of-the-art technology. The EMCOMILL FB-6 combines unique repeat accuracy with (4)..... flexibility. Digital drives (5)..... extraordinary high end dynamic machining. Quality speaks for itself, you can be sure of that.

II. Transporting Electricity

(Source: Adapted from a passage on http://www.eia.doe.gov/kids/energyfacts/sources/electricity.html)

adjusts appear distribute minimizes suggest tracking transfers transforming

Electricity is important in our daily lives. It is generated at a power plant before being sent to homes and businesses, which are very far away from the plant. To transport electricity over long distance, George Westinghouse developed a device called a transformer. This device made possible to (6)..... electricity to various places.



Firstly electricity is generated at the power plant. Then it moves along cables to a transformer, which (7)..... it from low to high voltage. After that it can be sent long distance through transmission lines to a substation. The substation (8)..... it into proper quantity by (9)..... the high voltage into the lower one. Finally, the substation (10)..... suitable amount of electricity to homes, offices, and factories.

III. Safety in Battery Diagnosis and Testing

(Source: Adapted from 'Automotive Technical Articles', Toyota Motor Sales, USA, Inc, p.8 , available at http://www.autoshop101.com.)

explode externally immediately mechanically obtain occur remove wear

When testing or servicing a battery, safety should be your first consideration. The electrolyte contains sulfuric acid. It can possibly damage your skin, eyes, or a car's finish. If electrolyte is splashed on your skin or in your eyes, wash it away (11)..... with large amounts of water. If electrolyte is pilled on the car, wash it away with a solution of baking soda and water.

When a battery is being charged, either by the charging system or by a separate charger, gassing will (12)..... . Hydrogen gas is explosive. Any flame or spark can ignite it. If the flame goes into the cells, the battery may (13)..... .

For safety precautions during working with the battery, make sure to (14)..... gloves and safety glasses as well as to (15)..... rings, watches and other jewelry.

Review Task 4

Description:
1. The task consists of two parts: the definition part and the cloze-passage part.
2. Thirty items of words are totally reviewed i.e. 15 items in each part.
3. The time for doing the task is 1 hour.

Part I: Match the words with the right definitions in the same set as in the following example.

For example:

Definitions	Words	
.....f..... part of a house	a. business	d. pencil
.....c..... animal with four legs	b. clock	e. shoe
.....d..... something used for writing	c. horse	f. wall

	Definitions	Words	
....1	a mistake	a. event	d. error
....2	a formal paper	b. document	e. assessment
....3	a particular way of acting	c. behavior	f. consequence
.....4	see, notice	a. access	d. fail
.....5	reach, enter	b. observe	e. employ
.....6	keep something safe from danger	c. target	f. protect
.....7	put something in	a. research	d. insert
.....8	study something systematically	b. steer	e. assume
.....9	believe as true without questions	c. receive	f. investigate
.....10	not easy	a. remaining	d. visual
.....11	as stated by	b. considerable	e. according
.....12	being exist / the same	c. approximate	f. difficult
.....13	alike, being the same	a. similar	d. entire
.....14	having all in one piece	b. extensive	e. predictive
....15	in the past, but not very long ago	c. recent	f. excellent

Part II: Fill the given words into the gaps of the passage. For each passage, there are more given words than needed.

I. Energy Star Label

(Source: Adapted from a passage available at http://hes.lbl.gov/hes/makingithappen/products.html)

benefits criteria hence instead observing purchasing severe specific

Look For the ENERGY STAR® Label

Saving the Earth. Saving Your Money.

The U.S. Environmental Protection Agency (EPA) and the U.S.Department of Energy (DOE) are working together to promote the use of energy-efficient equipment. They award the ENERGY STAR label to products that save energy.

In general, the ENERGY STAR label is not intended to increase product sales, but (1)..... to promote energy saving. Consumers get (2)..... by reducing the cost for electricity consumption.

The agencies set criteria of energy efficiency for (3)..... consumers and commercial products. These (4)..... are higher than the minimum national efficiency standards. Manufacturers and retailers will fix the ENERGY STAR label on those products that meet the criteria set by EPA and DOE.

The ENERGY STAR label can help customers make (15)..... decisions easier. These products not only save energy, but they also help prevent air pollution and save money, frequently with better performance. Remember to look for the ENERGY STAR label - the symbol of energy efficiency.

ENERGY STAR is for better utility.

II. Disc Brake Pads

(Source: Adapted from a passage available at http://www.tirerack.com/brakes/brakes.jsp?make=EBC&model=Greenstuff+brake+pads)

analyses cause however innovations isolated qualified responses since

Award-Winning, Disc Brake Pads

EBC Greenstuff disc brake pads are designed for sports cars, coupes and sedans used for high performance driving on the road. They are (6)..... which will be more responsive than most standard original brakes. With outstanding features, they can give instant (7)....., because no warm-up is needed. Therefore, safety can be guaranteed.

(8)....., brakes are safety critical parts of a motor vehicle.

Brake components should be installed by a skillful and (9)..... mechanic in a professional manner. Any incorrect installation of brake components can (10)..... a major safety problem or an accident. If you are not a qualified mechanic, you should not attempt to install these products, but should take the vehicle to a vehicle dealer or component automotive mechanic for their installation.

III. Low Power Circuits and Technology for Wireless Digital Systems

(Source: Adapted from http://www.cisl.columbia.edu/old_seminars.html)

aiming assume capabilities challenges determining explain performance

Abstract

CMOS technology is an advance in the fields of computers and telecommunication. At present, it is used widely to optimize system and performance of particular applications.

CMOS technology is highly complex and its scales are in deep submicron lengths. Thus, designers of applications face new (11).....in determining the proper balance of high and low performance devices.

(12)..... this balance is important for wireless digital systems because the unbalance will limit their (13)..... . This article will suggest some ways to get such balance. Then it will (14)..... research in developing low power communication systems. These systems make use of the (15)..... of advanced CMOS technology.

Appendix N

Pretest, Immediate Posttest and Delayed Posttest

I. Pretest, Immediate Posttest and Delayed Posttest

Description:

1. The test consists of two parts: the definition part and the cloze-passage part.
2. There are totally 101 items of words to be tested:
   - 51 items in the definition part
   - 50 items in the cloze-passage part.
3. The time for doing the test is 3 hours.

Part I: Match the words with the right definitions in the same set as in the following example.

For example:

Definitions	Words	
.....f..... part of a house	a. business	d. pencil
.....c..... animal with four legs	b. clock	e. shoe
.....d..... something used for writing	c. horse	f. wall

	Definitions	Words	
.....1	Give	a. improve	d. press
.....2	Receive	b. bend	e. obtain
.....3	make better	c. detect	f. provide
.....4	look for	a. search	d. decrease
.....5	tell about	b. permit	e. shift
.....6	make change	c. satisfy	f. describe
.....7	make apart	a. attempt	d. divide
.....8	become different	b. follow	e. assist
.....9	talk or write about	c. discuss	f. vary
.....10	make something bad	a. notice	d. specify
.....11	say about something clearly	b. spend	e. prevent
.....12	stop something from happening	c. damage	f. supply
.....13	pay attention	a. publish	d. review
.....14	get to, arrive at	b. reach	e. enhance
.....15	make information available to people	c. interest	f. imagine
.....16	a picture or drawing	a. education	d. figure
....17	a surrounding condition	b. issue	e. advance
.....18	a topic being talked about	c. waste	f. environment

.....19	a part of something	a. concept	d. evidence
.....20	a way of doing something	b. trial	e. section
.....21	an abstract idea to understand something	c. practice	f. couple
.....22	a place, location	a. version	d. cost
.....23	power to do work	b. tension	e. area
.....24	something a little different from others of the same type	c. energy	f. method
.....25	an amount or number of	a. quantity	d. investment
.....26	a good feature, benefit	b. estimate	e. advantage
.....27	an amount of space between two points	c. sequence	f. distance
.....28	ability to do or hold things	a. equipment	d. symbol
.....29	a box to hold things	b. case	e. trend
.....30	a sign or a mark to represent something	c. information	f. capacity
.....31	a top part of something	a. volume	d. behavior
.....32	an amount of space to hold things	b. skill	e. position
.....33	a point or a place where something is	c. surface	f. category
.....34	apart, not together	a. several	d. separate
.....35	useful, necessary	b. important	e. average
.....36	at about the middle level or degree	c. rigid	f. flexible
.....37	perfect, most suitable	a. economical	d. isolate
.....38	saving money or fuel	b. rare	e. overall
.....39	including everything in general	c. ideal	f. visible
.....40	very much	a. complex	d. academic
.....41	not easy, not simple	b. extreme	e. individual
.....42	of each person or thing	c. fundamental	f. obvious
.....43	by using hands	a. rapidly	d. randomly
.....44	in a special manner	b. especially	e. manually
.....45	in a suitable manner	c. properly	f. permanently
.....46	done by machines	a. constantly	d. particularly
.....47	in a specific manner	b. universally	e. mechanically
.....48	without stopping or changing	c. regularly	f. explicitly
.....49	from that time	a. during	d. although
.....50	but, despite the fact that	b. since	e. therefore
.....51	while, within a period of time	c. via	f. furthermore

Part II: Fill the given words into the gaps of the passage. For each passage, there are more given words than needed.

