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Identifying the English language learning needs of prospective mathematics teachers in elementary education

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Abstract

The use of English as the international language across disciplines is increasingly becoming widespread and more and more tertiary level degree programmes are offering English courses that are specific to students' academic and job related needs. This study aims to develop a content-rich syllabus in English for Specific Purposes context for the prospective mathematics teachers in Elementary Education in Turkish Universities. To this end, two needs analysis questionnaires (for prospective Mathematics teachers and for their faculty members) were developed and administered in three different state universities in Turkey, and 469 students and 19 faculty members participated in the study. The results indicated that both subject faculties and prospective teachers thought that an ESP course should be in the programmes, either as a selective or obligatory module. The questionnaires also uncovered information about why and in which circumstances the prospective Mathematics teachers needed to learn English, which language skills to develop, which language activities, and which topics to study. It is believed that the findings of the study will serve as a base for the development of a content-rich English language syllabus for prospective mathematics teachers in elementary education.

Keywords: Needs analyses, prospective mathematics teachers, english language teaching.

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1. Introduction

Continuous developments in the area of education and increases in more content-rich interdisciplinary studies have led to new insight in the area of language education. Students from different disciplines and professions have to master the English language, not only for academic purposes, but also for occupational purposes to collaborate and communicate with other people effectively and develop specialized knowledge and skills including multilingual oral, reading and communication competence (Wang, Lin, Spalding, Odell & Klecka, 2011). The growing status of English as the *lingua franca* among various disciplines has been widely recognised, and English courses that meet these needs have begun to play a significant role in tertiary level degree programmes around the world (Arslan & Akbarov, 2012; Liao, 2009). These courses are called English for Specific Purposes courses (hereafter ESP).

Increasingly, multicultural work practices require enhanced foreign language proficiency and cross-cultural confidence. Most of the profession-related literature for prospective Mathematics Teachers in Elementary Education (MATEE hereafter) is predominantly in English. Moreover, the Ministry of National Education (MoNE) in Turkey identified competencies for Elementary School Mathematics teachers as “being able to follow the recent developments in job-related publications, to conduct research on the topics and concepts covered in these publications” and “to attend both national and international courses, in-service trainings, congresses, symposiums and workshops and present their researches” (MoNE, 2008). Based on these arguments, it can be claimed that prospective MATEEs have specific English needs.

However, while the literature on needs analysis is relatively wider (Richards, 2013; McDonough, 2010; Riddell, 1991; Berwick, 1989), very few research report on the needs of prospective Elementary School mathematics teachers (Einer & Smith, 2013). Most of the studies related to English language and mathematics focus on teaching mathematics to students who are also learning English, rather than addressing the academic and job related needs of students who are going to be professionals in the area of mathematics teaching (Freeman & Crawford, 2008; Hodgen & Marshall, 2005). In a similar vein, Hendrik and Mji’s (2010) study focuses on an ‘aid’ that would assist learners in relating mathematics terms and concepts in English with terms in their own languages. In this respect, it is believed that this study will fill a gap in the related literature by providing an original and practical framework for the identification of the English language learning needs of the prospective MATEEs. Moreover, the study might contribute to the area of ESP literature by accomplishing the first and the initial step (needs analysis) which is the basis of a good educational practice.

Any government aiming to improve their education should take steps to better their teacher training programmes. With the emergence of more learner-centred approaches since the 1970s, tertiary level degree programmes worldwide have begun to design their programmes taking into consideration the needs of learners. General English courses began to be replaced by more innovative language courses that gave priority to ESP programme students’ needs and respected their opinions (Howatt, 1984; Cheng, 2011). ESP movement assumes that “all language teaching programs should be tailored to the specific learning and language use needs of identified groups of students” (Ajideh, 2009, p.162).

In most general terms, according to Hutchinson and Waters (1987:19), “ESP is an approach to language teaching in which all decisions as to content and method are based on the learner’s reason for learning”. ESP refers to “the teaching and learning of English as a second or foreign language where the goal of the learners is to use English in a particular domain” (Paltridge & Starfield, 2013, p.3). The common feature of all ESP courses is that they are designed to meet the specific needs of a particular group of learners. In these courses, students are given the opportunity to actively participate in almost every phase of learning. ESP courses are different from General English (GE) courses in that they are more learner-specific; and the learners are mainly adults (Paltridge & Starfield, 2013). These courses emphasise content learning rather than, or together with, language mastery and they determine the method in accordance with the functions that students are desired to

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master. Finally, ESP courses foster and are generally designed for intermediate or advanced level students.

