



Toward an Understanding of Technical University¹ EFL Learners' Academic Reading Difficulties, Strategies, and Needs

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Abstract

This study aimed to investigate technical university learners' academic reading difficulties, strategies, and learning needs. The participants involved were English and non-English majors at a technical university. The results of a qualitative open-ended interviews indicated that most of the participants struggled to master their subject disciplines because of inadequate linguistic proficiency and that their academic reading difficulties could be broadly attributed to deficiency in their language ability and their inability to comprehend content matter. Vocabulary was perceived to be the primary challenge when reading content-area textbooks. Moreover, while the learners' reading strategies and needs varied across disciplines, most learners showed a desire for greater support (e.g. in highlighting key points, and pre-teaching terminologies, sentence structures, grammar, and reading strategies). These findings have implications for appropriate syllabus planning as well as the need to rethink the roles of EFL teachers for academic reading.

1 Introduction

For EFL learners whose exposure to English is quite limited, reading becomes one of the most crucial means by which academic knowledge is transmitted. The ability to read academic texts is considered to be one of the most important skills that EFL learners need to acquire (Levine, Ferenz, & Reves, 2000). However, many of the EFL learners entering higher education are under-prepared for the reading demands that are placed for them (Dreyer & Nel, 2003). A great majority of these students might experience "vicious cycles," after entering the graduate program, if they had not learned how to read effectively and efficiently (Huang, 2006). They might dwell in their inappropriate reading habits without knowing how to read effectively.

A lack of vocabulary knowledge is one of the largest obstacles to efficiently comprehending academic texts in L2 (Levine & Reves, 1990). Chen (1999), in his empirical investigation, indicated that most college students in general universities in Taiwan have small vocabulary size of 2000-3000 words which is far below the requirement of 5000-7000 words in order to comprehend college English textbooks. Cheng (2010) further suggested that most Taiwanese college freshmen's command of English for college English texts is insufficient and their efficacy in reading to learn from texts in the EFL context is questionable. Being unable to deal with large amount of text, they might painstakingly rely on word-by-word reading. As a result, most of the students often moan and groan about the complicated texts and the huge number of reading assignments during a week. Another problem is that some ESP/EAP teachers are called upon to teach these courses with little

or no training in education (Huang, 2006). It is usually the teacher's school-related knowledge which subjectively determines what they teach in the classroom.

The above problems give rise to an urgent concern – how to help make struggling EFL learners' EAP reading better. According to Deutch (2003), to resolve the dilemma between skill training and learners' real learning needs in their respective specializations, it is important aspect in planning and organizing instruction to acquire an understanding of the learners. This study, underpinned by this belief, examined technical EFL university learners' academic reading difficulties, strategies, and needs in their fields of specialization. To further investigate whether learners with different majors suffer from the same difficulties or differ in their needs, this study was designed to include the participants across disciplines. Insights from this study would hopefully enable teachers to provide appropriate pedagogical measures by using what they know about their students to meet the learners' needs.

More specifically, the purpose of this study is to address the following questions: What are the technical EFL university students' academic reading difficulties, strategies, and needs? Are there any similarities and difference across disciplines?

2 Literature review

Academic reading is defined as a purposeful and critical reading of a range of lengthy academic reading texts for completing the study of specific subject areas (Sengupta, 2002). It is also different from other forms of reading, because academic reading is complex and discipline-specific, carefully synthesizing material from a number of sources. It requires consciously finding authorial intentions and purposes. However, many under-prepared EFL learners face huge challenges in meeting the academic reading demands (Dreyer & Nel, 2003) when entering higher education. Some might lose confidence and turn to translated versions to survive exams and assignments. Eventually, their English proficiency deteriorates.