I. Electric Current: DC and AC

(Source: Adapted from a passage available at http://encyclopedia.thefreedictionary.com.)

current direction efficient handle hence rather reaction result

In electricity, electric current is the flow of charges, usually through a metal wire or some other electrical conductors. Electric (1)..... has two basic types. One is a direct current (DC) and the other is an alternating current (AC).

In DC, the electric charge moves continuously in the same (2)..... . In AC, on the other hand, the electric charges oscillates (i.e., moves back and forth), (3)..... than moving in line. As a (4)....., the oscillation of AC can make different waveforms such as triangular, square, and sine waves. The best waveform is a perfect sine wave because it can produce the most (5)..... transmission of energy.

II. Energy

(Source: Adapted from a passage available at http://www.energyquest.ca.gov/story/chapter01.html)

amount different element equal integral invented measured medium

Energy causes things to happen around us. It can be found in several (6)..... forms. It can be chemical energy, electrical energy, heat (thermal) energy, light (radiant) energy, mechanical energy, and nuclear energy.

Energy is measured in many ways. One of the basic measuring units is called a Btu. Btu stands for 'British thermal unit', and was (7)..... by the English scientist. Btu is the (8)..... of heat energy used to raise the temperature of one pound of water by one degree Fahrenheit, at sea level.

Energy also can be (9)..... in joules. A thousand joules is (10)..... to a British thermal unit (i.e., 1,000 joules = 1 Btu).

III. AutoCAD

(Source: Adapted from a passage available at http://www.fbe.unsw.edu.au/learning/autocad/cadnotes/chap1.htm)

able component effect except measure shifts stable supports

AutoCAD is an interactive drawing system. It is designed to allow a user to construct or edit a drawing on a computer screen. It is similar to a word-processing program, (11)..... that the thing being processed in AutoCAD is a drawing. Each drawing is stored on a disk file, and AutoCAD is only (12)..... to edit one drawing (or file) at a time. The main (13)..... of AutoCAD is known as the *drawing editor.*

In earlier versions, AutoCAD was a two-dimensional drawing system. Now, it (14)..... a full three-dimensional database. This support has the (15)..... that AutoCAD can be used either as 2D or 3D systems.

IV. CNC Lathe

(Source: Adapted from an advertisement available at http://www.emco.at)

accuracy combines depends due produce command single special

The CONCEPT TURN 345 is a PC-controlled CNC lathe that has been used by industrial companies for years. This CNC is known by the name EMCOTURN345/II. It is a machine from the EMCO industrial machine line. We have adapted to the (16)..... needs of the training situation with our PC control unit – the interchangeable control panel. (17)..... to its size, performance and numerous functions, the CONCEPT TURN 345 has everything. It gives the trainees a machine on which they can learn how to (18)..... parts cost-effectively.

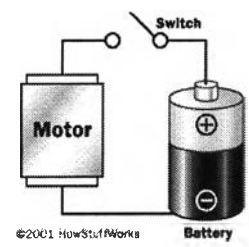
This power pack is full of state-of-the-art technology. The EMCO CONCEPT TURN 345 (19)..... outstanding features of a CNC lathe together. It has the ability to repeat (20)..... with maximum flexibility. Moreover, digital drives ensure extraordinary high end dynamic machining. Quality speaks for itself, you can be sure of that.

V. How a battery works

(Source: Adapted from an article written by Marshall Brain available at http://science.howstuffworks.com/battery.htm)

dangerous notice order spend terminal unless visible whereas

Batteries are all over the place -- in our cars, our PCs, portable MP3 players, and mobile phones. A battery is essentially a can full of chemicals for producing electrons. Chemical reactions that produce electrons are called *electrochemical reactions*.



If you look at any battery, you'll (21)..... that it has *two terminals*. One terminal is marked (+), or positive, (22)..... the other is marked (-), or negative. In an AA cell (normal flashlight batteries), the ends of the battery are the terminals. In a large car battery, there are two heavy lead posts that act as the terminals.

If you connect a wire between the negative and positive terminals, the electrons will flow from the negative to the positive terminal as fast as they can. This direct connection should not be done because it is (23)..... especially with large batteries. Normally, you connect some type of *load* such as a light bulb or a motor to the battery using the wire.

Electrons flow from the battery into a wire, and must go from the negative to the positive (24)..... for the chemical reaction to take place. The chemical reaction does not take place (25)..... electrons are flowing between these terminals. Once you connect a wire, the reaction starts.

VI. How to install a computer program safely

(Source: Adapted from an instruction available at http://www.ehow.com/how_2458_install-computer-program.html)

appear analysis find instructions options place select value

Today, installing a computer program is usually as simple as clicking the *Install* button. These (26)..... are used to install a computer program for Windows 95 and 98.

Steps:

1. (27)..... the floppy disk or CD-ROM containing the program in the appropriate drive.
2. A window will immediately (28)..... asking whether you want to install the program. Click *Install.*
3. If a window doesn't appear, open the *Start* menu and (29)..... *Settings*, then *Control Panel.*
4. Double-click *Add/Remove Programs.*
5. In the top part of the window that appears, click *Install.*

Tips:

- To install a Windows 3.1 or DOS program in Windows 98, open the *Start* menu and click *Run.* In the box that appears, click *Browse*, then (30)..... the program or its installer.

Warnings:

- Don't install older utility programs not designed for Windows 98 - they may corrupt your system.

VII. Memory for Cars

(Source: Adapted from a product note published in Design Engineering, 03 December 2004, available at http://www.e4engineering.com)

available bands contact devices include needs potential range

Integrated Silicon Solution (ISSI) has produced EEPROM devices for the automotive market. The new products cover densities from 1K to 64K. They come in all three popular interface protocols: I2C, Microwire, and SPI.

The devices are made up with process technology at SMIC. These (31)..... are widely used in a broad (32)..... of automotive applications, each of which (33)..... to be coded. Applications (34)..... remote control door locks, power seats and mirrors with memory, radios, and alarm systems.

ISSI's new EEPROMs operate from 2.5 V to 5.5V. They are (35)..... in 1K, 2K, 4K, 8K and 16K densities.

VIII. Electric Outlook

(Source: Adapted from an article available at http://www.graduatingengineer.com/futuredisc/mechanical2.html)

accepted despite expanded field firm slightly thus virtually

Before the Internet and computers, electrical engineers studied and made all electrical and electronic things. There was no question about who they were or what they did. If anything had to do with electricity or electronics, it was certainly the job of electrical engineers.

However, with the explosion of the high-tech industry, the job of an electrical engineer has (36)....., and the growth of this (37)..... shows no signs of slowing.

(38)..... the economic downturn, electrical engineers are still in demand as ever. Most companies are looking for electrical and computer engineers because business today operates (39)..... through computers and networking systems. Now electrical engineer can work for most types of business or industry such as a bank, a law (40)....., or a manufacturing plant.

It is clear that, with the expansion of technology, the future of electrical engineers is very bright.

IX. IMechE: Institution of Mechanical Engineers

(Source: Adapted from an official webpage of the Institution of Mechanical Engineers, IMechE, available at http://www.imeche.org.uk/about/about_us.asp)

cover damages detected disciplines excess organization related targets

The Institution of Mechanical Engineers (IMechE) was established in 1847 in the UK. It is the leading (41)..... for professional mechanical engineers. The Institution has grown to (42)..... the whole range of technologies and industries in which engineers work. Its aim is to ensure the highest professional standards.

