

Study of IT Terms Used in Non-Vocational High School *Information Technology* Class Textbooks: Toward Corpus-Based Lexical Studies and Sentence Comprehension

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Abstract

Computer terms, IT terms, and loanwords in Japanese are most commonly written in katakana. Katakana characters are written with fewer strokes than kanji characters, and therefore provide fewer clues that help in recognizing the characters. Also, many katakana characters are similar in shape, so learners of Japanese tend to find katakana terms harder to learn. Yet as information technology continues to advance, the number of new IT terms proliferates. Beginning in 2003, compulsory courses in *Information Technology* were added to the regular non-vocational high school curriculum, and this inspired me to examine the IT terminology and katakana words used in the textbooks for these classes. I surveyed the vocabulary in 23 textbooks (3,127 pages in all) used in the non-vocational high school *Information Technology* classes. More specifically, I extracted the IT terms listed in the indexes of the textbooks, and compiled an IT terminology list. Next, I culled just the katakana terms from the list, and analyzed the characteristics of the katakana words. I found that 1/4 of all the IT terms in the indexes of the textbooks were katakana terms. In comparing the three *Information Technology* classes (*IT-A*, *IT-B*, and *IT-C*), I also found a substantial difference in the number of “tokens per textbook” among the three classes. At the same time, I observed that the *Information Technology A* class tended to have fewer “types per textbook” than the *Information Technology B* class. This suggests that the *Information Technology A* class had fewer kinds of IT terms in the indexes of the texts used in those classes compared to the textbooks use in the *Information Technology B* classes, and the types of terms missing in the *IT-A* classes were represented in the indexes of textbooks used in the other classes. And conversely, there were more kinds of IT terms in the indexes of the *IT-B* class texts than in the *IT-A* class texts. In analyzing the IT terms found in the indexes of at least 10 out of 23 textbooks, I discovered that katakana terms accounted for about half of all the IT terms. It is thus apparent that a great many of the high frequency IT terms found in the indexes of many of the textbooks are katakana terms.

Keywords : vocabulary survey, katakana terms, *Information Technology* classes, loanwords, corpus, IT terms

1. Introduction

In previous work, the authors investigated Japanese language converted to electronic format (primarily Japanese text data sent over the Internet), and developed language structure analysis, semantic analysis, and other quantitative language processing methods. Then, after compiling and analyzing loanwords and other kinds of vocabulary, we used this Japanese corpus (i.e., digitized text that can be processed by computer) for further investigative work (Nozaki et al., 2009). Because this approach clarifies usage and characteristics of expression for loanwords and all sorts of other vocabulary, it holds great promise for applications to language education and Information technology education by identifying newly coined loanwords for inclusion in dictionaries, culling example sentences

for inclusion in corpora, helping understand the concepts behind recondite IT terms, and so on.

Loanwords are words that have been adopted from foreign languages with little or no modification. A great many loanwords are in current use in Japan including technical terms (IT-related terms such as *faiaworu* (firewall)), words reflecting an earlier period or social conditions (once fashionable words such as *rebenji* (revenge) and *karisuma* (charisma)), and countless other loanwords in Japanese. Indeed, loanwords are often used as essential key words in sentences, and the importance of loanwords tends to be increasing. Especially as the information-oriented society continues to evolve, we are seeing a rapid proliferation of difficult-to-understand loanwords relating to Information technology. While there is an enormous number of

loanwords in current circulation in Japan, they are often hard to understand by elderly folk or people learning Japanese as a second language who do not have a strong technical background. An analysis of loanwords will provide useful data for developing language acquisition support systems and should prove very beneficial for promoting Japanese language education.