There are some vital principles in developing an ESP syllabus. The needs analysis process is an indispensable part of the ESP syllabus design. It serves as a bridge between the students' present state of academic competencies and their target needs in their prospective areas of employment. Once the students' needs are identified and analysed, this can be used as a starting point. Robinson (1991) concurs with this idea by saying that "a basic ESP philosophy is to cater to specific needs of learners as much as possible". Long (2005) mentions reasons for conducting a needs analysis as being able to determine the relevance of the material to the learners' situation; to justify the materials in terms of relevance for all parties concerned; to account for differences in learner needs and styles; and to create a syllabus which will meet the needs of the learners as fully as possible.

Hutchinson and Waters (1987) categorise learner needs as *target needs* and *learning needs*. According to Hutchinson and Waters (1987, p.54-57), in terms of a learning-centred approach, *target needs* are "what the learner needs to do in the target situation". They are divided into three categories: necessities, lacks, and wants. Necessities are "what the learner has to know in order to function effectively in the target situation". Lacks are "the gaps between what the learner knows and the necessities". Wants are "what the learners think they need". *Learning needs* refer to "what the learners need to do in order to learn". Target needs cannot be fulfilled without satisfying learning needs. Learning needs depend on many factors such as the learners; their socio-cultural backgrounds; their attitude towards the English language, the learning of it and the multicultural contexts it is spoken in; their background knowledge of specialised content and their level of English; their age, gender and so on.

As to the rationale and importance of the study, "the literature on [E]SP teacher education is surprisingly limited" (Basturkmen, 2014, p. 17), and definitely need more research on needs analysis and content development in ESP teacher education programmes. This study, therefore, humbly attempted to contribute to the scarce ESP movement for prospective mathematics teachers. The study aimed to identify the foreign (English) language needs of the prospective MATEEs and based on the data gathered had some suggestions to develop a content-rich ESP syllabus for prospective MATEEs for further studies. To this end, this study attempted to answer the following research question:

- What are the perceptions of the prospective MATEEs and the faculty members in the Department of mathematics in Elementary Education in Turkish Universities with regard to English language learning and their professional and academic needs?

2. Methodology

2.1. Research Design

This study employs a mixed methods research design, which attempts at a complete understanding of real-life contexts through multi-level perspectives using both quantitative and qualitative research methods. The mixed methods research design is "research in which the investigator collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or a program of inquiry (Tashakkori & Creswell, 2007, p.4, cited in Creswell & Clark, 2011, p.4). The basic assumption is to maximize the effectiveness of both types of data. To this end, this study employed a needs analysis to identify the English language learning needs of the prospective MATEEs in Turkey with the help of some questionnaires prepared specially for the department of mathematics teaching. The questionnaire administered to prospective MATEEs was comprised of fifteen questions and the questionnaire administered to faculty members comprised 8 questions. The data was transformed to frequencies and percentages. The results of the open-ended questions were evaluated through constant comparison method of content analysis

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suggested by Miles and Huberman (1994), which allows to sort, code and connect pieces of data according to emerging patterns and themes.

2.2. Participants

A needs analysis questionnaire was administered to 19 faculty members in three universities- one large, one medium and one small scale university- in Turkey. The other needs analysis questionnaire was developed for prospective MATEEs and was administered in the same state universities to 469 prospective MATEEs.

2.3. Data Collection Tools

Two types of questionnaires were developed for assessing the participants' English language learning needs. One questionnaire was developed for prospective MATEEs and another was developed for the faculty members in the department of mathematics in Elementary Education. The results gathered from both of the questionnaires provided valuable insights into making decisions on what to teach and how to teach, which otherwise may have remained unsatisfactory. The needs analysis questionnaires were developed by the researcher and their face validity was ensured by four professionals in the area of English language teaching (ELT) and teacher training (TT).