The world-wide membership of the IMechE is now in (43)..... of 75,000 engineers. The members are mechanical engineers from all (44)..... . They work in research, design, development, manufacturing, teaching etc. In its Conferences and Events, all members share experiences and find out the latest development in their own and (45)..... fields.

X. Article Abstract

(Source: Adapted from an abstract of an article entitled 'What should computer scientists teach to physical scientists and engineers?', written by Gregory V. Wilson in *Computing Science & Engineering*, 1996, Vol.3 No. 2, available at http://csdl.computer.org/comp/mags/cs/1996/02/c2046abs.htm)

aids decrease flexible intensive necessary professionals resources spend

Most physical scientists and engineers do not use computers effectively. Whether students in colleges or (46)..... working in industry, they write programs when they could use existing software, they rarely use advanced data in their programs, and they make little use of software tools.

Asking physical scientists and engineers to study computer science as well as their own disciplines is impractical. Time is one of the limited (47)..... in a student or professional's life. While it is easy to make a list of things that would be useful to know, it is much more difficult to say what should be dropped from existing curricula, or what projects should be postponed, to make the (48)..... room.

In deciding what computing skills to teach to physical scientists and engineers, this article presents a thought experiment. Imagine that every new graduate student in science and engineering at your institution, or every new employee in your company, has to take a/an (49)..... one-week computing course. What would you want that course to cover?

The author believes that such a one-week course should (1) focus on programming (50)....., not programming methodology; (2) describe widely available tools, not stand-alone packages; (3) be conservative, that is, be based on tools that have proved themselves and are unlikely to change; and (4) focus on those platforms that practitioners are most likely to have access to.

Appendix O

Checklists and Results in Validating Review Tasks and Test

I. A checklist for validating the review tasks

Part I: Please tick (✓) in the appropriate boxes to give opinions.

Questions	Yes	No	Unsure
Word selection			
• Are the criteria for selecting the reviewed words justified?			
• Does the number of the words reviewed in each task represent the three related weekly wordlists?			
The Part of Definitions			
• Is the instruction clear?			
• Is the test format appropriate?			
• Are the given definitions appropriate?			
• Are the given distracters appropriate?			
The Part of Rational-Deletion Cloze Passages			
• Is the instruction clear?			
• Is the test format appropriate?			
• Is the length of each passage appropriate?			
• Are there enough contexts for guessing each deleted word?			
• Is the variety of the text types appropriate?			
• Are the topics suitable for engineering students?			
• Are the contents suitable for the students' English proficiency level?			
Overall			
• Do the tasks conform to the objectives of the study?			
• Does the length of each task match the time available?			

Part II: Please give some comments or suggestion to improve the tasks.

Thank you for your co-operation.

II. A checklist for validating the task items

Part I:

Task Objectives: To assess definitional knowledge of the given words.

Please do each task in part I and give comments by ticking (✓) in the appropriate boxes whether the given words can be reviewed with the given definitions. If the comments are 'no'/ 'unsure', please note the problems such as unclear definitions, more than one answers etc.

Review Task 1

Items	Reviewed Words	Definitions	Comments			Notes
			Yes	No	Unsure	
1	object	a thing				
2	fact	information				
3	task	a piece of work				
4	principle	a basic idea or rule				
5	property	quality in material				
6	experience	knowledge or skill getting through doing				
7	contain	hold within				
8	increase	make bigger or larger				
9	allow	let something happening				
10	continue	keep doing				
11	integrate	join things together				
12	indicate	show or make clear				
13	similar	alike / being the same				
14	effective	able to do things successfully				
15	physical	related to body or material things				

Reviewed Task 2

Items	Reviewed Words	Definitions	Comments			Notes
			Yes	No	Unsure	
1	term	a word or vocabulary				
2	series	a group of similar thing placed in order				
3	equation	a mathematical statement that two amounts are equal				
4	purpose	aim				
5	item	a thing				
6	activity	a happening action				
7	state	say formally				
8	reduce	make smaller				
9	release	let something out				
10	supply	give something that is wanted				
11	achieve	finish doing something successfully				
12	compare	look for similarity or difference between things				
13	actual	real				
14	certain	sure to happen				
15	artificial	made by man, not by nature				

Review Task 3

Items	Reviewed Words	Definitions	Comments			Notes
			Yes	No	Unsure	
1	image	Picture				
2	formula	a set of scientific or mathematic rules				
3	detail	a part of information about something				
4	spin	turn around quickly				
5	locate	find out where something is				
6	expect	think that something will happen				
7	avoid	stay away from				
8	protect	keep something safe from danger				
9	suggest	give an idea for someone to think about				
10	quite	Very				
11	normal	Usual				
12	flexible	able to change or bend				
13	secure	safe from danger				
14	entire	having all in one piece				
15	conventional	in a usual and acceptable way of doing				

Review Task 4

Items	Reviewed Words	Definitions	Comments			Notes
			Yes	No	Unsure	
1	error	a mistake				
2	document	a formal paper				
3	procedure	a method of doing something				
4	modify	change				
5	access	get into				
6	observe	see or notice				
7	insert	put something in				
8	remain	keep being the same				
9	assume	believe as true without questions				
10	difficult	not easy				
11	according	as stated by				
12	academic	related to studying				
13	appropriate	suitable				
14	local	in a nearby area				
15	recent	in the past, but not very long ago				

Part II:

Task Objectives: To assess ability to transfer lexical knowledge to reading contexts

Please do each task in part II and give comments by ticking (✓) in the appropriate boxes whether the given words are properly reviewed with enough contexts. If the comments are 'no'/ 'unsure', please note the problems.

Review Task 1

Items	Reviewed Words	Comments			Notes
		Yes	No	Unsure	
1	plant				
2	theory				
3	solution				
4	application				
5	develop				
6	light				
7	create				
8	another				
9	become				
10	form				
11	involve				
12	typical				
13	manufacture				
14	require				
15	identify				

Review Task 2

Items	Reviewed Words	Comments			Notes
		Yes	No	Unsure	
1	define				
2	as				
3	conduction				
4	original				
5	mean				
6	classify				
7	general				
8	motion				
9	kind				
10	revolution				
11	simple				
12	consist				
13	attach				
14	parallel				
15	instance				

Review Task 3

Items	Reviewed Words	Comments			Notes
		Yes	No	Unsure	
1	choose				
2	option				
3	quality				
4	maximum				
5	ensure				
6	distribute				
7	adjust				
8	minimize				
9	transform				
10	transfer				
11	immediately				
12	occur				
13	explode				
14	wear				
15	remove				

Review Task 4

Items	Reviewed Words	Comments			Notes
		Yes	No	Unsure	
1	instead				
2	benefit				
3	specific				
4	criteria				
5	purchase				
6	innovation				
7	response				
8	however				
9	qualify				
10	cause				
11	challenge				
12	determine				
13	performance				
14	explain				
15	capability				

III. A checklist for validating the test

Part I: Please tick (✓) in the appropriate boxes to give opinions.

Questions	Yes	No	Unsure
Word selection			
Are the criteria for selecting the tested words justified?			
Does the number of the tested words represent the total target words?			
Part I: Definitions			
Is the instruction clear?			
Is the test format appropriate?			
Are the given definitions appropriate?			
Are the given distracters appropriate?			
Part II: Rational-Deletion Cloze Passages			
• Is the instruction clear?			
• Is the test format appropriate?			
• Is the length of each passage appropriate?			
• Are there enough contexts for guessing each deleted word?			
• Is the variety of the text types appropriate?			
• Are the topics suitable for engineering students?			
• Are the contents suitable for the students' English proficiency level?			
Overall			
Does the test conform to the objectives of the study?			
Does the length of the test match the time available?			

Part II: Please give some comments or suggestion to improve the test.

Thank you for your co-operation.

IV. A checklist for validating the test items

Part I

Test Objectives: To assess definitional knowledge of the given words.

Please do the test in part I and give comments by ticking (✓) in the appropriate boxes whether the given words can be tested with the given definitions. If the comments are 'no'/ 'unsure', please note the problems such as unclear definitions, more than one answers etc.

