English Communication Needs of Computer Science Internship and Workplace

Dr. Belinda HO
Department of English
City University of Hong Kong
Avenue, Kowloon
Hong Kong

Abstract

This paper is an exploratory study on the English communication needs of Computer Science students during their internship and in the workplace after their graduation so as to decide on the contents of an English for Specific Purposes (ESP) course which prepared Computer Science students for their internship and workplace after graduation. Results of a questionnaire and interviews show that there was a general increase in the amount of English communication done through reading, writing, listening and speaking in the participants' workplace after graduation. The communicative events which occurred most frequently during their internship and at their workplace after graduation and which were also items suggested to be included in the ESP course were: the reading and writing of emails, manuals and specifications as well as the conducting of meetings.

Keywords: English for specific purposes, Computer Science internship, Computer Science workplace

1. Introduction

With an increasingly globalized workforce and the common use of English as the working language (Marra 2013:176), employees in the workplace need to have a good command of English to bring about effective communication at work. In view of the English communication needs in the workplace, most universities offer English for Specific Purposes (ESP) courses to prepare their students for communication in their workplace. Some universities even offer ESP courses to prepare students for their internship, which is the first interface between what the students have learned in their discipline and what they will learn in the business world in which they will be engaged after graduation.

According to common sense, the level of work assigned to the interns who are undergraduates would probably be lower than that assigned to graduates in their workplace. Thus, the English communication needs of the interns may be different from those in their workplace after graduation. However, whether there are really differences and whether the differences are great or not needs to be confirmed.

In a university in Hong Kong, a new English for Specific Purposes (ESP) course needed to be designed for Year 2 Computer Science students in a four-year program to prepare them for English communication during their internship in Year 3 and in their workplace after graduation. The immediate question that arises was what items should be included in a course that could meet both purposes. It would be simple if the English communication needs of the students during their internship and in the workplace after graduation were the same. However, if there were major differences between the needs on these two occasions, and if all major communicative events on those two occasions had to be turned into teaching items, the course might become congested and might cause many problems related to the design, tasks, assignments and teaching methods. For example, there would be insufficient time to cover all teaching items within the number of weeks allocated for the course. The students might be easily confused about the different genres taught and their heavy work load might result in a heavy marking load for teachers.

Thus, it seemed that before the ESP course could be designed, it was necessary to find out whether there were actual differences between the English communication needs of the students during their internship and in the workplace after graduation so as to decide what items to be included in the course.

2. Literature Review

2.1 Existing ESP Courses that Prepare Computer Science Students for Work

A review of the contents of the existing ESP courses that prepare Computer Science students for work might give an idea about the kinds of decisions that had been made about the contents of these courses.

McDonald and McDonald (1993), for example, describe a required course for Computer Science Majors in Northwest Missouri State University which mainly helps students to learn how to write about and give an oral presentation on a topic related to Computers to a group of clients or in technical conferences.

Freiermuth (2002) describes an ESP course in technical writing at a university in Japan in which a simulation was used with Computer Science students who were asked to build a paper bridge as a project team and then write up a technical proposal as a team.

Xenodohidis (2002) developed a curriculum for English for Computing in an Institute of Vocational Training in Greece to familiarize students with terminology used in computer science, help them to improve their writing skills by asking them to produce writings in English ranging from simple letter writing to more complicated texts, to understand, interpret and present quantitative data, and to communicate effectively in work-related situations.

Blume et al. (2009) also explain the details of a "Communication Skills for Computer Scientists" Course, an undergraduate course at the University of Toronto, which included three areas of instruction, namely writing, speaking and interpersonal communication. Work-related tasks were performed to simulate the job situations in the course.