Turning to high school education in Japan, a series of new *Information Technology* courses were introduced to the curriculum starting in 2003, one series for the regular non-vocational high schools and a different series for the technical high schools. The non-vocational program is divided into three classes: *Information Technology A*, *Information Technology B*, and *Information Technology C*. The emphasis of the three classes is somewhat different: *Information Technology A* highlights the practical aspect of IT, *Information Technology B* gives students a scientific understanding of IT, and *Information Technology C* explores the attitudes towards the information-oriented society. While students are only required to take one of the three classes, the material is structured and taught in such a way that all three of these objectives—practical aspects of IT, scientific understanding of IT, and attitudes toward the information-oriented society—are covered in each of the classes. In other words, all three classes try to achieve the same basic educational objectives with respect to IT, but the relative emphasis on the content is somewhat different. For example, the primary emphasis of *Information Technology B* is to give students a solid scientific understanding of IT, but this cannot be done without also learning the practical aspects of IT, which is covered in the *Information Technology A* classes.

To summarize, important aspects of the Japanese language today are (1) increasing importance of loanwords, (2) increasing use of hard-to-understand IT-related loanwords (especially computer terminology) as the information-oriented society continues to unfold, and (3) *Information Technology* has now become a compulsory subject in the high school curriculum using textbooks that contain many IT-related terms. Considering (1) above, this study focuses on loanwords. And addressing points (2) and (3), the study focuses specifically on IT-related loanwords, and analyzes the terms that are included in the textbooks used by the regular non-vocational high school *Information Technology* classes.

The high school *Information Technology* textbooks contain a great many IT-related words. For this study, I first extracted the IT terms from the indexes of the non-vocational *Information Technology* textbooks and compiled an IT terminology list. I then analyzed the characteristics of the IT terminology used in high school texts. The work has been beneficial in helping understand the more obscure IT terminology, and in providing useful instructional knowledge for the *Information Technology* classes.

2. Previous Lexical Studies of Textbooks

In this section I will briefly review previous lexical studies of textbooks in Japan. Quite a number of such studies have been done, and those carried out by the National Institute for Japanese Language (NIJLA) are particularly well known (1983, 1984, 1986, 1987, and 1989). In 1983 the NIJLA conducted a survey of vocabulary used in high school social studies and science textbooks that were used in 1974 (NIJLA, 1983). The study addressed nine courses in all: five social studies courses (Social Ethics, Politics and Economics, Japanese History, World History, and Geography B) and four science courses (Physics I, Chemistry I, Biology I, and Geography I). Then in 1986, the NIJLA carried out a survey of vocabulary in middle school textbooks that were used in 1980 (NIJLA, 1986). That survey encompassed a total of seven textbooks: four science texts (Science 1 first and second semester books and Science 2 first and second semester texts) and three social studies textbooks (History, Geography, and Civics). One can see that the NIJLA has carried out some very large-scale lexical studies of textbook in Japan. The NIJLA studies achieve a high standard of reliability and detailed analysis, so these surveys constitute a very valuable resource. The problem is that the NIJLA textbook surveys were done some three decades ago, so it is essential that we conduct new studies examining the vocabulary of modern textbooks that are currently in use.

Saito et al. (1999) surveyed adjectives used in elementary level Japanese language readers, and Hashimoto (2001) investigated loanword usage in high school Japanese language textbooks. Nuibe (1984, 1985) investigated English language textbooks used in the schools. Yoshida (2006) examined the content of the horticulture section of the 2002 edition of middle school Technology and Home Economics textbooks. He examined the frequency and rate of usage of hiragana, katakana,

and kanji, and analyzed the difficulty of the vocabulary and kanji. One can see that a range of textbooks have been examined from elementary to high school level. An obvious omission among these studies is that none has looked at the new high school *Information Technology* textbooks. Moreover, while a number of researchers have considered the overall state of loanword usage, no one has looked specifically at IT-related terminology. Here we address these omissions by examining the state of IT terminology usage in the regular non-vocational *Information Technology* class textbooks.

Lexical studies have also been done with the goal of helping and improving Japanese language instruction. At Fukushima National College of Technology a study was done of two textbooks that foreign exchange students found especially difficult to understand—Electricity Basics and Machinery and Materials (Omori, 2000). The basic engineering-related technical terms were then classified, and it was found that 90% of the technical terms and loanwords were seldom used in normal everyday discourse. Muraoka (1997) examined the vocabulary in eight issues of a technical agriculture journal, and his findings have proved very helpful in thesis writing and in clarifying the meaning of the area-specific Japanese terminology. So terminology and vocabulary studies have not just been confined to K-12 textbooks, but have been also been applied to the analysis of technical journals and textbooks used in technical colleges. It is apparent that lexical studies have been done with the goal of helping foreign students better comprehend written Japanese.