Empirical studies have examined why many students experience difficulties in academic reading. With considerable variability across disciplines, proficiencies, and years of study, Hyland (1997) investigated the students' perceptions of academic learning at Hong Kong universities. The result revealed that Hong Kong students appeared to perceive English proficiency, particularly vocabulary knowledge, and subject knowledge to be the most problematic factors. Hyland (1997) thus suggested the need for continuous and effective support for EFL learners' academic learning.

Additionally, Hauptman (2000) further proposed background schemata as the most important element for the comprehensibility of L2 texts, followed by levels of text signaling and the linguistic factor. After analyzing the patterns of students' difficulties in reading biological texts at the University of Guam, USA, O'Toole and Scheffer (2008) considered the influential factors to be years of study and L1 language background. Cohesive devices, prepositions and nouns were presented as specific features that cause students' problems with the language in science. Moreover, Cheng (2010), after evaluating Taiwanese freshmen's cognitive readiness for EAP reading, claimed that the efficacy of reading to learn from texts, for most science and engineering majors, is quite questionable.

Given the fact that many EFL learners lack the skill and confidence to engage in academic reading, it must be taken into account the real needs and desires of learners. Huang (2006) quantitatively investigated the situational factors that may motivate EFL to read their content-area texts by analyzing data collected from 212 college business majors. The results indicated that learners were willing to read when assistance was available from EFL teachers, key points were highlighted clearly in textbooks, and reading skills were taught. Huang concluded that learners may have similar needs that should be satisfied in order to sustain the learning effort.

Additionally, some researchers have proposed steps and principles (Buick, 1993; Janzen & Stoller, 1998) that help frame an effective reading program. Buick (1993) suggested a learner-centered approach based essentially on such specifications as self-selecting reading texts, practicing reading in the actual academic contexts of students, identifying learners' interests, and evaluating through an oral presentation. The central role of the instructor was that of a monitor, who re-

sponds to any observed needs for comments and guidance. A check-list was also kept for monitoring reading and related activity. The notion of learner-centeredness implies the importance of understanding learners' learning needs.

Unlike Buick's (1993) learner-centered classroom, Janzen and Stoller (1998) emphasized advance planning on the part of the teacher. Four essential steps include adopting materials at an appropriate level of difficulty, selecting strategies, considering other factors (e.g. student characteristics, the demands of the text, and the goal of the reading instruction), organizing lesson plans and the scripts to guide the presentation of strategies, and adjusting instruction in response to student needs and reactions. These elements in the steps imply the necessity of understanding learners and actively seeking solutions that will facilitate learning.

There is general agreement that ESL/EFL students need skills for effective reading. A number of studies have indicated that L2 reading can be improved by explicit teaching of a repertoire of strategies (Drewyer & Nel, 2003; Janzen & Stroller, 1998; Rusciolelli, 1995). They have suggested that teachers, as researchers, should provide their students from the ground level with strategies training because they need to be equipped with skills to solve their reading problems. Another empirical study showed that explicit teaching of reading strategies is helpful for reading science and technology texts (Mustafa, 1998).

To help students become more strategic readers, teachers should not only be responsible for developing reading instruction, but they also need to systematically teach effective reading strategies (Alexander, 1996). A number of language educators have developed effective teaching methods for reading comprehension and strategy use. A cooperative teaching strategy, namely Cooperative Integrated Reading and Composition (CIRC), was applied by Calderon (1999) to promote learners' proficiency and academic achievement. The results indicated that guided interaction around meaningful and interesting tasks and interesting reading selections helped the most reluctant learners become actively engaged in learning. Recent studies further recommended that teachers create a technology-enhanced environment (e.g. Varsite, a Learning Content Management System) to develop a strategic EAP course (Dreyer & Nel, 2003; O'Reilly, Sinclair, & McNamara, 2004).

While a variety of instructional solutions were provided to ensure the success of academic reading, the needs of the EFL learners in EAP reading have been ignored. According to Deutch (2003), an important aspect in planning and organizing EAP instruction is to understand the students. Teachers need an in-depth understanding of their students and must be willing to address students' learning needs when conducting content literacy instruction (Misulus, 2009). In other words, needs analysis should be set as a priority for academic courses (Deutch, 2003). It is vital to start an instructional program for academic reading with an understanding of the learners' difficulties and needs.