3. Results and Discussion

3.1. Findings of the Needs Analysis Questionnaire for Prospective Mathematics Teachers

The demographic information about the prospective MATEEs responding to the needs analysis questionnaire was as below:

Of 469 prospective MATEEs, 77% of the prospective teachers were female and 23% of them were male, all of the respondents were between the ages 18 and 23. Nearly all of them (97%) asserted that they had not attended an intensive language programme before, and the few prospective MATEEs who identified that they had attended an intensive language programme before stated that they had finished the programme at an intermediate level.

The second part of the questionnaire investigated whether the participating universities offer an ESP course. Only 34% of the students stated that ESP courses were offered in their universities. Of these, 78% of the respondents explained that these courses were offered as selective in their universities, and spanned three hours a week. Just 18% of the respondents stated that their English language proficiency was assessed before being admitted to these ESP courses. The rest of the respondents indicated that their English language proficiency was not assessed before being admitted to these ESP courses. However, they clarified that since these courses were selective, those who believed they were proficient enough in English tended to select these courses.

Of all the prospective MATEEs in three universities, 66% of the respondents asserted that their university did not offer an ESP course. However, 76% also expressed their wish to be offered an ESP course as a selective course in their departmental programmes. They also stated that these courses should span at least three hours a week.

In the third part of the needs analysis questionnaire, prospective MATEEs gave their opinions on the need to learn English and their attitudes towards learning English:

Nearly all of the respondents (90%) expressed a belief in the need to learn English. The vast majority (75%) explained that they required English because they believed that it would contribute to both their personal and professional development. Additionally, they stressed that with the help of proficiency in general and academic English, they could have better career opportunities. They (62%) also emphasised the need to learn English in order to complete their postgraduate education, and to follow educational programmes in English. Half of the respondents (50%) indicated that they required

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English to comprehend written or printed materials in English that were related to their profession, and to be able to take part in international student exchange programmes, such as Erasmus.

However, although the prospective MATEEs stressed the importance of being competent English language users both in their future workplaces and in their social life, 36% of them revealed that they did not like learning English. Among the reasons they put forward were “In the English courses we always study the same topics”, “The English courses are dull”, “Although I take English courses for years, I cannot use it”, “I think I don’t have an ability to learn and use English”, “I don’t feel involved in the lessons, activities”, “I generally lose my motivation to learn English very quickly”, “In the English courses I get embarrassed when I cannot speak or use it accurately”.

The fourth part of the questionnaire covered questions that assessed which English language skills the respondents would like to develop more and would need most, and in which situations they would like to use the language most. The aim of this part was content determination, genre and text specification, and material selection. Since ESP is a learner-centred approach to language teaching, it is vitally important to identify learners’ preferences.

The answers of the respondents suggested that the skills that they required most were speaking (presentation and lecturing) skills (33%), lexical knowledge (24%), reading comprehension (13%), listening comprehension (12%), writing skills (6%), speaking (communicating with people) skills (6%), grammar knowledge (3%) and translating (3%).

The results also suggested that the text types that they read most in English were formal and informal letters (55%), e-mails (51%), websites (47%), profession-related articles (36%), diaries (26%), and short stories (25%). The text types that they wrote the most in English are given respectively: paragraphs (75%), notes (55%), formal and informal letters (31%), websites (31%), and e-mails (26%).

With regard to the situations in which they were most likely to speak English, the results suggest that presentations (71%), lecturing (71%), conferences (43%), and dialogues (41%) were the most favoured situations. The answers of the respondents also suggest that they were most likely to listen to English in situations such as lecturing (70%), presentations (57%), conferences (57%), and dialogues (51%). The vast majority of the respondents also stressed that they might listen to English when watching movies.

The responses also indicated that the groups of people the respondents were most likely to speak to in English were the people they interacted with over the Internet (80%), the international exchange students in their departments (68%), their English-speaking teachers (52%), and possible English speaking colleagues after graduation (52%). They also asserted that they were most likely to speak English in circumstances such as working in a school whose language of instruction is English (54%), going abroad with the help of the international student-exchange programmes such as Erasmus (72%), and attending to international conferences and programmes related to their profession (69%).

The fifth and the final part of the questionnaire aimed to see which topics they would like to learn most and study more about as related to their profession and the activities that they believed would help them learn better.