Most of the courses reviewed above (McDonald and McDonald, 1993; Xenodohidis, 2002; Blume et al., 2009) seem to have two common areas of focus, namely writing and speaking, and the topics and tasks chosen are related to the Computer field and some (such as those described by McDonald and McDonald, 1993; Xenodohidis, 2002 and Blume et al., 2009) involve job-related situations. However, there is no clear indication regarding why those teaching items were chosen and whether the work-related situations simulated in these courses are those related to the students' internship or their workplace after graduation. It is also uncertain whether the purpose of the courses is to prepare students for their internship or their workplace after graduation or both.

2.2 Research Studies on the English Language needs of Computer Science Professionals in the Workplace

Regarding research on the English language needs of computer science professionals in their workplace, which often help to inform the contents of an ESP course that prepares students for work, Pholsward (1993) reported in his study on the English language needs of Thai Computing professionals that the writing tasks most frequently performed in the workplace were writing reports, short notes, memorandums, summaries and correspondence. The frequently performed listening/speaking tasks were contacting customers, etc., conducting meetings, and holding general or telephone conversations. However, since his study was carried out in 1993, the findings of this study might have become dated.

After his study, little research work has been done on the language needs of computer science professionals in their workplace.

In 2009, Kaneko et al. carried out a comprehensive survey of workplace English needs of Computer Science Graduates in Japan. Results show that the tasks that were most frequently performed in the workplace were reading and writing of business-type documents such as emails, memos, faxes. The listening tasks included listening to lectures or presentations and the speaking tasks involved social interaction in conversation and small talks. However, this study was carried out in Japan. It is uncertain whether the communicative events in the work place in Japan are similar to those in the Hong Kong situation.

Thus, it is worthwhile exploring through a needs analysis study with a group of students who had studied in the same university in Hong Kong, gone through their internship and were now working after graduation to find out more accurately whether there were real differences between the communication needs during their internship and in their workplace after graduation.

This paper reports on an exploratory and a small-scale needs analysis of the English Communication Needs of the Computer Science students in their internship during their study in a university in Hong Kong and in their workplace after graduation to inform the contents of an ESP course that prepared them for both purposes.

3. Research Questions

The objectives of this study were to

(1) Investigate and compare the English communication needs of Computer Science students during their internship and in their workplace after graduation, and

(2) Identify the items that needed to be included in an ESP course that prepared the students for their internship and in their workplace,

The research questions in this study were:

(1) What were the English communication needs of the participants during their internship and in their workplace?
  - What kinds of documents did the participants frequently need to read and write in English during their internship and in their workplace?
  - What kinds of listening and oral communications did they frequently need to engage in in English during their internship and in their workplace?

(2) Was there a difference in the frequency of needs for English communication during the participants' internship and in their workplace after graduation?

Based on the answers to Research Questions 1 and 2, what could be included in an ESP course that prepared them for their internship and their workplace will be discussed.

4. Research Method

4.1 Rationale for the Choice of Research Method

Flowerdew (2013) comments that needs analysis is usually defined in terms of the target situation analysis (TSA) though in needs analysis, learning situation analysis (LSA), which deals with personal information about learners' "subjective, felt and process-oriented needs" such as their learning experiences, motivation and attitude to English, and present situation analysis (PSA), which deals with information about the English language abilities of learners such as their strengths and weaknesses in language use and skills (Dudley-Evans and St John,1998) could also be considered. According to West (1994), target situation analysis is to identify what learners need to do with the foreign language in the target situation. To carry out target situation analysis, Chambers (1980) suggests entering the target situation to collect data and analyse them to identify the functions, forms and frequency of communication that really occurs there. This provides a basis for decision-making regarding the long-range aims of a course.

To determine the contents of a course, Brady (1992) mentions that one criterion for selection of content is the criterion of utility, which suggests that the content should be the most useful to the students when coping with their future. Such usefulness can be decided by the perceived frequency of use of that teaching item by the students in their future. Jones (1991) also states that the needs questionnaire data is traditionally analysed in terms of the frequency of use as reported by the subjects. Thus, frequency was chosen as the major item for examination in this study.