3. Research Objectives

This study addresses the shortcomings and omissions of previous research that were detailed in the previous section by:

(1) Examining the vocabulary and terminology used in the latest textbooks. As useful as they were, the studies by the National Institute for Japanese Language (NIJLA) were done close to three decades ago, so it is imperative that we do similar studies for the current textbooks that are now in use.

(2) Examining the textbooks used in regular non-vocational high school *Information Technology* classes. This is important because, so far, no studies have examined the vocabulary in the high school *Information Technology* class textbooks.

(3) Analyzing the different types of IT terminology used in the *Information Technology* textbooks based on the finding of (1) and (2). Surveys have been done in the electrical, mechanical, material (Omori, 2000), and agricultural spheres (Muraoka, 1997), but so far no study has examined IT terminology in the area of Information technology.

(4) Analyzing loanwords found among the IT terms that are written in katakana. Hashimoto (2001) surveyed loanwords used in Japanese language textbooks, but so far no one has analyzed the use of loanwords in the new *Information Technology* textbooks. The emphasis here on katakana loanwords among IT terminology is warranted for three reasons: (1) Technical terms written in kanji or kanji compounds are relatively easy for Japanese to understand, because public education does a good job of teaching kanji. (2) But many IT terms are loanwords written in katakana, most of which derive from English. (3) Since the native language of Japanese high school students is not English, naturally katakana loanword are harder to grasp than technical terminology written in kanji.

(5) Compiling an IT glossary based on the finding of (1)–(4), that provides a useful resource supporting high school level *Information Technology* education. Specifically, I investigated to see if there are any discernable differences in the way IT terminology is used in the various textbooks used in the three *Information Technology* classes.

4. Survey of Vocabulary Used in Non-Vocational High School *Information Technology* Textbooks

This section first examines the vocabulary used in the regular non-vocational *Information Technology* textbooks used in high school classes, then analyzes the actual state of usage of IT-related terms.

4.1 Methodology

4.1.1 Material

The specific content we will be examining in this study are the textbooks used in Japan's non-vocational high schools to teach *Information Technology* classes in 2003. The subject matter is covered in three classes called *Information Technology A*, *Information Technology B*, and *Information Technology C*. In this study I examined a total of 23 textbooks: 11 texts used in the *IT-A* classes, 6 books used in the *IT-B* classes, and 6 books used in the *IT-C* classes. Table 1 is a list of the publishers of the 23 textbooks examined. For example, one can see that the 11 textbooks used

in the *IT-A* classes were published by 11 different publishers. Similarly, the 6 texts used to teach *IT-B* and 6 books used in the *IT-C* classes were published by 6 different publishers each. The numbers in parenthesis after the publishers' names indicate the number of pages in the textbook. Counting all 23 textbooks provided by 11 publishers, the study encompasses 3,127 pages of textbook content.

Table 1
Textbooks Examined in This Study and Their Publishers

| | Publishers (pages) | Total Pages |
|-------------|---|-------------|
| <i>IT-A</i> | 第一学習社(136), 一橋出版(144), 日文出版(142), 清水書院(144), オーム社(122), 教育出版(127), 開隆堂(133), 啓林館(119), 東京学習出版社(144), 数研出版(99), 暁出版(137) | 1447 |
| <i>IT-B</i> | 第一学習社(136), 清水書院(164), オーム社(142), 教育出版(127), 開隆堂(133), 啓林館(167) | 869 |
| <i>IT-C</i> | 第一学習社(136), 一橋出版(126), 清水書院(132), オーム社(123), 教育出版(127), 啓林館(167) | 811 |

Note - The numbers in parenthesis after the publishers' names indicate the number of pages in the textbook.