The respondents were given a list of the topics related to the teaching profession in general, and mathematics teaching in particular, and they were asked to score the topics on a Likert Scale from one to three. The results of this question indicated that the top five topics they wanted to learn more about were “How to be a successful teacher”, “The qualities of a good maths teacher”, “The steps and procedures to write a CV”, “Learning styles”, and “Famous mathematicians”.

Watching movies (86%); activities that stimulate interaction and comprehension, such as making and comprehending presentations in English (78%); or giving and comprehending a mathematics lecture in English (74%); and occupation-related vocabulary enhancing activities (72%) were rated as the activities that would help them most. As discussed previously, a totally learner-centred approach is favoured in topic identification and activity determination.

3.2. Findings of the Needs Analysis Questionnaire for Subject Faculties

Below are the results of the needs analysis questionnaire that was administered to subject faculties:

Of the 19 faculties, three (16%) suggested that the ESP course should principally meet the target needs of prospective MATEEs, two (10%) pointed out that the course should meet learning needs, whereas 14 (74%) faculties believed that the course should meet both the target needs and academic needs. As to the medium of instruction, 18 faculties out of 19 (94%) asserted that the medium of instruction in the Department of mathematics in Elementary Education should be Turkish.

When asked why prospective MATEEs should learn English, the faculty listed the reasons as follows in descending order: They may enrol in a graduate level programme (n:19); some/most/all of the written materials related to their profession is in English (n:17); they may participate in international student exchange programmes such as Erasmus or Mevlana (n:16); they may believe that it will contribute to their occupational and personal development (n:16); they may follow an educational programme or a course in English (n:14); they may take an English proficiency exam such as TOEFL, IELTS (n:12); they may work with English speaking colleagues after graduation (n:11); they may apply for a job abroad (n:10); they may give a lecture in English to English speaking or non-English speaking people (n:9); the language of the profession is mainly English (n:5).

More than 84% of the subject faculties believed that the prospective MATEEs would need English mostly to read and write (n:16). Nearly 79% of prospective MATEEs thought that they would require listening comprehension skills after graduation (n:15). The skill of speaking English was chosen as the third most required skill (74%), and translation was the least required skill (57%).

Over 84% of the subject faculties (n:16) asserted that ESP lecturers should work in collaboration with the subject faculties in the Department of mathematics in Elementary Education, whereas three faculties said that no cooperation was needed.

As to the necessity of an ESP course, all of the subject faculties believed that ESP courses should be incorporated into the programmes. Nearly 79% of the respondents asserted that ESP courses should be obligatory, whereas about 20% stated that the ESP courses should be offered as a selective course in the programme. More than half of the respondents (53%) asserted that the ESP courses should be at least 4 hours a week. Nearly 37% were of the opinion that these courses should be at least 3 hours a week and the rest of the respondents (10%) suggested these courses should span 2 hours a week.

Finally, when asked if they had any other comments, eleven subject faculties stated that ESP lecturers should have at least basic knowledge of mathematics and knowledge of the principles of the teaching profession in terms of Elementary Education. They also suggested that collaboration may be required on the syllabus basis; if not all, some of the courses may be studied in an adjunct way. Therefore, these teachers needed to plan their units and the topics they wanted to study before the instruction began.

3. Conclusion and Implications

Identifying what is needed and how this can best be achieved has become a starting point for developing a content rich ESP syllabus for prospective MATEEs. The research shows that prospective MATEEs in Turkey have some clear needs in relation to their profession and English language learning. Identifying both prospective mathematics teachers' and subject faculties' expectations and needs has vital prominence in the process of developing a syllabus. This helps to enhance the effectiveness and the quality of instruction in ESP courses.

With regard to the results of both needs analyses, it is worth noting that subject faculties believed in the effectiveness of ESP courses, wanted to see them in the programme and expected these courses to cover both target needs and learning needs of the prospective MATEEs. As to the results of the needs analysis administered to prospective MATEEs, it was observed that they believed in the need to develop their English language skills, especially those they would require in their specialised areas

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such as lecturing, making presentations, taking notes, asking and answering questions related to their area, developing an argument, comprehending a lecture, following a presentation, and developing their profession-related terminological knowledge.

Based on the findings of the needs analysis process, it is suggested to develop and implement a learner-centered, content-rich ESP syllabus for the prospective MATEEs. Feedback should be received to see the effectiveness of the program. It is believed that ESP instruction will not only enrich them as academically but also as individuals.

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