4.2 Subjects

An invitation was sent through email and phone call to 50 Computer Science students who had undergone internship during their study at a university in Hong Kong and were working in the workplace after graduation to participate in this study. A convenience sample of 18 students agreed to take part in this study.

All of them had worked for 1-3 years, mostly (55.6%) for 2 years. All of them were working in the Computer field. Some (33.3%) worked in information technology companies, and 22.2% worked as programmers.

4.3 Data Collection

A questionnaire was given out to a convenience sample of 18 participants through email to find out their communication needs during their internship and in their workplaces after graduation.

In the questionnaire, the participants were asked about how frequently they read and write certain documents commonly recognized through common sense and listen to English and speak in English in certain communicative events commonly recognized through common sense during their internship and in their workplace after graduation. A 5-point Likert scale was used in the questionnaire which is shown in Appendix I.

Among the 18 participants, 8 who were willing to participate in interviews were selected to be given in-depth interviews to collect more detailed qualitative data related to the questions in the questionnaire and to follow up on issues that might be derived from the results of the questionnaires.

4.4 Data Analysis

Descriptive statistics (mean scores, frequencies and standard deviations) were computed for the answers to the questions in the questionnaire. All interview data were tape-recorded, transcribed, tabulated and categorized using the method of content analysis, through which "fairly simple classifications or tabulations of specific information" were formulated (Borg & Gall, 1989, p. 520) and frequency counts were tallied on some classified items. The results from all these research instruments were triangulated to identify what should be included in the course.

5. Results

5.1 Questionnaire Results

The answers to the first two research questions as collected through the questionnaire are reported below.

5.1.1 The English Communication needs during Internship and in the Workplace

Tables 1-8 in Appendix II show the frequency of the English communication needs in reading, writing, listening and speaking during internship and in the workplace. Regarding reading and writing, this section only reports on the documents which more than 50% of the participants frequently read and wrote. Regarding listening and speaking, as the participants seldom needed to listen to and speak in English, only the two communication events in which the participants were most frequently engaged were reported in spite of the fact that their percentage of frequency of occurrence was far below 50%. The results as shown in Table 1-8 can be summarized in Table 9 in Appendix II.

As can be seen in Table 9, the documents that the participants read most frequently during their internship were emails (88.9%) and manuals (50%), and those in their current jobs were emails (94.5%), specifications (77.8%), reports (66.7%) and manuals (61.1%).

The documents that the participants wrote most frequently during their internship were emails (77.8%), and those in their current jobs were emails (88.9%) and specifications (66.1%).

The participants did not frequently need to listen to English during their internship, nor did they need to do so in their current jobs as the highest % of frequency (16% for meeting and 27.8% for presentation respectively) was far below 50%.

The students also did not frequently need to speak in English during their internship or speak in English in their current jobs as the highest % of frequency (11.2% for giving technical support and 22.3% for meeting and conference call respectively) was far below 50%.

5.1.2 The Difference in the Frequency of needs for English Communication during the Participants' Internship and in their Workplace after Graduation

Comparison of the mean of the frequency of occurrence of the English communicative events as reported in Table 9 during their internship and in their workplace after graduation is shown in Tables 10-13 in Appendix II. It can be seen that the mean of the frequency of reading all listed documents and in writing all listed documents increased in the participants' workplace. The mean of the frequency of listening to English and speaking in English in the listed communicative events also increased in their workplace.

In other words, in general, the frequency of communicating in English in reading, writing, listening and speaking increased in the participants' workplace.

5.2 Interview Results

During the interviews, more detailed information related to the questions in the questionnaire were elicited.

5.2.1 The Interviewees' Job Situations

Among all interviewees, half of them (4 out of 8) worked in the same company since graduation from the university. Two worked for 2 companies in total, and two worked for 3 companies in total. Three participants had been promoted in position since graduation; two had their job nature changed, and three others were unidentified. Therefore, it seems that in 2 to 3 years after graduation, it is quite likely that an IT graduates would either be promoted to a more senior role or it is likely to have a change in job nature, where a different skill set is required.