4.1.2 Procedure

First I extracted all of the IT terms listed in the indexes of the 23 textbooks examined, and manually entered the terms into a computer. Then I compiled the IT terms to create a IT terminology list. I then classified the IT terms in terms of type of character based on the JIS X 0208-1990 standard. The 10 characters represented by cells 03-16 to 03-25, that is 0-9, are *numerals*. The 83 characters represented by cells 04-01 to 04-83 are *hiragana*. The 86 characters from cells 05-01 to 05-86 are *katakana*. And the 6,355 characters represented by cells 16-01 to 84-06 are *kanji* (that is, the kanji included in JIS Level 1 kanji and JIS Level 2 kanji). The 52 Roman characters are represented by cells 03-33 to 03-58 (upper case characters) and 03-65- to 03-90 (lower case characters). In addition, various symbols are also included in the character set including a variety punctuation marks and mathematical signs that are not included in numerals, hiragana, katakana, kanji, or Roman characters.

For the purposes of this study, katakana terms are defined as character strings longer than one character consisting of the 86 katakana characters

defined above, plus a macron (—) to represent long vowel sounds and a centered period (·) to separate compounds for a total of 88 characters. Specifically excluded from my definition of katakana terms are (1) terms combining katakana and Roman letters such “shifuto JIS kodo” (shift JIS code) and “IP adoresu” (IP address); (2) terms combining kanji and katakana such as “domein mei” (domain name), “ta cyanneru ka” (multiplication of channels), and “iho kopi” (illegal copy). Minor variations in the way katakana terms are written (spelled)—e.g., “sekyuritii” vs. “sekyuriti” (security) one written with the a macron extending the vowel sound and the other without the macron—are handled as follows. Although the original terms are the same (security), variations in orthography are treated as separate entries for the purpose of counting frequency of use.

4.2 Results and Discussion

4.2.1 Word Frequency Analysis

Using the procedure outlined above, we extracted 2,751 IT term types and 5,944 IT term tokens. Out of this corpus, we then culled 690 katakana term types and 2,024 katakana term tokens. The katakana terms thus accounted for 25% of the IT term types ($690/2751 = 0.25$), and 34% of the IT term tokens ($2024/5944 = 0.34$). It is thus apparent that the katakana terms accounted for a very significant proportion of the IT term types (25%) and IT term tokens (34%). These finding reveal that, compared with other orthographies, (1) katakana IT terms constitute 1/4 of the IT terms, but (2) account for approximately 1/3 of the usage of all the IT terms.

Table 2 shows the list of IT terms compiled in the study. There is not enough space to reproduce the entire list, so the list only shows the 35 most frequently used IT terms with a frequency rating of 15 or greater. Table 3 shows the frequency ratings of the katakana terms. These are just the katakana terms culled from the list in Table 2. Due to limited space, I included just the 56 most frequently used terms with a frequency rating of 9 or higher.

To understand what I mean by the term *frequency rating*, consider the katakana term “intanetto” (Internet) that has a frequency rating of 22. This simply means that the term “intanetto”

(Internet) is included in the indexes of 22 out of the 23 textbooks used in the regular non-vocational *Information Technology* classes. Since the term appears in the indexes of 22 out of 23 books, the

inclusion rate is 22/23 or about 95.6%. Similarly, the incidence of the term “bitto” (bit) in Tables 2 and 3 is 20/23 = 0.87, for an inclusion rate of 87%.

Table 2
IT Terminology List

| Frequency | IT Terminology (Words About the Information Technology) |
|-----------|--|
| 22 | 電子メール, インターネット |
| 20 | 著作権, ビット, デジタルカメラ |
| 19 | マルチメディア, データベース |
| 18 | 文字コード, プロトコル, バイト, HTML |
| 17 | 検索エンジン, プライバシー, パスワード, ソフトウェア, コンピュータウイルス, LAN |
| 16 | 標準化, 電子商取引, プレゼンテーション, ピクセル, Webページ, WWW, 2進数 |
| 15 | 量子化, 情報通信ネットワーク, 画素, 圧縮, メーリングリスト, ホームページ, ハードウェア, コンピュータ, アナログ, OS, CPU |

Note-Only 35 terms with a frequency rating of 15 or higher.