Items	Tested Words	Definitions	Comments			Notes
			Yes	No	Unsure	
1	provide	give				
2	obtain	receive				
3	improve	make better				
4	search	look for				
5	describe	tell about				
6	shift	make change				
7	divide	make apart				
8	vary	become different				
9	discuss	talk or write about				
10	damage	make something bad				
11	specify	say about something clearly				
12	prevent	stop something from happening				
13	interest	pay attention				
14	reach	get to, arrive at				
15	publish	make information available to people				
16	figure	a picture or drawing				
17	environment	a surrounding condition				
18	issue	a topic being talked about				
19	section	a part of something				
20	practice	a way of doing something				
21	concept	an abstract idea to understand something				
22	area	a place, location				
23	energy	power to do work				
24	version	one form of a thing or product				
25	quantity	an amount or number of				
26	advantage	a good features, benefit				
27	distance	an amount of space between two points				
28	capacity	ability to do or hold things				
29	case	an example, a box to hold things				
30	symbol	a sign or a mark to represent something				
31	surface	a top part of something				
32	volume	an amount of space to contain things				
33	position	a point or a place where something is				
34	separate	apart, not together				
35	important	useful, necessary				
36	average	at about the middle level or degree				
37	ideal	perfect, most suitable				
38	overall	including everything in general				
39	economic	relating to money or production				
40	extreme	very much				

Items	Tested Words	Definitions	Comments			Notes
			Yes	No	Unsure	
41	complex	not easy, not simple				
42	individual	of each person or thing				
43	manually	by using hands				
44	especially	in a special manner				
45	properly	in a suitable manner				
46	mechanically	done by machines				
47	particularly	in a specific manner				
48	constantly	without stopping or changing				
49	since	from that time				
50	although	but, despite the fact that				
51	during	while, within a period of time				

Part II:

Test Objectives: To assess ability to transfer lexical knowledge to reading contexts

Please do the test in part II and give comments by ticking (✓) in the appropriate boxes whether the given words are properly tested with enough contexts. If the comments are 'no'/ 'unsure', please note the problems.

Items	Tested Words	Is each given word properly tested?			Notes
		Yes	No	Unsure	
1	current				
2	direction				
3	rather				
4	result				
5	efficient				
6	different				
7	invent				
8	amount				
9	measure				
10	equal				
11	except				
12	able				
13	component				
14	support				
15	effect				
16	special				
17	due				
18	procedure				
19	combine				
20	accuracy				
21	notice				
22	whereas				
23	dangerous				
24	terminal				
25	unless				

Items	Tested Words	Is each given word properly tested?			Notes
		Yes	No	Unsure	
26	instruction				
27	place				
28	appear				
29	select				
30	find				
31	devices				
32	range				
33	need				
34	include				
35	available				
36	expand				
37	field				
38	despite				
39	virtually				
40	firm				
41	organization				
42	cover				
43	excess				
44	disciplines				
45	relate				
46	professional				
47	resource				
48	necessary				
49	intensive				
50	aid				

V. Results from the checklists for validating test and tasks

To validate the tests and review tasks, two experts were consulted and they gave their opinions in the checklists on the issues of word selection, format and design, and consistency to the objectives of the study.

To calculate the data from the checklists, the items marked with agreement on justification is rated 1, those with disagreement is -1, and those with unsure is 0. Then, these results are calculated for means and the overall results were shown in the following table. The issues are considered justified if the mean values are over 0.5.

	N	Minimum	Maximum	Mean	Std. Deviation
1. Word Selection: Criteria	2	1	1	1.00	.000
Representativeness	2	0	1	.50	.707
2. Part I: Instructions	2	-1	0	-.50	.707
Test format	2	0	1	.50	.707
Definitions	2	0	1	.50	.707
Distractors	2	0	0	.00	.000
3. Part II: Instructions	2	-1	0	-.50	.707
Test format	2	0	1	.50	.707
Length of passage	2	1	1	1.00	.000
Enough contexts	2	1	1	1.00	.000
Variety of text types	2	1	1	1.00	.000
Topics of passage	2	1	1	1.00	.000
Contents	2	0	1	.50	.707
4. Overall: Conform to objectives	2	1	1	1.00	.000
Time	2	0	0	.00	.000
Valid N (listwise)	2				

VI. Results from the checklists for validating each item in Definition Part of the test

To validate the test items, three English instructors tried out the measures and gave their opinions in the checklists on the clarity or ambiguity of test taking. To calculate the data from the checklists, the items marked with agreement on justification is rated 1, those with disagreement is -1, and those with unsure is 0. Then, these results are calculated for means and the overall results were shown in the following table. The issues are considered justified if the mean values are over 0.5.

Test Items	N	Minimum	Maximum	Mean	Std. Deviation
definition 1	3	1	1	1.00	.000
definition 2	3	1	1	1.00	.000
definition 3	3	1	1	1.00	.000
definition 4	3	1	1	1.00	.000
definition 5	3	1	1	1.00	.000
definition 6	3	1	1	1.00	.000
definition 7	3	0	1	.67	.577

definition 8	3	1	1	1.00	.000
definition 9	3	1	1	1.00	.000
definition 10	3	1	1	1.00	.000
definition 11	3	1	1	1.00	.000
definition 12	3	1	1	1.00	.000
definition 13	3	1	1	1.00	.000
definition 14	3	1	1	1.00	.000
definition 15	3	1	1	1.00	.000
definition 16	3	1	1	1.00	.000
definition 17	3	1	1	1.00	.000
definition 18	3	1	1	1.00	.000
definition 19	3	1	1	1.00	.000
definition 20	3	1	1	1.00	.000
definition 21	3	1	1	1.00	.000
definition 22	3	1	1	1.00	.000
definition 23	3	1	1	1.00	.000
definition 24	3	0	1	.67	.577
definition 25	3	1	1	1.00	.000
definition 26	3	1	1	1.00	.000
definition 27	3	1	1	1.00	.000
definition 28	3	1	1	1.00	.000
definition 29	3	0	1	.67	.577
definition 30	3	1	1	1.00	.000
definition 31	3	0	1	.67	.577
definition 32	3	1	1	1.00	.000
definition 33	3	0	1	.67	.577
definition 34	3	1	1	1.00	.000
definition 35	3	1	1	1.00	.000
definition 36	3	1	1	1.00	.000
definition 37	3	1	1	1.00	.000
definition 38	3	1	1	1.00	.000
definition 39	3	1	1	1.00	.000
definition 40	3	1	1	1.00	.000
definition 41	3	1	1	1.00	.000
definition 42	3	1	1	1.00	.000
definition 43	3	1	1	1.00	.000
definition 44	3	1	1	1.00	.000
definition 45	3	1	1	1.00	.000
definition 46	3	1	1	1.00	.000
definition 47	3	1	1	1.00	.000
definition 48	3	1	1	1.00	.000
definition 49	3	1	1	1.00	.000
definition 50	3	1	1	1.00	.000
definition 51	3	1	1	1.00	.000
Valid N (listwise)	3				

Appendix P

Sample of Students' Logs

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Name.....
Date.....

Student's Log
Lesson 1

Please give information as much as possible on what and how you deal with the concordance-based method, according to the following topics.
(กรุณาให้ข้อมูลให้มากที่สุดเท่าที่จะทำได้เกี่ยวกับการกระทำและวิธีการที่คุณเรียนด้วยวิธีแบบคอนคอร์แดนซ์ ตามหัวข้อดังต่อไปนี้)

- What do you learn from the lesson today? (คุณเรียนรู้อะไรจากบทเรียนวันนี้)
- How do you participate with class activities? (e.g., paying fully attention, actively taking notes, being distracted, feeling bored, etc.) (คุณร่วมกิจกรรมในชั้นเรียนวันนี้อย่างไร เช่น ตั้งใจเรียนเต็มที่ จดโน้ตตลอดเวลา ไม่มีสมาธิ หรือรู้สึกเบื่อ ฯลฯ)
- How do you deal with the concordancing method? (e.g., being able to observe contexts from the concordances well, or unable to identify the particular meanings of the given keywords etc.) (คุณเรียนด้วยวิธีการแบบคอนคอร์แดนซ์อย่างไร เช่น สามารถสังเกตบริบทในคอนคอร์แดนซ์ได้ดี หรือไม่สามารถระบุความหมายเฉพาะของคำที่กำหนดให้ได้ ฯลฯ)
- What are your opinions about using the method today? (e.g. difficult / easy, interesting/confusing, etc.) (คุณมีความคิดเห็นเกี่ยวกับวิธีใช้คอนคอร์แดนซ์ในวันนี้อย่างไร เช่น ยาก/ง่าย น่าสนใจ/งง ฯลฯ)
- What are your feelings about the method? (e.g. like/dislike, excited/ challenged/discouraged etc.) (คุณรู้สึกอย่างไรกับการใช้คอนคอร์แดนซ์จากบทเรียนวันนี้ เช่น ชอบ/ไม่ชอบ ตื่นเต้น/ท้าทาย/ท้อใจ ฯลฯ)
- Do you have any problems? If yes, what are they? (e.g., a computer is out of order, unable to understand the reading texts in concordance lines etc.) (วันนี้คุณมีปัญหาจากบทเรียนบ้างหรือไม่ ถ้ามี อะไรคือปัญหา เช่น คอมพิวเตอร์เสีย อ่านข้อความในคอนคอร์แดนซ์ไม่เข้าใจ ฯลฯ)
- What are your comments or suggestions for improving the lessons? (คุณมีความคิดเห็นหรือคำแนะนำเพื่อปรับปรุงบทเรียนหรือไม่)
- Others. If any. (อื่นๆ ถ้ามี)

