

## Teaching Technical Vocabulary through Word Formation Rules

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### Abstract

Technical vocabulary instruction occupies a crucial role in the field of English for science and technology (EST). Recognizing students' needs and their linguistic background knowledge has a considerable impact on teaching English technical vocabulary for L2 learners. The present study investigates whether word formation rules could help Moroccan computer engineering students learn and recognize vocabulary items related to their specialty. A background questionnaire was administered to 42 undergraduate computer engineering students from the Higher School of Technology. The subjects were also asked to take a technical vocabulary test and a course treatment on word formation rules. The findings revealed that most students were not aware of word formation rules before the instruction. Results of the morphological awareness test showed that the instruction was statistically significant. Thus, the null hypothesis was rejected as the direct instruction on the word formation rules proved to be effective.

**Keywords:** EST, technical vocabulary, word formation rules, computer engineering

## 1. Introduction

English for science and technology (EST) has recently brought much attention from English teachers and science students alike. Computer engineering (CE) students in Morocco learn technical English so as to get familiarized with the specific type of English related to their specialty. In this context, learning vocabulary, among other skills, has become a significant factor to students' technical English learning. According to Read (2004), two distinctions should be made when referring to specific purpose vocabulary. The first of which is to focus on sub-technical words which are frequent in academic texts. The second is to identify the technical terms associated with specific disciplines. The former was developed by Coxhead's (2000) Academic Word List which compiles 570 word families based on a thorough analysis of 3.5 million word corpus of written academic texts. The latter was developed by Ward (1999) who created a corpus of 200 most frequent word families of engineering texts. The present study adopts Ward's contribution since the purpose of the researcher is to measure the efficiency and usefulness of word formation rules in learning technical vocabulary related to CE corpus.

## 2. Teaching Technical Vocabulary

Learning vocabulary has a substantial role in language learning as it enhances students' level of both receptive and productive skills. In English for specific context, CE students acknowledge the importance of vocabulary learning in improving their level of English language. A needs analysis conducted by Mahraj (2017) on CE students at the Higher School of Technology of Berrechid (ESTB) showed that vocabulary learning is a significant factor for CE students' success in learning technical English. Results of the study showed that most CE students thought that vocabulary is as much important as the four skills (p.81). Along this line, the present study suggests a content based instruction as it integrates the target language skills and the learning of content (Mansouri: 2010, p.24). According to Nation (2001, p.263), most English content words can change their form by adding prefixes or suffixes which constitute word parts. This study attempts to teach technical vocabulary through using word formation rules. Morphologically speaking, word formation processes include compounding and derivation. The latter is divided into affixation and non-affixation. Affixation includes prefixation, infixation and suffixation. Infixation is excluded in the present study as "morphologists usually agree that English has no infixes" (Plag: 2003, p.127). Our focus will be on affixation (prefixation and suffixation), compounding, and acronyms as a non-affixation rule.

The graph below represents word formation rules investigated in the present study:

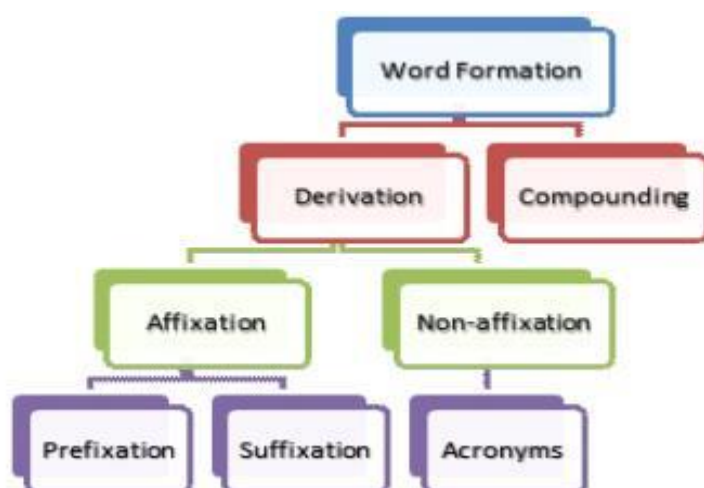


Figure1: word formation rules adapted from Plag (2003: p.22)