3 Research method

3.1 Subjects

Further to Huang's (2006) quantitative investigation into the needs of business EFL majors in content-area reading, this qualitative study involved 47 Engineering majors² and 59 English majors³ aged between 19 and 20 at a technical university. Those students who graduated from vocational senior high school are usually viewed as less efficient readers with little language training, no matter what major they are (Ou, 1997). They are relatively low motivated, less proficient, and less skilled in their academic performance, compared with their counterparts in general universities (Lin, 1995). To examine whether learners' difficulties and needs in content-area reading vary across academic disciplines, engineering and English majors were chosen for comparison and contrast. By the time the study was conducted, both groups of majors were required to read content-area textbooks written in English in their fields of specialization. However, none of them received any training in EAP reading.

3.2 *Data collection procedures*

Influenced by insights from humanist and cognitive psychology, it is believed that learners bring to learning their own beliefs, goals, attitudes, and decisions (Richards, 2000). Therefore, instead of a five-point Likert-scale questionnaire, a survey with open-ended questions was administered to the students at the beginning of their sophomore year to elicit their needs and difficulties in EAP reading. The students were given the following prompts in answering the survey:

- *Please describe how you read the English textbook(s) for your major courses before?*
- *How did those reading habits influence you, such as your reading proficiency, confidence, motivation, attitudes toward academic reading?*
- *Please describe the difficulties you have when you read English textbook(s).*
- *Please describe how you think the teacher can help you with the academic reading.*

Moreover, researchers must be mindful that self-reported data are typically biased, as students are likely to say what they think is expected of them or reluctant to reveal what they really would like to say, especially to the teacher. Fortunately, this bias was minimized by the fact that the survey was conducted anonymously; thus, the students did not need to please the teacher-researcher. The students were asked to write a minimum of 400 words in order to elicit as much response as possible. The instructor translated the questions to assure that the students understood what was asked of them. Students were allowed to write in Chinese considering their language competency. In-depth interviews were conducted in Chinese with five randomly selected students from each group to clarify questions that arose from the survey.

3.3 *Data analysis*

The coding categories and themes emerged from several attempts to examine the data using the process of inductive analysis involving the processes of identifying, coding and categorizing (Patton, 1990). The researcher repeatedly read through the survey and interview data, then identified and noted recurrent themes and salient expressions regarding difficulties, reading strategies, and needs. The data were examined and compared several times before the final themes were determined. For example, 56 of the 59 respondents mentioned the following: "... I find it very frustrating to read the textbooks in my field. There are so many unknown words that give me difficulties to understand the whole passage." This was coded as "V" and categorized as a "vocabulary problem" with its percentage presented as 94.9%. The categorized themes were then ranked in n order of frequency and percentage, as shown in Tables 1, 2 and 3.

The analysis was also extended to compare the similarities and differences in reading difficulties, strategies, and needs across different disciplines. That is, comparisons between the two groups were conducted by identifying the occurrences and frequencies in each emerged theme, as presented in Tables 1, 2 and 3. The qualitative data enabled further analysis and interpretation of the learning experiences and needs through the learners' own voices. Another researcher scrutinized the first results and provided questions for further examination since member checks heightened face validity by clarifying and confirming intended meanings.

4 **Results and discussion**

4.1 *The academic reading difficulties of EFL technical university students across disciplines*

The analysis of the qualitative data revealed several major themes relating to the technical university students' academic reading difficulties. As shown in Table 1, a large majority of the students (94.9% of English majors; 97.9% of engineering majors) attributed their academic reading difficulties to vocabulary problems, that is, to inadequate vocabulary. Both English and Engineering majors ranked vocabulary as the most problematic area.