Three participants were working as programmers, two as consultants, one as an engineer, one as a technical supporter and the other one was in management. It is worth noted that three participants had been promoted to become an HR consultant, a section manager and an Engineer. All three of them reported similar situations: " After promotion, I was more involved in paper-work, reports, holding meetings, etc. It's not just doing task-related programming as in my internship."

5.2.2 English Communication needs during Internship and Graduation

All participants explained the importance of email as the major means of communication both internally and externally. Also for internal use, different documentations were involved, which included "reports", "specifications" and "manuals". The participant who was promoted to an IT-related managerial position expressed that she always needed to write incident reports in order to combat the system failure or to manage the clients' expectations. Depending on the company, some interviewees revealed that all documentations were required to be written formally, but some companies only asked for informal ones. However, all of them mentioned with relief: "Templates or samples are provided when formal documentations are required!"

Verbal reporting in meetings were sometimes needed as well. Only one participant needed to communicate with clients outside the company constantly, and in that case, presentations with the use of PowerPoint slides were required. She said," I need more training in oral English."

5.2.3 The Difference in the Frequency of needs for English Communication during the

Participants' internship and their workplace

All interviewees reported that in general, both verbal and written English were more frequently used in the workplace than during internship,

6. Discussions

Based on the findings reported in Section 5.1 and in the light of the results of the interviews, this section discusses what items could be included in the ESP course that prepared students both for their internship and their workplace after graduation.

6.1 Which Purpose to Focus on

The findings of this study indicate that there was generally an increased use of English for communication in the workplace of the participants after graduation when compared with that during their internship. The variety of documents that the students frequently read increased in their current job when compared with that during their internship. These seem to suggest that the target of the ESP course could focus more on preparing the students for their workplace after graduation rather than for their internship. The overlapping of some English communication needs in reading, writing, listening and speaking during their internship and in their current job appear to suggest that when the students were prepared for communication in the workplace, in fact they were also prepared for their internship.

6.2 Which Level of Employees to Target at

The participants in this study had been working for 2.5 to 3 years. According to some interviewees, it was quite likely that an IT graduate would either be promoted to a more senior position or that they would have a change in job nature 2 to 3 years after their graduation. Most of the participants of this study represented the fresh graduates who had not yet been promoted. This may help to explain why the difference between their English communication needs in their workplace and those during their internship was not great. Their main current job was still related to task-oriented programming, as in their internship, rather than communication in English through reading, writing, speaking and listening. For future research, it might seem worthwhile investigating the English communication needs of the employees in the workplace at the junior and senior level to see if there is a greater difference between the English communication needs of those two levels.

However, if a course is to be designed in the university to prepare the students for their workplace, it is only practical to prepare them for their junior positions in the workplace. In the first place, as reported in the interview, the three participants who had been promoted speculated that they were more likely to be involved in doing paper work, such as writing reports or holding meetings after promotion rather than merely doing the task-related programming that they had recently been engaged in. Even so, this should not be a problem to them because the majority of interviewees mentioned that even if they were asked to write different kinds of formal documents, templates or sometimes samples were provided. Secondly, as the junior staff climb up the career ladder, they should have gradually gathered more expertise through experience in communication rather than relying on what they had been taught in the university.

In short, the ESP course that prepares the students for their internship and in the workplace after graduation could target on what they need in their junior years at their workplace after graduation.

6.3 Which Language Skill to Focus on

Table 9 shows that the participants most frequently needed to read and write in English both during their internship and in their workplace after graduation. This seems to suggest that the focus of the ESP course should be on reading and writing.

Regarding reading and writing, the kinds of documents that they needed to read and write most frequently during internship and in their current jobs were emails. Thus, "email" was an essential item that should be included in the course. Since the participants needed to read manuals during their internship and in their current jobs, as well as needing to read and write specifications in their current jobs, the reading of manuals plus the reading and writing of specifications could also be included in the course.