Table 3
Katakana Terms Frequency List

| Frequency | Katakana Terms (about IT Terminology) |
|-----------|---|
| 22 | インターネット |
| 20 | ビット, デジタルカメラ |
| 19 | マルチメディア, データベース |
| 18 | プロトコル, バイト |
| 17 | プライバシー, パスワード, ソフトウェア, コンピュータウイルス |
| 16 | プレゼンテーション, ピクセル |
| 15 | メーリングリスト, ホームページ, ハードウェア, コンピュータ, アナログ |
| 14 | リンク, プログラム, ハイパーテキスト, デジタル |
| 13 | プロバイダ, ブラウザ, パーソナルコンピュータ, ネットワーク, コンピュータネットワーク, キーボード, イメージスキャナ |
| 12 | キーワード |
| 11 | メディア, マウス, フォント, ファイル, ファイアウォール, ハードディスク, ネットニュース, チャット, サーバ |
| 10 | フロッピーディスク, フォルダ, パケット, ハイパーリンク, データ, セキュリティ, シミュレーション, クライアント, アルゴリズム, アプリケーションソフトウェア |
| 9 | ワールドワイドウェブ, メールサーバ, ファクシミリ, バーコード, ネットケット, デジタルビデオカメラ, スキャナ |

Note - Only 56 terms with a frequency rating of 9 or higher.

Next, I extracted just the IT terms with a usage rate of 10 or greater from Tables 2 and 3 for closer analysis. Again, a usage rate of 10 or more simply means that the term is included in the indexes of at least 10 out of the 23 textbooks. Table 4 lists the types and tokens for the IT terms with a usage rate of 10 or greater. Examining these entries, we find that katakana terms account for about half of all the terms that are included in the indexes of at least 10 of the 23 textbooks under study. It is thus very clear that katakana terms make up a good proportion of the most frequently used IT terms that are included in the indexes of many *Information Technology* textbooks.

Table 4

Number of IT terms with a frequency rating of 10 or higher

| Character Type | Types | Token | Ratio |
|----------------|-------|-------|-------|
| Katakana | 49 | 669 | 49.5% |
| Non-Katakana | 51 | 682 | 50.5% |
| Total | 100 | 1,351 | 100% |

4.2.2 Differences Among the Three *Information Technology* Classes—*IT-A*, *IT-B*, and *IT-C*

Next I compared the incidence of the extracted IT terms for the three *Information Technology* classes—*IT-A*, *IT-B*, and *IT-C*— and the findings are presented in Table 5. As one can see in the table, there were 1,569 IT term types and 2,709 IT term tokens in the *IT-A* class, 1,149 IT term types and 1,652 IT term tokens in the *IT-B* class, and 1,098 IT term types and 1,583 IT term tokens in the *IT-C* class. But one will recall that the study examines 11 textbooks for the *IT-A* classes, but only 6 textbooks each for the *IT-B* and *IT-C* classes. In other words, the study encompasses 5 more textbooks for the *IT-A* classes than the other two courses. I therefore used the following calculation to derive an average number of IT term types and average number of IT term tokens per textbook. Since the study examines 11 textbooks used in the *IT-A* classes, I multiplied the number of IT term types by 1/11th to derive “the number of types per textbook.” I calculated “the number of IT term tokens per textbook” in the same way by multiplying the number of tokens for the *IT-A* classes by 1/11th. I then performed the same calculations for the *IT-B* and *IT-C* classes multiplying by 1/6th to derive per-book types and tokens since I examined 6 textbooks each for these two classes.

A number of interesting findings are revealed by comparing the per-book IT term types and tokens for the three *Information Technology* classes. (1) While there was no significant difference in the “number of tokens per textbook” for the three IT classes with values ranging from 250 to 275, (2) there was a fairly sizable difference in the “number of types per textbook” among the classes. (3) More specifically, we found that the “number of types per textbook” for the *IT-A* classes was much lower (142.6 terms) than that for the *IT-B* classes (191.5 terms). This reveals that the indexes of textbooks used in the *IT-A* classes have fewer types of IT terms than the books used in *IT-B* classes, but that the terms missing from the *IT-A* textbooks are found repeatedly in the indexes other textbooks used in the high school IT curriculum. The obvious converse is that there are more types of IT terms in the indexes of the books used in the *IT-B* classes than in the indexes of the textbooks used in the *IT-A* classes. Finally, Appendix A, B, and C show lists of the IT terms extracted for the *IT-A*, *IT-B*, and *IT-C* classes, respectively.