Moreover, 54.2 % of English majors and 34 % of engineering majors reported that they had difficulties in comprehending the passage despite the aid of a dictionary. Some students also revealed other problems in such areas as sentence structures (38.9% of English-majors; 27.6% of engineering majors), background knowledge (25.4% of English-majors; 55.3% of engineering-majors), and polysemy (18.6% of English-majors; 0.9% of engineering-majors). They stated that some topics in the reading texts were beyond their common knowledge, and vocabulary with multiple meanings often hindered their reading comprehension.

The qualitative analysis of the data further demonstrated the similarities and differences between the two subject groups, as shown in Table 1. The results revealed that English majors were more linguistically conscious than their counterparts in terms of reading difficulties. A higher percentage of English majors reported that linguistic problems, such as vocabulary knowledge (English 18.6% vs. Engineering 0.9%) and sentence structures (English 38.9% vs. Engineering 27.6%), caused their difficulties in academic reading. In contrast, more Engineering majors (55.3%) than English majors (25.4%) mentioned their difficulties in understanding the content of passage or the terminology.

Table 1. Technical university students' difficulties in academic reading across disciplines

<i>Difficulties in EAP Reading</i>	<i>Frequency & Percentage</i>	
	English majors (N=59)	Engineering Majors (N=47)
1. Inadequate amount of vocabulary	56 (94.9%)	46 (97.9%)
2. Inability to comprehend text meaning	32 (54.2%)	16 (34.0%)
3. Difficulty in understanding sentence structures	23 (38.9%)	13 (27.6%)
5. Lack of background knowledge	15 (25.4%)	26 (55.3%)
4. Lack of vocabulary knowledge	11 (18.6%)	4 (0.9%)
6. Inability to read large quantity of material	6 (10.1%)	3 (6.4%)

Note. Percentage = frequency/total students

Furthermore, the follow-up interview data also supported the findings from the survey entries. Among the ten interviewees, two students in the English group (ENG⁴) and four in the Engineering group (N-ENG⁵) mentioned that they had vocabulary and grammar problems in EAP reading. That is, there were six similar statements in both groups, mentioning that they were badly hindered by a number of unknown words and complex structures while reading their English textbooks (ENG-4 & 5; N-ENG-1, 3, 4, & 5, interview). In addition, three of the students in English group and two of the Engineering majors groaned that they failed to find the main ideas, even with the help of dictionary, and got frustrated with a large number of reading assignments for the assigned chapters (ENG-2, 3, & 5; N-ENG-2 & 3, interview). Some students from the Engineering group mentioned the lack of background knowledge and technical terms which might hinder their academic reading (N-ENG-1 & 3, interview).

Overall, the results, as shown in Table 1, suggested that most of the technical EFL university students in this study perceived vocabulary problem as the predominant obstacle to academic reading. This supports Hyland's (1997), Chen's (1999), and O'Toole and Scheffer's (2008) findings, indicating that a majority of the technical university students perceived that their difficulties in academic reading is due to their inadequate vocabulary ability. Thus, the finding necessitates the expansion of the technical university learners' vocabulary size and knowledge. It would also be worthwhile conducting a further study to investigate how much vocabulary size and knowledge is needed at the threshold to academic reading.

The result also indicated the comprehension of subject knowledge to be another obvious difficulty in academic reading. To comprehend academic content exclusively in English is overwhelming for those students with inadequate language proficiency. This finding provides further support for Hauptman's (2000) schema conception which demonstrated that understanding greatly depends on readers' background knowledge of the content area of a text.

Additionally, in this study, most of the students in the Engineering group reported that most of the terms were unknown to them. This gap might lie in the fact that language courses offered in Taiwan are not intended to teach substantive engineering material and topics. General English courses in senior high school and the university also did not cater sufficiently to these academic requirements in the students' fields of specialization.