Regarding listening and speaking, it became apparent that they seldom needed to listen to English or speak in English either during their internship or in their current job. The percentage of frequency of the occurrence of English communicative events was far below 50%. At first glance, it seems that the listening and speaking components need not be included in the course if time does not permit. However, in the interviews, some of the interviewees opined that though they only needed to read and write in English frequently, they would still like to have more training in speaking, because while they could spend time polishing their writing, they had to respond in English immediately in oral communications. They thus felt that more training in speaking would help them perform better. This indicates that though the questionnaire results suggested that the focus of the ESP course should be on reading and writing, speaking and listening could not be neglected. It seems that students would benefit more if all four language skills of reading, writing, listening and speaking could be included in the course. In view of the fact that both listening and speaking are involved in a communicative event, the two skills could be considered as an integrated whole. As a result, if the listening and speaking skills were to be included in the course, the communicative event that carried the highest percentage of frequency, namely conducting meetings, giving presentations, and giving technical support could be considered. However, if time only permits one item to be included in the course, conducting meeting could be chosen since it was the communicative event that occurred both during their internship and in their current job.

6.4 What Items to Include in the ESP Course

In other words, the ESP course that prepared the students both for their internship and their workplace after graduation could essentially include the reading and writing of emails, the reading of manuals, the reading and writing of specifications as well as conducting meetings. In this way, because there were only four teaching items in the course, the course would not be congested and should be pedagogically manageable.

The reading and writing of emails supports the finding of Kaneko et al. (2009) and conducting meetings falls in line with the findings of Pholsward (1993) showing that these are important items to include in the course as they are relevant even across two centuries.

7. Conclusion

To conclude, this exploratory study has thrown light on the communication needs of the participants in their internship and their workplace after graduation and has suggested what should be focused on and what items could be included in the ESP course that prepares the students for both internship and the workplace.

The findings of this study do not only fill the unexplored area of comparison between the English communication needs during internship and in the workplace after graduation with concrete information, they will also become a useful source of reference for designers of courses that prepare computer science students for their internship and workplace after graduation, not only in Hong Kong, but also in similar learning contexts in different parts of the world.

In the research field, the research design of the present study, such as basing the criterion of selection of content on the criterion of utility (Brady, 1992) and frequency of communication that occurs in the target situation (Jones, 1991; Chambers, 1980), could be adopted as appropriate to conduct similar needs analysis in any relevant discipline in other parts of the world.

However, one limitation of the study is that the sample of this study was too small for the results to be generalizable. The interesting findings seem to suggest that future studies with larger samples taken from more courses in more institutions are needed to confirm the results so as to more effectively inform the syllabus design of ESP courses that prepare students for their internship and / or their workplace in Hong Kong and in similar learning contexts in different parts of the world.

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Appendix I

Questionnaire

1. The year in which you graduated from City University of Hong Kong: _____

2. Nature of the company in which you are working (e.g. a bank) : _____

3. My current Job position title: _____

4. Job position title during your internship _____

5. For how many years have you worked in the computer field after graduation? (Please ✓ as appropriate)

    < 1   _____

    1-3   _____

    4-6   _____

    7-9   _____

    10+   _____

6. For how many years have you worked in the current company/institution? (Please ✓ as appropriate)

    < 1   _____

    1-3   _____

    4-6   _____

    7-9   _____

    10+   _____

7. How frequently did you **READ** the following documents during your ***internship***? (Please ✓ as appropriate)

Document	Always 5	4	Sometimes 3	2	Never 1	Remarks
Email						
Memo						
Letter						
Agenda						
Minutes						
Report						
Proposal						
Manual						
Specification						

8. How frequently do you **READ** the following documents in your ***current job***? (Please ✓ as appropriate)

Document	Always 5	4	Sometimes 3	2	Never 1	Remarks
Email						
Memo						
Letter						
Agenda						
Minutes						
Report						
Proposal						
Manual						
Specification						