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Appendix Q

Observation Checklist in Teacher's Field Notes

Observation List	Yes	No	Unsure	What & Why & How?
I. Students' participation • Do they actively participate in class activities? • Do they understand the instructions? • Do they understand the focus of each activity?				
II. Students' dealing with a concordancer • Can they operate a concordancer well? • Are there any problems in dealing with it?				
III. Students' dealing with corpus information? • Can they observe the contexts of keywords? • Can they make use of such observation? • Do they conduct the activities as suggested? • Can they complete the given tasks? • Can they do the task well? • Are there any problems in dealing with it?				
IV. Students' feelings • Are they motivated to do the activities? • Are they confident in dealing with the method? • Are they confused or discouraged?				
V. Problems • Are there any other problems?				

Appendix R

Questionnaire II

.....

The information derived from this questionnaire is very useful for improving the concordance-based lessons for EFL students as much as possible. It is not concerned with the evaluation of your studying performance in this semester. Therefore, please give honest answers to all the questions.

The questionnaire consists of 5 parts as follows.

• Part I: Studying Habits	• Part IV: Attitudes towards the method
• Part II: Computer Skills	• Part V: Comments and Suggestions
• Part III: Concordancing Skills	

ข้อมูลที่ได้รับจากแบบสอบถามนี้จะเป็นประโยชน์ในการจัดปรับบทเรียนให้เหมาะสมกับผู้เรียนภาษาอังกฤษเป็นภาษาต่างประเทศ ไม่มีผลกระทบต่อการประเมินผลการเรียนของคุณในภาคเรียนนี้แต่ประการใด กรุณาตอบคำถามให้ครบทุกข้อตามความเป็นจริง

แบบสอบถามแบ่งเป็น 5 ส่วนดังนี้

• ตอนที่ 1: อุปนิสัยในการเรียน	• ตอนที่ 4: ทัศนะคติต่อวิธีการ
• ตอนที่ 2: ทักษะทางคอมพิวเตอร์	• ตอนที่ 5: ความเห็นและคำแนะนำ
• ตอนที่ 3: ทักษะทางคอนคอร์แดนซ์	

Name (ชื่อ-นามสกุล) .....

Faculty (คณะ) ..... Field of study (สาขาวิชา) .....

<u>Instruction</u>: Please give the information by ticking (✓) in appropriate boxes or columns and giving short answers where needed.

<u>การตอบแบบสอบถาม</u>: กรุณาให้รายละเอียดด้วยการกรอกข้อมูลที่เกี่ยวข้อง และ ใส่เครื่องหมาย (✓) ลงในกรอบหรือในตาราง ตามความเหมาะสม

Part I: Studying habits (อุปนิสัยในการเรียน)

1. How did you attend English classes? (คุณเข้าเรียนในลักษณะอย่างไร)
   - ☐ Always attend class and never late (เข้าเรียนสม่ำเสมอและไม่เคยสาย)
   - ☐ Always attend class but sometimes late (เข้าเรียนเสมอแต่บางครั้งมาสาย)
   - ☐ Usually attend class with very few absences (เข้าเรียนบ่อยมีขาดเรียน2-3ครั้ง)
   - ☐ Attend class with absence more than three times (เข้าเรียนแต่มีขาดเรียนเกิน 3 ครั้ง)
2. Did you attend class late? (คุณเข้าเรียนสายหรือไม่)
   - ☐ Usually late but never absent (มักจะมาสายแต่ไม่เคยขาดเรียน)
   - ☐ Sometimes late but never absent (เข้าเรียนสายเป็นบางครั้งแต่ไม่เคยขาดเรียน)
   - ☐ Usually late with a few absence (มักจะมาสาย มีขาดเรียน 2-3 ครั้ง)
   - ☐ Usually late with absence more than three times (มักจะมาสายและมีขาดเรียนเกิน 3 ครั้ง)

3. Do you fully participate in class activities? (คุณตั้งใจเข้าร่วมกิจกรรมในชั้นเรียนเต็มที่หรือไม่)

☐ Always (เสมอ)

☐ Often (บ่อย)

☐ Sometimes (บางครั้ง)

☐ Rarely (นานๆครั้ง) Why? (เพราะเหตุใด) .....

☐ Never (ไม่เคย) Why? (เพราะเหตุใด) .....

4. Do you understand the lessons clearly? (คุณเข้าใจบทเรียนอย่างชัดเจนหรือไม่)

☐ Always (เสมอ)

☐ Often (บ่อย)

☐ Sometimes (บางครั้ง)

☐ Rarely (นานๆครั้ง) Why? (เพราะเหตุใด) .....

☐ Never (ไม่เคย) Why? (เพราะเหตุใด) .....

5. When you do not understand some points in the lessons, what do you do? (เมื่อไม่เข้าใจบางเรื่องในบทเรียน คุณทำอย่างไร)

☐ Ask the teacher (ถามอาจารย์)

☐ Ask friends (ถามเพื่อน)

☐ Find answers by yourself such as. by reviewing from handouts (หาคำตอบด้วยตนเอง เช่น จากการทบทวนบทเรียน)

☐ Do nothing (ไม่ได้ทำอะไรเลย)

6. How often do you review the previous lessons? (ท่านทบทวนบทเรียนบ่อยมากน้อยเพียงใด)

☐ Always (เสมอ)

☐ Often (บ่อย)

☐ Sometimes (บางครั้ง)

☐ Rarely (นานๆครั้ง)

☐ Never (ไม่เคย)

7. How often do you complete all assignments and submit them in time? (คุณทำงานที่มอบหมายครบและส่งทันตามกำหนดบ่อยมากน้อยเพียงใด)

☐ Always (เสมอ)

☐ Often (บ่อย)

☐ Sometimes (บางครั้ง)

☐ Rarely (นานๆครั้ง)

☐ Never (ไม่เคย)

Part II: Computer skills (ทักษะทางคอมพิวเตอร์)

1. How well can you use general computer programs? (คุณใช้โปรแกรมคอมพิวเตอร์ทั่วไปได้ดีเพียงใด)

   ☐ Very well (ดีมาก)

   ☐ Well (ดี)

   ☐ Averagely (พอใช้)

   ☐ Poorly (ไม่ดี)

   ☐ Very poorly (ไม่ดีมากๆ)

2. How well can you use a concordancer – WCONCORD? (คุณใช้โปรแกรมคอนคอร์แดนเซอร์ WCONCORD ได้ดีเพียงใด)

   ☐ Very well (ดีมาก)

   ☐ Well (ดี)

   ☐ Averagely (พอใช้)

   ☐ Poorly (ไม่ดี)

   ☐ Very poorly (ไม่ดีมากๆ)

3. Can you use a concordancer to do the following activities? (คุณสามารถใช้โปรแกรมคอนคอร์แดนเซอร์ทำกิจกรรมต่อไปนี้ได้หรือไม่)