Moreover, the students' difficulties in comprehending content texts might result from their learning experiences. Most of the reading courses in the universities are limited to reading short passages, accompanied by assessment with a number of gapfill or multiple-choice questions. This corresponds with Dreyer and Nel's (2003) finding which indicated that EFL college learners were under-prepared for the reading demands that are placed on them. A great majority of the students were thus suffering from the "vicious cycles" of learning (Huang, 2006) – muddling through both the general English course and their fields of specialization, and consequently becoming less-skilled and reluctant readers during their undergraduate study.

4.2 *The academic reading strategies of technical university students across disciplines*

Table 2 reveals that the students' reading strategies vary among individuals and disciplines, because several themes were identified and no single theme was mentioned by a large percentage of the students, except for the strategy of "refer to a dictionary." As shown in Table 2, a majority of students in both the English group (67.8%) and the Engineering group (44.7%) relied on the dictionary for academic reading. However, they differed in the way they processed unknown words. Most English majors (70%) tended to read and underline the unknown words prior to using a dictionary, whereas a majority of Engineering counterparts (85.2%) looked up the unknown words in a dictionary immediately when they encountered them. This finding explained why English majors reported greater use of reading strategies, while Engineering majors tended to rely on teacher facilitations, peers help, or other visual and technical aids such as illustrations, graphs and tables, or Chinese versions of text, as evidenced by Table 2.

Table 2. Technical university students' reading strategies for academic reading across disciplines

<i>Reading strategies</i>	<i>Frequency & Percentage</i>	
	English Majors (N=59)	Engineering Majors (N=47)
1. Refer to a dictionary	40 (67.8%)	21 (44.7%)
Read → underline all the unknown words → use dictionary	28 (70.0%)	3 (14.3%)
Look word immediately → read	12 (30.0%)	18 (85.2%)
2. Preview the titles and keywords	14 (23.7%)	3 (6.4%)
3. Note taking & summarize important details	11 (18.6%)	5 (10.6%)
4. Guess the word meaning	8 (13.6%)	4 (8.5%)
5. Teacher facilitation (e.g. explain & highlight key-points)	5 (8.5%)	18 (38.3%)
6. Read Chinese version of text	1 (1.7%)	8 (17.0%)
7. Ask help from peers or teacher	5 (8.5%)	10 (21.3%)
8. Refer to graphs, tables, or illustrations or exercises	1 (1.7%)	10 (21.3%)
9. others (e.g. use translation software)	0 (0%)	4 (8.5%)

Additionally, it was found that compared with non-English majors, more students in the English group were more skilled and autonomous in applying reading strategies such as previewing titles and keywords (23.7%), note-taking and summarizing (18.6%), and guessing word meaning (13.6%); however, the percentage of students reporting these strategies were low. While more students in the English group were able to underline longer sentences and summarize important details, Engineering majors tended to rely on other resources, namely teachers' help in explaining or highlighting key points (38.3%), Chinese versions of textbooks (17%), and help from other

peers (21.3%). Moreover, Engineering majors reported that they referred to graphs, tables, or illustrations or the follow-up exercises (21.3%) to understand the text.

Furthermore, the follow-up interview data also revealed that inexperienced students depended heavily on a dictionary for solving word problems. Some students in the English group and the Engineering group admitted that they look up every unknown word in a dictionary, put down the Chinese meaning below the target word, and translated the sentences to Chinese (ENG-1, 4; N-ENG-3 & 4, interview).

4.3 *The needs of technical university learners across disciplines*

Table 3 indicates the diverse needs of the students in both the English and Engineering groups with no single category revealing an extraordinarily high percentage. The percentage of needs in each category was not very high due to a variation among the student population. In other words, the survey results further indicated that while there were some common needs for academic reading among the students, there was some variations across disciplines. Overall, the students reported their eagerness to be taught terminologies and vocabulary. Among the themes identified for both groups, the need for pre-teaching of special terminology ranks as the students' foremost need for academic reading, followed by teachers' facilitation (e.g. highlighting key points and instructing reading skills).