A succinct definition of the word formation rules used in the present study is set as follows:

- Compounding: the combination of two morphemes to form a new word. Lieber (2005, p.375) distinguishes two forms: “synthetic compounds (also called verbal, deverbal, or verbal nexus compounds) are ones in which the second stem is derived from a verb, and rootcompounds (also called primary compounds) are ones in which the second stem is not deverbal”.
- Prefixation: the process of adding prefixes to words that usually changes meaning. Lieber (2005, p.391) states that prefixes are attached to words rather than roots except for latinate forms.
- Suffixation: the process of adding suffixes to words to change word category.
- Acronyms: the formation of a word from the initial letters of a name.

A review of the related literature showed that little research has been done on the role of word formation rules in teaching technical vocabulary. Yet, in research on the effect of word formation rules on students learning, Olshtain (1987) found that advanced students attained a higher level of language competence than intermediate students through the acquisition of new word formation processes. Equally important, Khoury (2008) studied whether root and pattern strategy could help students identify and produce new vocabulary items in Arabic as a foreign language context. Findings of the study demonstrated that students who received direct instruction on word formation processes did well than those who didn't receive any instruction. Another study by Al Jarf (2011) on the teaching of word formation processes to translation students showed that instruction in both English and Arabic word formation is significant as it helps translation students identify the similarities and differences between both languages, and enhance their translation skills of English technical terms.

### 3. Statement of the Problem

With the advent of technology and the speedy evolution of research in science and technology, computer engineering students at the Moroccan Higher School of Technology in Berrechid (ESTB) find difficulty to recognize and understand English technical vocabulary. Being instructed in French and with a limited knowledge of technical vocabulary, students find it difficult to cope with the

English terminological nuances in the field of CE.

#### **4. Research objectives**

The present study aims at helping undergraduate students recognize the frequent word formation processes in technical vocabulary. In particular, it attempts to strengthen their affix background of computer engineering vocabulary by ways of understanding the frequent word formation processes peculiar to this field.

#### **5. Research Hypothesis**

The study attempts to confirm or disconfirm the following hypothesis:

Computer engineering students have a limited knowledge of word formation rules in technical vocabulary.

Since this research utilizes a pretest and post-test design, the null and alternative hypotheses can be formulated as follows:

- **H<sub>0</sub>**: Making students aware of word formation rules related to computer engineering WILL NOT improve their level of technical vocabulary;
- **H<sub>1</sub>**: Making students aware of word formation rules related to computer engineering WILL improve their level of technical vocabulary.

#### **6. Research Questions**

The present study attempts to answer the following questions:

- Are computer engineering students aware of English word formation rules?
- Can computer engineering students internalize English word formation rules?

#### **7. Research Methodology**

##### **7.1 Samples**

Forty two undergraduate students participated in the study. They were in semester 1 of CE specialty at the “Ecole Supérieure de Technologie Berrechid”. They had an English class of three hours per week taught by the researcher. The subjects were taught 42 hours of technical English throughout the semester.

##### **7.2 Instruments**

Two research instruments were used in this study. Firstly, a language background questionnaire was administered to the subjects before the intervention. The questionnaire aimed to check the respondents' English background knowledge, their level of English, the strategies used to learn technical vocabulary. Secondly, a technical vocabulary test was conducted before and after the treatment. The test includes two parts: part one tests the learners' affix knowledge (prefixes and suffixes) through a 40 item list. Part two tests their knowledge of compounding through a five item matching rubric. The last part tests learners' acronym knowledge through three different rubrics.

### 7.3 Instructional procedure

The instructional procedure took place after the pretest. Students received direct instruction in English word formation rules, namely; prefixation, suffixation, compounding and acronym. Each word formation was explained and illustrated by examples related to computer engineering lexicon. Each word formation rule took three hours instruction which is actually the weekly allotted time for the English class. During each course, learners had to practice the newly learned rules both in isolation and in context. The instructed word formation rules and their definitions were adopted from Lieber (2005), Plag (2003) and Bauer (1983). Some of the exercises assigned during the instruction were adopted from Marks (2007) and Eteras & Fabre (2007).