Activities (กิจกรรม)	Yes (ใช่)	No (ไม่ใช่)	Unsure (ไม่แน่ใจ)
• Find statistic information of the corpus (หาข้อมูลเชิงสถิติของ Corpus)			
• Build word frequency list (สร้าง word frequency list)			
• Find frequency information of particular words. (หาจำนวนครั้งของแต่ละคำที่เกิดขึ้นใน corpus)			
• Sort word frequency list (จัดเรียงลำดับใน word frequency list)			
• Search word (ค้นหาคำ Corpus)			
• Search collocation (ค้นหา Collocation)			
• Search word with a wildcard (*) (ค้นหาคำโดยใช้ wildcard (*))			
• Sort left or right contexts of keywords (จัดเรียงลำดับข้อมูลซ้ายขวาของ keywords)			
• Find more contexts in full sentence (หาบริบทเพิ่มเติมเป็นประโยคเต็ม)			
• Find more contexts in the source text (หาบริบทเพิ่มเติมจากแหล่งที่มาหรือจากต้นฉบับ)			
• Delete duplicate/unnecessary sentences (ลบประโยคที่ซ้ำหรือไม่ต้องการ)			

4. How often do you use a concordancer to do these activities? Tick (✓) in the appropriate boxes, according to the given numbers. (ท่านสามารถใช้โปรแกรมคอนคอร์แดนเซอร์ทำกิจกรรมต่อไปนี้บ่อยมากน้อยเพียงใด กรุณาใส่เครื่องหมาย ✓ ตามหมายเลขต่อไปนี้)

- 5 = Always (เสมอ) • 3 = Sometimes (บางครั้ง) • 1 = Never (ไม่เคย)
- 4 = Often (บ่อย) • 2 = Rarely (นานๆครั้ง)

Activities (กิจกรรม)	5	4	3	2	1
• Find statistic information of the corpus (หาข้อมูลเชิงสถิติของ Corpus)					
• Build word frequency list (สร้าง word frequency list)					
• Find frequency of particular words. (หาจำนวนครั้งของแต่ละคำที่เกิดขึ้นใน Corpus)					
• Sort word frequency list (จัดเรียงลำดับใน word frequency list)					
• Search word (ค้นหาคำ Corpus)					
• Search collocation (ค้นหา Collocation)					
• Search word with a wildcard (*) (ค้นหาคำโดยใช้ wildcard (*))					
• Sort left or right contexts of keywords (จัดเรียงลำดับข้อมูลซ้ายขวาของ keywords)					
• Find more contexts in full sentence (หาบริบทเพิ่มเติมเป็นประโยคเต็ม)					
• Find more contexts in the source text (หาบริบทเพิ่มเติมจากแหล่งที่มา)					
• Delete duplicate/unnecessary sentences (ลบประโยคที่ซ้ำหรือไม่ต้องการ)					

5. How quick can you do these activities? Tick (✓) in the appropriate boxes, according to the given numbers. (ท่านสามารถใช้โปรแกรมคอนคอร์แดนเซอร์ทำกิจกรรมต่อไปนี้ได้เร็วมากน้อยเพียงใด กรุณาใส่เครื่องหมาย ✓ ตามหมายเลขต่อไปนี้)

- 5 = Very quick (เร็วมาก) • 3 = Moderately quick (เร็วปานกลาง) • 1 = Very slow (ช้ามาก)
- 4 = Quick (เร็ว) • 2 = Slow (ช้า)

Activities (กิจกรรม)	5	4	3	2	1
• Find statistic information of the corpus (หาข้อมูลเชิงสถิติของ Corpus)					
• Build word frequency list (สร้าง word frequency list)					
• Find frequency of particular words. (หาจำนวนครั้งของแต่ละคำที่เกิดขึ้นใน Corpus)					
• Sort word frequency list (จัดเรียงลำดับใน word frequency list)					
• Search word (ค้นหาคำใน Corpus)					
• Search collocation (ค้นหา Collocation)					
• Search word with a wildcard (*) (ค้นหาคำโดยใช้ wildcard (*))					
• Sort left or right contexts of keywords (จัดเรียงลำดับข้อมูลซ้ายขวาของ keywords)					
• Find more contexts in full sentence (หาบริบทเพิ่มเติมเป็นประโยคเต็ม)					
• Find more contexts in the source text (หาบริบทเพิ่มเติมจากแหล่งที่มา)					
• Delete duplicate/unnecessary sentences (ลบประโยคที่ซ้ำหรือที่ไม่ต้องการ)					

6. Apart from the assignment, how often do you access the corpus for your own purposes? (นอกเหนือจากงานที่ได้รับมอบหมาย ท่านใช้คลังข้อมูลด้วยจุดประสงค์ส่วนตัวบ่อยมากน้อยเพียงใด)

   ☐ Always (เสมอ)

   ☐ Often (บ่อย)

   ☐ Sometimes (บางครั้ง)

   ☐ Rarely (นานๆครั้ง)

   ☐ Never (ไม่เคย)

7. How confident do you feel in using the concordancer? (ท่านมั่นใจในการใช้โปรแกรมคอนคอแดนเซอร์มากน้อยเพียงใด)

   ☐ Very much confident (มั่นใจมากๆ)

   ☐ Much confident (มั่นใจมาก)

   ☐ Moderately confident (มั่นใจพอสมควร)

   ☐ Little confident (มั่นใจเล็กน้อย)

   ☐ Very little confident (มั่นใจน้อยมาก)

8. Do you like using the concordancer? (คุณชอบใช้โปรแกรมคอนคอร์แดนเซอร์หรือไม่)

   ☐ Very much (มากๆ)

   ☐ Much (มาก)

   ☐ Average (ปานกลาง)

   ☐ Little (น้อย)

   ☐ Very little (น้อยมากๆ)

Part III: Concordancing Skills (ทักษะทางคอนคอร์แดนซ์)

1. When you read texts in a concordance format, do you use the following reading strategies? (เมื่ออ่านข้อความในรูปแบบคอนคอแดนซ์ คุณใช้เทคนิคการอ่านต่อไปนี้ใช่หรือไม่)

Reading Strategies (เทคนิคการอ่าน)	Yes (ใช่)	No (ไม่ใช่)	Unsure (ไม่แน่ใจ)
• Read the selected lines words by words. (อ่านบรรทัดที่เลือกคำต่อคำ)			
• Find to read full sentences at the top. (หาประโยคเต็มอ่านจากด้านบน)			
• Select to read short or comprehensible concordances. (เลือกอ่านคอนคอร์แดนซ์ที่สั้นหรือที่เข้าใจ)			
• Locate immediate contexts of the keywords and read words in chunks. (กำหนดหาข้อมูลใกล้เคียง keywords แล้วอ่านเป็นกลุ่มคำ)			
• Ignore unnecessary information (ไม่สนใจข้อมูลที่ไม่จำเป็น)			
• Try to identify keywords' parts of speech to help in interpreting (พยายามระบุหน้าทีทางไวยากรณ์ของ keywords เพื่อช่วยในการตีความ)			
• Find some clues to help understanding texts. (หาบริบทที่ช่วยให้เข้าใจข้อความ)			
• Find keywords' regular collocation. (หากลุ่มคำที่มักเกิดคู่กับ keywords)			
Do you use any other strategies? If yes, please specify. คุณใช้เทคนิคการอ่านแบบอื่นหรือไม่ ถ้ามี กรุณาระบุ)			

2. Can you use concordance information to do the following activities? (คุณใช้ข้อมูลคอนคอร์แดนซ์เพื่อทำกิจกรรมต่อไปนี้ได้หรือไม่)

Activities (กิจกรรม)	Yes (ใช่)	No (ไม่ใช่)	Unsure (ไม่แน่ใจ)
• Identify parts of speech of keywords from contexts. (ระบุหน้าที่ทางไวยากรณ์ของ keywords จาก contexts)			
• Identify particular groups of phrases of the keywords. (ระบุกลุ่มคำหรือวลีของ keywords)			
• Identify regular collocation of the keywords. (ระบุกลุ่มคำที่มักเกิดคู่กับ keywords)			
• Deduce words meaning from contexts. (เดาศัพท์จากบริบท)			
• Identify key context clues. (ระบุบริบทที่สำคัญๆ)			
• Find some examples of particular patterns according to grammatical rules. (หาตัวอย่างรูปแบบข้อความตามกฎไวยากรณ์)			

3. How quick can you do the following activities? Tick (✓) in the appropriate boxes, according to these numbers. (คุณทำกิจกรรมต่อไปนี้เร็วมากน้อยเพียงใด กรุณาใส่เครื่องหมาย ✓ ตามหมายเลขต่อไปนี้)

- 5 = Very quick (เร็วมาก)
- 4 = Quick (เร็ว)
- 3 = Moderately quick (เร็วปานกลาง)
- 2 = Slow (ช้า)
- 1 = Very slow (ช้ามาก)