9. How frequently did you **WRITE** the following documents during your *internship*? (Please ✓ as appropriate)

Document	Always 5	4	Sometimes 3	2	Never 1	Remarks
Email						
Memo						
Letter						
Agenda						
Minutes						
Report						
Proposal						
Manual						
Specification						

10. How frequently do you **WRITE** the following documents in your *current job*? (Please ✓ as appropriate)

Document	Always 5	4	Sometimes 3	2	Never 1	Remarks
Email						
Memo						
Letter						
Agenda						
Minutes						
Report						
Proposal						
Manual						
Specification						

11. How frequently did you **LISTEN** to English on the following occasions during your *internship*? (Please ✓ as appropriate)

Occasion	Always 5	4	Sometimes3	2	Never 1	Remarks
Presentation						
Meeting						
Technical interview with client						
Engaging in negotiation with client						
Lecture						
Recorded message						
Giving technical support						
Video conference						
Conference call						
Social conversation						

12. How frequently do you **LISTEN** to English on the following occasions in your *current job*? (Please ✓ as appropriate)

Occasion	Always 5	4	Sometimes 3	2	Never 1	Remarks
Presentation						
Meeting						
Technical interview with client						
Engaging in negotiation with client						
Lecture						
Recorded message						
Giving technical support						
Video conference						
Conference call						
Social conversation						

13. How frequently did you **SPEAK** in English on the following occasions during your *__internship__*? (Please ✓ as appropriate)

Occasion	Always 5	4	Sometimes 3	2	Never 1	Remarks
Presentation						
Meeting						
Technical interview with client						
Engaging in negotiation with client						
Lecture						
Giving technical support						
Video conference						
Conference call						
Social conversation						

14. How frequently do you **SPEAK** in English on the following occasions in your *__current job__*? (Please ✓ as appropriate)

Occasion	Always 5	4	Sometimes 3	2	Never 1	Remarks
Presentation						
Meeting						
Technical interview with client						
Engaging in negotiation with client						
Lecture						
Giving technical support						
Video conference						
Conference call						
Social conversation						

Appendix II

Table 1: The Documents that the Participants frequently needed to Read during their Internship

Document	Frequency										Mean	Std
	Always 5		Often 4		Sometimes 3		Seldom 2		Never 1			
Email	13 88.9%	72.2%	3	16.7%	2	11.1%	0 0%	0%	0	0%	4.61	0.698
Manual	5 50%	27.8%	4	22.2%	5	27.8%	0 22.2%	0%	4	22.2%	3.33	1.495

Table 2: The Documents that the Participants Frequently Needed to Read in Their Current Jobs

Document	Frequency										Mean	Std
	Always 5		Often 4		Sometimes 3		Seldom 2		Never 1			
Email	16 94.5%	88.9%	1	5.6%	0	0%	0 5.6%	0%	1	5.6%	4.72	0.958
Specification	11 77.8%	61.1%	3	16.7%	3	16.7%	0 5.6%	0%	1	5.6%	4.28	1.127
Report	5 66.7%	27.8%	7	38.9%	1	5.6%	2 27.8%	11.1%	3	16.7%	3.50	1.465
Manual	5 61.1%	27.8%	6	33.3%	4	22.2%	0 16.7%	0%	3	16.7%	3.56	1.381

Table 3: The Documents that the Participants Frequently Needed to Write in Their Internship

Document	Frequency					Mean	Std
	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1		
Email	12 66.7% 77.8%	2 11.1%	4 22.2%	0 0% 0%	0 0%	4.44	0.856

Table 4: The Documents that the Participants Frequently Needed to Write in Their Current Jobs

Document	Frequency					Mean	Std
	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1		
Email	14 77.8% 88.9%	2 11.1%	0 0%	1 5.6% 11.2%	1 5.6%	4.50	1.150
Specification	8 44.4% 61.1%	3 16.7%	1 5.6%	4 22.2% 33.3%	2 11.1%	3.61	1.539