### 7.4 Data collection and data analysis

Students were informed about the purposes of the present study prior to the administration of the survey. They responded to the language background questionnaire using an online platform. Also, they took one hour to answer the test. Aligning with the purposes of the study, respondents were not allowed to consult any dictionary. Obtained data were analyzed using SPSS Statistics 22. Descriptive statistics were used to measure students' level of technical vocabulary knowledge. Also, a paired t-test was calculated to find out whether there was a significant difference between the pretest and post-test scores.

## 8. Results and Discussion

To respond to the research questions, two descriptive statistics were conducted. The descriptive statistics related to the frequent strategies which students resort to when they encounter a new word are shown in table one:

Table 1: The strategies used by students when they encounter a new word

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid I use word parts	5	11.9	11.9	11.9
I check a dictionary	20	47.6	47.6	59.5
I guess from the context	15	35.7	35.7	95.2
other	2	4.8	4.8	100.0
Total	42	100.0	100.0	

The table shows that students' most frequent strategy is checking dictionaries (20). CE Students, also, resort to guessing the meaning from the context (15). Only (5) respondents stated that they use word parts to identify the meaning of newly encountered word. This result reveals that most students are not aware of English word formation rules. Here comes the significance of the study.

The descriptive statistics related to the pre and post-test scores are displayed in table 2 below:

Table 2: Descriptive Statistics of the Pre and Post-test Scores

	Mean	Median	Standard Deviation	Standard Error	Range
Pre-test	35.17	33.25	14.04	2.1677	65.50
Post-test	80.28	83.75	12.37	1.9095	49.00

Results of the descriptive statistics of the pre and post-test scores demonstrate that the performance of students on the post-test was much better than the pre-test (mean = 80.28% and 35.17% respectively). Results also show that the typical student scored 83.75% on the post test and 33.25% on the pretest. A comparison of the mean scores of both tests showed a significant difference in identifying, learning and applying English word formation rules to understand technical vocabulary related to CE. These results demonstrate that instruction in English word formation rules proved to be effective in making CE students aware of the English word formation processes, and apply them to understand difficult vocabulary items in their specialty.

In order to check whether there is any improvement in students' knowledge of word formation rules, a paired samples test was calculated. Table 3 below shows the result of the paired samples test:

Table 3 Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-test - Post-test	-45.10714	14.04980	2.16793	-49.48537	-40.72892	-20.807	41	.000

As displayed in table 3, the paired samples test showed that there were significant differences in terms of students' knowledge of word formation processes because the post instruction mean was statistically and significantly higher than the pre instruction mean (mean difference = -45.10%). Thus, the null hypothesis was rejected ( $T=20.80$ ;  $P<.001$ ) while the alternative hypothesis was accepted as CE students became aware of the frequent word formation processes (prefixation, suffixation, compounding, acronyms) used to form CE terms. They also applied this acquired knowledge to understand and coin new words by and large. Accordingly, the direct instruction on word formation rules had a significant effect on CE students' vocabulary learning. These findings go hand in hand with previous studies by Al Jarf (2011) who found that translation students who received training in word formation processes attained a higher level of English morphological knowledge that helped them produce acceptable and appropriate translations from and into English.



## 9. Conclusion

Based on the results of this study, teaching technical vocabulary through word formation rules to CE students proves to be effective. Results of the questionnaire and the pretest showed that students at engineering streams were not aware of the English word formation rules. However, the post-test revealed differences in the use and application of the word formation rules on CE vocabulary at the level of .05. As a result, the instructional procedure carried out by the teacher researcher was statistically significant as it enabled the subjects to identify and produce new technical words related to their specialty.

The present study does have some limitations that should be taken into consideration for further research. Because the study is a small scale research, its result cannot be generalized to all CE students in Morocco. So, using an exhaustive research would come up with more reliable result. Equally important, the present study is quantitative as it uses descriptive statistics as the main research method. Thus, using another qualitative instrument would enrich the existing literature and provide more valuable information on the research area.

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