Activities (กิจกรรม)	5	4	3	2	1
• Identify parts of speech of keywords from contexts. (ระบุหน้าที่ทางไวยากรณ์ของ keywords จากบริบท)					
• Identify particular groups of phrases of the keywords. (ระบุกลุ่มคำหรือวลีของ keywords)					
• Identify regular collocation of the keywords. (ระบุกลุ่มคำที่มักเกิดคู่กับ keywords)					
• Deduce words meaning from contexts. (เดาศัพท์จากบริบท)					
• Identify key context clues. (ระบุบริบทที่สำคัญๆ)					
• Find some examples of particular patterns according grammatical rules. (หาตัวอย่างรูปแบบข้อความตามกฎไวยากรณ์)					

4. How many problems do you have when dealing with a large amount of information in the corpus? (คุณมีปัญหามากน้อยเพียงใดเมื่อพบข้อมูลจำนวนมากใน Corpus)

☐ Very many (มากๆ)

☐ Many (มาก)

☐ Average (พอสมควร)

☐ A few (เล็กน้อย)

☐ Very few (น้อยมาก)

5. When dealing with a large amount of information in the corpus, what do you do? (เมื่อพบข้อมูลจำนวนมากใน Corpus คุณทำอย่างไร)
   - ☐ Ignore irrelevant information. (ไม่สนใจข้อมูลที่ไม่เกี่ยวข้อง)
   - ☐ Further search other words. (ค้นคำอื่นต่อไป)
   - ☐ Stop using a concordancer. (หยุดการใช้งานคอนคอแดนซ์)
   - ☐ Others. Please specify. (อื่นๆ โปรดระบุ) .....
6. Do you think how much a concordance format can help you in identifying groups of words? (คุณคิดว่ารูปแบบคอนคอร์แดนซ์ช่วยคุณในการกำหนดกลุ่มคำได้มากน้อยเพียงใด)
   - ☐ Very much (มากๆ)
   - ☐ Much (มาก)
   - ☐ Average (ปานกลาง)
   - ☐ Little (น้อย)
   - ☐ Very little (น้อยมากๆ)
7. Do you think how much a concordance format can help you in identifying recurrent collocations of words? (คุณคิดว่ารูปแบบคอนคอร์แดนซ์ช่วยคุณในการกำหนดกลุ่มคำที่มักเกิดร่วมกัน collocations ได้มากน้อยเพียงใด)
   - ☐ Very much (มากๆ)
   - ☐ Much (มาก)
   - ☐ Average (ปานกลาง)
   - ☐ Little (น้อย)
   - ☐ Very little (น้อยมากๆ)

Part IV: Attitudes towards the concordance-based method (ทัศนคติต่อวิธีเรียนแบบคอนคอร์แดนซ์)

1. Do you think how much a concordance-based method is useful for studying English? (คุณคิดว่าวิธีการเรียนแบบคอนคอร์แดนซ์เป็นประโยชน์ต่อการเรียนภาษาอังกฤษมากน้อยเพียงไร)
   - ☐ Very much (มากๆ)
   - ☐ Much (มาก)
   - ☐ Average (ปานกลาง)
   - ☐ Little (น้อย)
   - ☐ Very little (น้อยมากๆ)
2. Do you think a concordance-based method is easy or difficult to use for studying English? (คุณคิดว่าวิธีการแบบคอนคอร์แดนซ์ใช้ง่ายหรือยากในการเรียนภาษาอังกฤษ)
   - ☐ Very easy (ง่ายมากๆ)
   - ☐ Easy (ง่าย)
   - ☐ Average (ปานกลาง)
   - ☐ Difficult (ยาก)
   - ☐ Very difficult (ยากมากๆ)

3. How much do you like using the concordance-based method? (คุณชอบใช้วิธีการเรียนแบบคอนคอร์แดนซ์มากหรือน้อยเพียงไร)

   ☐ Very much (มากๆ)

   ☐ Much (มาก)

   ☐ Average (ปานกลาง)

   ☐ Little (น้อย)

   ☐ Very little (น้อยมาก)

4. Will you still use a concordancer to study English on your own? (คุณจะยังคงใช้โปรแกรมคอนคอร์แดนซ์เพื่อเรียนภาษาอังกฤษด้วยตนเองอีกต่อไปหรือไม่)

   ☐ Yes (ใช้) Because (เพราะ) .....

   ☐ No (ไม่ใช้) Because (เพราะ) .....

   ☐ Unsure (ไม่แน่ใจ) Because (เพราะ) .....

Part V: Comments and Suggestions (ความคิดเห็นและคำแนะนำ)

Please give your opinions, comments or suggestions for improving the concordance-based lessons. (กรุณาให้ความคิดเห็นหรือคำแนะนำเพื่อนำไปปรับปรุงบทเรียนที่ใช้วิธีการเรียนการสอนแบบคอนคอร์แดนซ์)

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Thank you for your cooperation.

Appendix S

Checklists and Results in Validating Questionnaires

I. A checklist for Questionnaire I

This checklist is used for assessing the Questionnaire I. This questionnaire is going to be used at the beginning of the study in order to collect personal data of the students in both experimental and comparison groups. It consists of five parts i.e., general information, English background, reading background, computer skills, and comments and suggestions.

There are three main parts of the checklist.

1. A checklist for assessing each item of the questionnaire.
2. A checklist for assessing the whole questionnaire in overall.
3. An open-ended part for giving other comments or suggestions.

PART I: For assessing each item of the questionnaire

1. In the following table, please give comments on the following topics.
   - Each item is justified for obtaining necessary data or not.
   - Each question is clear or not.
2. Please use the following symbols for giving comments in the checklists.
   ✓ = Yes
   X = No
   ? = Unsure
3. If needed, please give comments in the available column, write directly in the questionnaires, or use a separate piece of paper.

Part	Items	Justified	Clear Question	Comments / Suggestions
I	1			
	2			
	3			
	4			
II	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
III	1			
	2			
	3			
	4			
	5			
	6			
	7			

	8			
	9			
	10			
IV	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
V	-			

PART II: For assessing the whole questionnaire in overall

1. In the following tables, please give comments whether the given issues are justified.
2. Please use the following symbols for giving comments in the checklists.
   - ✓ = Yes
   - X = No
   - ? = Unsure
3. If needed, please give comments in the available column, or write in a separate piece of paper.

Please give comments whether the given issues are justified or not for serving the objectives of the study.

Issues	Yes / No / Unsure	Comments or Suggestions
1. Design format		
2. Contents		
3. Clear Instruction		
4. Coverage or sufficiency		
5. Others. If any.		

PART III: Please give comments or suggestions for improving Questionnaire I.

Thank you very much for your assistance.

II. A Checklist of Questionnaire II

This checklist is used for assessing the Questionnaire II. This questionnaire is going to be used at the end of the study in order to explore students' learning processes while dealing with the concordance-based method as well as to explore their attitudes towards the method. It consists of five parts i.e., studying performance, computer skills, concordancing skills, attitudes towards the method, and comments and suggestions.

There are three main parts of the checklist.

1. A checklist for assessing each item of the questionnaire.
2. A checklist for assessing the whole questionnaire in overall.
3. An open-ended part for giving other comments or suggestions.

PART I: For assessing each item of the questionnaire

1. In the following table, please give comments on the following topics.
   - Each item is justified for obtaining necessary data or not.
   - Each question is clear or not.
2. Please use the following symbols for giving comments in the checklists.
   ✓ = Yes
   X = No
   ? = Unsure
3. If needed, please give comments in the available column, write directly in the questionnaires, or use a separate piece of paper.

Part	Items	Justified	Clear Question	Comments / Suggestions
I	1			
	2			
	3			
	4			
	5			
	6			
	7			
II	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
III	1			
	2			
	3			
	4			
	5			
	6			
	7			
IV	1			
	2			
	3			
	4			
V	-			

PART II: For assessing the whole questionnaire in overall

1. In the following tables, please give comments whether the given issues are justified.
2. Please use the following symbols for giving comments in the checklists.
   - ✓ = Yes
   - X = No
   - ? = Unsure
3. If needed, please give comments in the available column, or write in a separate piece of paper.

Please give comments whether the given issues are justified or not for serving the objectives of the study.

Issues	Yes / No / Unsure	Comments or Suggestions
1. Design format		
2. Contents		
3. Clear Instruction		
4. Coverage or sufficiency		
5. Others. If any.		