Table 5
Number of Entries in the IT Term List for the Three *Information Technology* Classes (*IT-A*, *IT-B*, and *IT-C*)

| | Types | Token | Number of Textbooks | Types per Textbook | Token per Textbook |
|-------------|-------|-------|---------------------|--------------------|--------------------|
| <i>IT-A</i> | 1,569 | 2,709 | 11 | 142.6 | 246.3 |
| <i>IT-B</i> | 1,149 | 1,652 | 6 | 191.5 | 275.3 |
| <i>IT-C</i> | 1,098 | 1,583 | 6 | 183.0 | 263.8 |

Note that the *number of IT term types per textbook* and *number of IT term tokens per textbook* were calculated, since we analyzed a different number of textbooks for the three classes (i.e., 11 textbooks for *IT-A* classes and 6 each for *IT-B* and *IT-C* classes).

5. Conclusions

This study examined the IT-related katakana terminology contained in the indexes of 23 textbooks used in the compulsory *Information Technology* classes taught in Japan’s regular non-vocational high schools. A total of 23 textbooks were examined including 11 textbooks used in *IT-A* classes and 6 books each for the *IT-B* and *IT-C* classes. All of the books were provided by 11 publishing companies. The cumulative page count for all 23 of the textbooks examined is 3,127 pages.

First I extracted all of the IT terms listed in the

indexes of the 23 textbooks examined and compiled the terms in an IT terminology list. Next, I culled just the katakana terms from the IT term list and found that, while the katakana terms constituted 1/4 of the IT terms, they accounted for 1/3 of the usage of all the IT terms. In comparing the three IT classes, I found that there was no significant difference in the “number of tokens per textbook” in the textbooks used in the three classes. But interestingly, I also found that there was quite a significant difference in the “number of types per textbook” in the books used in the different classes. Specifically, I found that the textbooks used in the *IT-A* classes tended to have fewer “IT term types per textbook” than the *IT-B* classes.

Most Japanese IT terms and loanwords are written in Roman characters or in katakana. Because katakana characters are written with fewer strokes than kanji, katakana provide fewer clues that help in recognizing the characters. Also, many of the katakana characters are similar in shape. Consequently, people learning Japanese as a second language sometimes have trouble differentiating the characters in loanwords written in katakana. Learners of Japanese are also perplexed by the fact that Japanese loanwords are often pronounced very differently from the original foreign word and even sometimes have different meaning from the original foreign word from which they are derived. These factors influenced my decision to focus on IT and katakana terms. The IT terminology list developed in this work could be very useful in developing instructional materials for teaching Japanese. The prevalence of obscure loanwords is clearly a prime factor inhibiting understanding of IT-related content by the elderly and those who are less knowledgeable about the latest Information technology developments. A seemingly unending stream of IT-related terms and other obscure loanwords is disseminated over the Internet. The IT terminology list developed by this study could be very useful as an aid in helping people understand IT-related content written in Japanese.

6. Challenges Ahead

Building on the findings detailed in this report, there are a number of themes that I would like to explore in future work: (1) Develop instructional aids for the *Information Technology* classes by exploiting the IT terminology list developed in this work for high school classroom practice. (2) Create

a corpus of example sentences that clearly illustrate how IT terms are actually used in context. This would be useful in helping students understand the concepts behind the IT terminology. (3) Examine the appropriateness of the IT term list entries and example sentences for educational purposes. (4) Investigate the degree of understanding and degree of difficulty of the IT term list entries for high school students, then group the terms into categories based on the degree of difficulty. (5) Investigate the state of IT terminology usage over time, and do a quantitative linguistic analysis based on the results. For example, this might be done by analyzing the changes in IT term usage in newspapers over the past ten years. (6) A seemingly unending stream of IT-related terms and other obscure loanwords is disseminated over the Internet. While these terms are generally too new to be included in the *Information Technology* class textbooks, I would like to come up with a way to identify and explain these new IT-related coinages that appear on the net. (7) Identify new IT terms that are not included in large-scale electronic dictionary databases. This would help identify new IT-related terms that should be included in electronic dictionaries, and also provide basic material that would be useful when compiling dictionaries. (8) Develop a corpus based on the IT terminology list compiled in the study. (9) Do an analysis highlighting orthographic variations in the way katakana terms are written.