Table 5: The Occasions on which the Participants Needed to Listen to English during their Internship

Occasion	Frequency					Mean	Std
	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1		
Meeting	1 5.6% 16.7%	2 11.1%	4 22.2%	3 16.7%	8 44.4%	2.17	1.295

Table 6: The Occasions on which the Participants Needed to Listen to English in Their Current Jobs

Occasion	Frequency					Mean	Std
	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1		
Presentation	3 16.7% 27.8%	2 11.1%	5 27.8%	2 11.1% 44.4%	6 33.3%	2.67	1.495

Table 7: The Occasions on which the Participants Needed to Speak in English during their Internship

Occasion	Frequency					Mean	Std
	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1		
Giving technical support	1 5.6% 11.2%	1 5.6%	3 16.7%	2 11.1% 72.2%	11 61.1%	1.83	1.249

Table 8: The Occasions on which the Participants Needed to Speak in English in their Current Jobs

Occasion	Frequency					Mean	Std
	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1		
Meeting	1 5.6% 22.3%	3 16.7%	5 27.8%	3 16.7% 50%	6 33.3%	2.44	1.294
Conference call	1 5.6% 22.3%	3 16.7%	4 22.2%	1 5.6% 55.6%	9 50%	2.22	1.396

Table 9: A Summary of the Frequency of the English Communication Needs During Internship and in the Participants' Current Jobs

Frequency of reading the following documents		Frequency of writing the following documents		Frequency of listening to English in the following events		Frequency of speaking in English in the following events	
Internship	Current job	Internship	Current job	Internship	Current job	Internship	Current job
Email (88.9%)	Email (94.5%)	Email (77.8%)	Email (88.9%)	Meeting (16%)	Presentation (27.8%)	Giving technical support (11.2%)	Meeting (22.3%)
Manual (50%)	Specifi-cation (77.8%)		Specifi-cation (66.1%)				
	Report (66.7%)						
	Manual (61.1%)						

Table 10: Differences in the Mean of the Frequency of Reading the Following Documents during the Participants' Internship and in their Workplace after Graduation

Documents	Mean (Internship)	Standard Deviation (Internship)	Mean (Current Job)	Standard Deviation (Current Job)	Increase in mean (in current job)
Email	4.611	0.698	4.722	0.958	+ 0.11
Report	3.111	1.491	3.500	1.465	+ 0.39
Manual	3.333	1.495	3.556	1.381	+ 0.22
Specification	3.278	1.526	4.278	1.127	+ 1

Table 11: Differences in the Mean of the Frequency of Writing the Following Documents during the Participants' Internship and in their Workplace after Graduation

Documents	Mean (Internship)	Standard Deviation (Internship)	Mean (Current Job)	Standard Deviation (Current Job)	Increase in mean (in current job)
Email	4.444	0.856	4.500	1.150	+ 0.06
Specification	2.611	1.335	3.611	1.539	+ 1

Table 12: Differences in the Mean of the Frequency of Engaging in the Following Kinds of Listening Communicative Events during the Participants' Internship and in their Workplace after Graduation

Occasions	Mean (Internship)	Standard Deviation (Internship)	Mean (Current Job)	Standard Deviation (Current Job)	Increase in mean (in current job)
Presentation	2.167	1.043	2.667	1.495	+ 0.52
Meeting	2.167	1.295	2.389	1.461	+ 0.22

Table 13: Differences in the mean of the Frequency of Engaging in the Following Kinds of Speaking Communicative events during the Participants' Internship and in their Workplace after Graduation

Occasions	Mean (Internship)	Standard Deviation (Internship)	Mean (Current Job)	Standard Deviation (Current Job)	Increase in mean (in current job)
Meeting	1.722	0.895	2.444	1.294	+ 0.72
Technical Support	1.833	1.249	2.056	1.349	+ 0.22