PART III: Please give comments or suggestions for improving Questionnaire II.

Thank you very much for your assistance.

III. The results on validity and reliability of the questionnaires

A. Calculation for validity of the questionnaires

To validate the questionnaire, three experts were consulted and they gave their opinions in the checklists on the justification of each questionnaire item. To calculate the data from the checklists, the items marked with agreement on justification is rated 1, those with disagreement is -1, and those with unsure is 0. Then, these results are calculated for means and the overall results were shown in the following table. The issues are considered justified if the mean values are over 0.5.

Results from the checklist for assessing the overall aspects of both questionnaires

	N	Minimum	Maximum	Mean	Std. Deviation
Design format	3	1	1	1.00	.000
Contents	3	1	1	1.00	.000
Clear Instruction	3	1	1	1.00	.000
Coverage or Sufficiency	3	1	1	1.00	.000

B. Calculation for reliability of the questionnaires

After these questionnaires were tried out, only the items in the form of a 5-point rating scale were calculated for the reliability value by using the method of an *alpha coefficient* or *Cronbach's Alpha* at the set point of 0.75.

Alpha value of Questionnaire I

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
P216	60.0000	86.1000	.3113	.8573
P2I81	58.7619	88.0905	.1577	.8618
P2I82	59.5714	82.1571	.5017	.8511
P2I83	60.7143	88.4143	.1830	.8602
P2I84	60.5714	88.5571	.1220	.8629
P2I85	59.0476	87.1476	.1741	.8627
P2I86	61.5714	81.5571	.5032	.8509
P2I87	60.8095	79.0619	.6306	.8457
P2I88	61.2857	74.5143	.8730	.8347
P2I89	61.3333	79.0333	.6212	.8460
P2I810	61.8095	83.2619	.5938	.8496
P2I811	61.4762	82.0619	.5178	.8505
P2I812	60.1429	74.8286	.7809	.8380
P2I813	61.3333	78.0333	.6109	.8461
P2I91	60.7143	83.9143	.4649	.8527
P2I92	60.6190	85.6476	.4328	.8542
P2I93	60.1905	82.3619	.5353	.8502
P2I94	60.4762	81.9619	.7075	.8465
P3I2	59.3810	91.2476	-.0757	.8745
P3I4	60.1905	86.7619	.3386	.8566
P4I2	59.2857	85.6143	.2604	.8599
P4I5	60.1429	86.1286	.5421	.8534
P3I8	59.7143	87.1143	.1653	.8635
(Note: P = Part, I = Item: For example: P216 = Part 2 Item 1 sub-item 6)				
Reliability Coefficients				
N of Cases = 21.0		N of Items = 23		
Alpha = .8593				

Alpha value of Questionnaire II

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
P1I3	149.8571	245.3286	-.0302	.9143
P1I4	150.4286	233.5571	.5449	.9087
P1I6	151.0000	238.0000	.3738	.9104
P1I7	150.0476	244.6476	.0051	.9137
P2I1	150.3333	235.5333	.5405	.9091
P2I2	150.3810	234.2476	.5194	.9089
P2I41	150.6190	234.7476	.3922	.9102
P2I42	150.2857	239.5143	.1922	.9126
P2I43	150.2381	229.6905	.6000	.9077
P2I44	149.7143	235.0143	.4806	.9093
P2I45	149.5238	243.3619	.0954	.9125
P2I46	150.6667	228.9333	.5516	.9081
P2I47	150.4286	237.9571	.1945	.9134
P2I48	149.5238	232.0619	.5484	.9084
P2I49	149.9048	234.6905	.4046	.9100
P2I410	150.4286	234.0571	.3909	.9102
P2I411	150.7619	238.2905	.1406	.9155
P2I51	150.5238	238.0619	.3158	.9109
P2I52	150.3333	236.4333	.4193	.9099
P2I53	150.2381	227.8905	.6756	.9068
P2I54	150.1905	224.3619	.6879	.9061
P2I55	150.0000	227.6000	.6960	.9066
P2I56	150.7619	222.6905	.7134	.9057
P2I57	150.6667	227.0333	.5533	.9081
P2I58	149.9048	226.8905	.5639	.9079
P2I59	150.5714	225.2571	.5525	.9081
P2I510	150.6667	223.2333	.7208	.9056
P2I511	150.8571	231.5286	.3798	.9108
P2I6	151.7143	228.9143	.5982	.9076
P2I7	150.6667	241.3333	.1892	.9120
P2I8	150.4762	237.6619	.3011	.9111
P3I31	151.0476	236.3476	.3818	.9103
P3I32	151.0476	236.8476	.4058	.9101
P3I33	151.0476	234.8476	.4086	.9100
P3I34	150.8095	239.7619	.2257	.9118
P3I35	150.9524	237.2476	.3901	.9102
P3I36	151.0476	232.7476	.4993	.9089
P3I4	151.0952	235.5905	.4435	.9097
P3I5	152.5714	237.0571	.4968	.9096
P3I6	150.3810	239.4476	.3657	.9106
P3I7	150.5714	238.4571	.4067	.9102
P4I1	150.5238	238.3619	.4128	.9102
P4I2	150.7143	240.3143	.3071	.9110
P4I3	150.5238	237.3619	.4005	.9101
(Note: P = Part, I = Item: For example: P113 = Part 1 Item 1 sub-item 3)				
Reliability Coefficients				
N of Cases = 21.0		N of Items = 44		
Alpha = .9117				

Appendix T

Semi-structured Interview

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I. Computer concordancing skills

- Can you use the concordancer well?
- Can you tell in what ways the concordancer can be used?
- Which functions of the concordancer do you use?
- Do you think its use is easy or difficult?
- Do you like using it?
- Suppose that we are going to study a word such as '*depend*' and we would like to know how often this word occurred in our Engineering Corpus. Do you know how to find this information?
- And if we would like to learn more about '*depend*', for example, words in the same family with it, how can we find this information?
- And if we want to know which words often come after '*depend*', how can we do that?
- In this illustration, (either concordances of '*depend*' or '*referred*' were provided), can you specify how many word types of keywords appear?
- What preposition often comes after '*depend/refer*'?
- If too much information appears on the screen after searching a word, what should you do?
- How do you observe which word is a noun, a verb or an adjective?

II. Skills in dealing with concordances

- When you read concordances, which parts do you look at first?
- Do you observe the immediate left and right contexts of the keywords?
- Do you mostly read in concordance lines or find a full sentence at the top?
- Do you read words by words or in chunks of words?

III. Attitudes and opinions

- Do you think the concordance format is helpful for observing the contexts? Why?
- Do you think dealing with the concordancing method helps you memorize the studied words more than usual? Why?
- Do you like using it or not? Why?
- Do you think the method is useful for studying English?
- Can you specify the usefulness of the method?
- How do you feel about using the method?
- Do you have any problems in using the method? If yes, what are they?
- Do you continue to use the method for your own study?
- Would you give comments or suggestions for improving vocabulary learning with the concordancing method?

BIOGRAPHY

Mrs. Pisamai Supatranont was born on September 24th, 1959 in Bangkok. She graduated with an M.A. in Applied Linguistics (English for Science and Technology) from King Mongkut's University of Technology Thonburi in 1993. She also received a scholarship from the Australian Government to further her M.Ed. study in Applied Linguistics at the University of Western Australia in 1997. In 2001, she received a grant from Cambridge University Press in Singapore to join an intensive course for a Specialist Certificate in Language Curriculum and Materials Development from RELC, Singapore. In 2004, she joined an extra-curricular activity of the EIL program to embark on educational visits to different universities in California in the United States of America. Based on her present dissertation, she was awarded a grant for research promotion from the committee of the 2005 KOTESOL conference in Korea. Accordingly, she presented her research study in Seoul, Korea in October 2005 and her paper concerned with this research was accepted for publication in *Korea TESOL 2005 Proceedings*, published in May, 2006.

Currently, she works for Rajamangala University of Technology Lanna, Tak Campus. Her fields of interest are ESP, Materials Designs and Classroom concordancing. She has taught ESP to engineering and business students for 24 years and has developed ESP materials for teaching these students including textbooks for Foundation English and Technical English courses. Her translated works published by Se-Education Public Company Limited include '*Time Management for Teams*', '*Electrical and Electronic Measurement and Testing*' and '*Op Amps & Linear Integrated Circuits for Technicians*'.