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APPENDIX A

IT Terminology List for *Information Technology A* classes

| Frequency | IT Terminology (Words About the Information Technology) |
|-----------|--|
| 11 | 電子メール, マルチメディア, デジタルカメラ, データベース, LAN, HTML |
| 10 | 検索エンジン, インターネット |
| 9 | 電子掲示板, 著作権, プロトコル, プレゼンテーション, ブラウザ, Web ページ, URL, OS |
| 8 | 文字コード, 電子商取引, 圧縮, リンク, メディア, メーリングリスト, プロバイダ, ビット, パスワード, パーソナルコンピュータ, ハイパーテキスト, ハードウェア, ネットワーク, ソフトウェア, WWW |
| 7 | 文字化け, 情報社会, 携帯電話, 画素, ホームページ, プログラム, ファイル, ピクセル, バイト, ネットニュース, デジタル, チャット, コンピュータウイルス, イメージスキャナ, アナログ, SOHO, CPU |

Note - Only 48 terms with a frequency rating of 7 or higher.

APPENDIX B

IT Terminology List for *Information Technology B* classes

| Frequency | IT Terminology (Words About the Information Technology) |
|-----------|---|
| 6 | 検索, モデル化, ビット, データベース, シミュレーション, インターネット, アルゴリズム, 2進数 |
| 5 | 文字コード, 標本化, 入力装置, 電子メール, 著作権, 中央処理装置, 出力装置, 記憶装置, プログラム, プライバシー, ピクセル, バイト, ソフトウェア, コンピュータウイルス, アナログ, WWW, OS, GUI, CPU, CD-ROM, 10進数 |
| 4 | 量子化, 問題解決, 補助記憶装置, 変数 並べ替え, 表計算ソフトウェア, 配列, 探索, 情報通信ネットワーク, 主記憶装置, 機械語, 画素, 圧縮, リレーショナルデータベース, モンテカルロ法, モデル, メモリ, マウス, プログラミング言語, フロッピーディスク, パスワード, バーコード, ハードディスク, ハードウェア, トレードオフ, デジタル, データベース管理システム, ソート, コンピュータネットワーク, コンピュータ, キーワード, キーボード, キー, アプリケーションソフトウェア, Web ページ, TCP/IP, POSシステム, JPEG |

Note - Only 67 terms with a frequency rating of 4 or higher.

APPENDIX C

IT Terminology List for *Information Technology C* classes

| Frequency | IT Terminology (Words About the Information Technology) |
|-----------|---|
| 6 | 量子化, 電子メール, 著作権, 情報システム, メーリングリスト, ホームページ, プロトコル, プライバシー, ビット, パケット, バイト, デジタルカメラ, インターネット |
| 5 | 文字コード, 標本化, 電子商取引, 著作物 著作権法, 情報通信ネットワーク, 情報社会, 検索エンジン, マルチメディア, パスワード, ドメイン名, コンピュータウイルス, コンピュータ, 2進数 |
| 4 | 電子メールアドレス, 情報機器, 主記憶装置, 公開鍵暗号方式, 光の3原色, 個人情報, 携帯電話, 画素, リンク, メールサーバ, マウス, プレゼンテーション, フォント, ピクセル, ハイパーリンク, ハイパーテキスト, ネットワーク, デジタル信号, デジタル化, デジタルビデオカメラ, ソフトウェア, コンピュータネットワーク, クライアント, キーボード, bps, WAN, URL, HTML, GPS, CD-ROM, CCD, 10進数 |

Note - Only 59 terms with a frequency rating of 4 or higher.