Table 3. Technical university students' needs for academic reading across disciplines

<i>Needs</i>	<i>Frequency & Percentage</i>	
	English majors (N=59)	Engineering majors (N=47)
1. Pre-teach vocabulary & terminology	27 (45.8%)	16 (34.0%)
2. Teacher facilitation (e.g. key-points highlight)	14 (23.7%)	7 (14.9%)
3. Teach reading skills	11 (18.2%)	7 (14.9%)
4. Proper materials selection (e.g. difficulty level)	9 (15.25%)	5 (10.6%)
5. Teach sentence structures and grammar	5 (8.5%)	7 (14.9%)
6. Others (e.g. less demanding in quantity; TA availability)	3 (5.1%)	4 (8.5%)

In general, the students reported a need for assistance from subject lecturers (e.g. in pre-teaching terminology, highlighting key points, and teaching grammar). This is consistent with Huang's (2006) finding that indicated teachers' facilitation is the most important form of assistance for students in academic reading.

Another interesting finding is that more students in English group (15.3%) than in the Engineering group mentioned the importance of materials being pitched at the appropriate difficulty level and of learning reading skills, as can be seen in Table 3. However, compared with their English counterparts (8.5%), more students in the Engineering group (14.9%) reported a need for the teaching of sentence structures and grammar, in addition to vocabulary and reading skills. Moreover, a few students in both groups revealed a need for less reading assignments due to their inability to cope with long reading texts.

The reason that more English majors mentioned the selection of appropriate materials might be because most of them had not reached the level of reading proficiency necessary for reading academic textbooks and thus had difficulties in comprehending large amount of language input. However, the fact that fewer Engineering majors reported this issue does not mean that they could read well. One possible reason might be that most of them referred to visual aids (e.g. figures, tables, or formula) in the passage or technical aids (e.g. Chinese versions of the texts) (Huang, 2006). The findings with regard to students' needs are also consistent with those regarding their strategy use, as shown in Table 2.

In-depth interviews provided further evidence to support the finding that students in both the English and Engineering groups considered teacher facilitation to be their most prominent need. During the interview, some participants mentioned that they felt frustrated with reading English textbooks and hoped to be taught some English terms although they might have already learned their Chinese equivalents (ENG-2, 3; N-ENG-1, 2, 4, interview). Furthermore, two of the five Engineering majors moaned about the reading load and revealed a desire for teachers' help in highlighting the key points (N-ENG-3 & 4, interview).

The findings in Table 3 indicate that there is a need for the teaching of helpful academic reading skills to technical university EFL students. This study lends support to Alexander's (1996) and Mustafa's (1998) assertions that the explicit and systematic teaching of reading strategies is helpful for reading scientific and technical textbooks. Given the fact that many technical university EFL students revealed a need in this respect, it is clear that they have to be equipped with skills to gain a good comprehension of their academic textbooks.

5 Conclusion, pedagogical implications, and limitations

In conclusion, this study revealed that technical university EFL students' academic reading difficulties fall broadly into the categories of linguistic and content-matter constraints. Overall, most of the students indicated that insufficient vocabulary and a lack of specialist knowledge represent serious obstacles to academic reading. There were variations among the participating students from two different disciplines in terms of their reading strategies and needs. Many students in this study revealed a desire for greater teacher facilitation (e.g. in pre-teaching some terminology, highlighting key points, and teaching grammar).

The following pedagogical implications, drawn from the findings of this study, offer some suggestions to improve the teaching of academic reading. First, teachers should be supportive as there was clearly need for teacher facilitation. Pre-teaching frequently occurring terms or difficulty words might make students feel more secure in their academic reading. It might also be helpful to activate appropriate schemata by asking warm-up questions and directing students to relate the content to their prior knowledge. Students might feel more motivated to read if teachers would explain the organization and structure of the articles and highlight key points in the text. If other possible resources, such as TA assistance, are available, many students might feel less helpless when they cannot fully understand the subject content.

Secondly, it is the content teacher's responsibility to choose reading texts at an appropriate difficulty level and with less complicated sentence structures, a clear organization and layout. At least at the initial stage, it might be helpful to start with less intimidating textbooks – for example, a simplified international edition – to maximize EAP reading.

Thirdly, all students in different learning contexts should not be taught with the same method because they have different perceptions and require different classroom activities. As demonstrated in the findings (see Tables 2 & 3), the students across disciplines reported different difficulties and needs for academic reading due to different learning backgrounds and language proficiency. For the EFL Engineering majors, teachers should provide help, such as highlighting key points, pre-teaching difficult vocabulary and terms, providing clear organization and layout, and so forth.

Finally, it is imperative to incorporate strategies with EAP reading, such as teaching how to recognize prefixes and suffixes, prediction, skimming, scanning, finding main ideas, using context clues, referring to graphs and tables, and summarizing. Moreover, instruction must focus on the application of skills learned in a general reading class to specific contexts (Janzen & Stoller, 1998; Mustafa, 1998; Walker & Huber, 2002). For instance, students can learn to apply such skills as outlining and note-taking to academic reading.

Additionally, it might be helpful to involve students in both extensive and intensive reading that are discipline-specific. As shown in this study, although most Engineering students found it helpful to understand the subject content by referring to teachers' highlights, graphs, tables, illustrations, or examples in the textbook, subject knowledge and the general principles behind the theory cannot be gained just by doing the follow-up exercises with standardized answers. The ability

to read academic texts is considered to be one of the most important skills that EFL learners need to acquire (Levine, Ferenze, & Reves, 2000). By doing such “artificial” reading, students will never learn how to read and obviously be disadvantaged in terms of their competitiveness vis-à-vis other graduates who can read English texts well. It is also necessary to integrate writing tasks such as essays or summaries into EAP writing. Thus, students can not only practice reading excerpts from the text, but also writing and acquire skills that would be required in their academic life.

Although some interesting findings were obtained in the present study, they should be not taken as conclusive due to the following limitations. The study needs to be replicated and expanded in future because it was a conducted on a small scale with a limited research design and a small number of subjects. More insightful results could be achieved if a research approach involving quantitative and qualitative methods were applied. Subjects from a wider range of disciplines should also be included.

To sum up, to help EFL students with academic reading, educational researchers should learn more about the learners, their difficulties, and needs. Although the findings may not be generalized to other learners, they provide nevertheless a holistic understanding of EFL learners as well as fruitful insights for teachers who encounter the same teaching problems. The present study suggests that teachers should attempt to understand learners’ internal affective reactions to the entire reading program to avoid making wrong assumptions in terms of text difficulty, materials selection, teaching methodologies, and course design. By understanding what students need, teachers can effectively design an instructional program and precisely assess students’ growth in academic reading.

Notes

¹ Technical university learners refer to those in Technological and Vocational Education System, who are defined as relatively inadequate in their vocabulary size, grammar knowledge, and strategy use (Ou, 1997) and are found to be low motivated in their academic performance, compared with their counterparts in the general universities (Lin, 1995). In Taiwan, the Technological and Vocational Education System also includes universities of science and technology.

² Engineering majors in this study involve those majoring in Mechanical Design, Power Engineering, and Electrical Engineering.

³ English majors in this study refer to those who were registered in the Applied Foreign Languages Department of the technical university where the study was conducted; however, they had graduated from non-English disciplines, such as information management or accounting, at vocational senior high schools and lacked experience in content-area reading.

⁴ “ENG” refers to the students in the English-major group. The subject’s serial number is given as ENG-x.

⁵ “N-ENG” refers to the students in the Engineering group. The subject’s serial number is named as N-ENG-x.

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