

Need Analysis of English For Math Instructional Material

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Abstract. Need analysis is the starting point in designing a course or developing material. It is used to gather information from the population about what they need in learning. This study aims at investigating the needs of English for math instructional material for the mathematics education department at UIN Alauddin Makassar. The design research was descriptive quantitative and qualitative research. The population of the research was 64 students, ten graduates, and two lecturers. Research data were collected by using questionnaire and interview. The questionnaire comprises present situation analysis, target situation analysis, and learning needs. The findings show that 1) students have fair ability in English skills – listening, speaking, reading, writing, vocabulary, and grammar, and pronunciation; 2) students need to learn more in reading than others skills. Vocabulary related to their major, and grammar; 3) students need to learn auditorily and visually through video. Students also need to learn in a small group and work in pairs.

Keywords: *Math, Mathematics, Instructional Material, English for Math*

1. INTRODUCTION

In Indonesia, the decree Number 045/U/2002, paragraph 2, article10 specifies that institutional curriculum could include English besides other primary subjects. The National Education Law Number 20 year 2003, paragraph 2, Article 37 stresses that the curriculum at the tertiary level should include English languages, besides Indonesian and local languages. As a subject in an institutional curriculum, English is taught in non- English study programs (such as economics, law, and engineering) across the institution where it is learned to support the key competence of a particular study program. It was subjected to the students who need English for academic studies such as Biology, Physic, and Math.

Data obtained from observation had shown that students of the Mathematics Education Department need English as the key to success in their major disciplines. The students were strongly urged to build up their English Competences as a tool in gaining access to information and materials that did not exist in their language.

The fact has shown that some majors in Tarbiyah and teaching faculty of UIN Alauddin Makassar have been taught English language. However, the lecturer only taught how to make

simple sentences, and sometimes just give the exercises for them. Lecturer also had not analyzed the learner before providing the material or what the material is relevant to their major. In this case, the lecturer only focuses on teaching general English material. Furthermore, the lecturer used the materials from some resources for the internet or foreign printed book. The lecturer compiled based on the topic that she/he has developed. It is not developed based on need analysis. Therefore, there is a gap between what the lecturer taught and what students need. While [1] point out that need analysis is a starting point in designing course, including material development.

Needs analysis is one of the important stages in the process of language learning materials development, either in English for Specific Purposes (ESP) or general English [2], [3], [4], [5], [6].

Thus, instructional materials based on needs analysis are very important for the students and the lecturers in the teaching and learning process. Without learning material, it might be difficult for the lecturers to improve the effectiveness of the teaching and learning process. In the same cases, the students might be challenging to adjust to the learning, especially if the lecturer teaches the materials quickly and less clearly. Therefore, the materials can be used both the lecturers and students, as an attempt to improve the quality of learning.[7] points out that materials are a key component of the teaching and learning process.

Therefore, to make students easy in catching information from any English literature, so it should facilitate English printed sources that fulfill students' needs. Consequently, it is important to design English for Math material based on integrated need analysis.

2. METHOD

Design research was a quantitative and qualitative method. The population of the research was 64 students, 10 graduates, and 2 lecturers. Research data were collected by using questionnaire and interview. The questionnaire comprises present situation analysis, target situation analysis, and learning needs. The questionnaire was validated before using an instrument.

3. RESULT AND DISCUSSION

To facilitate students with the instructional material fulfilling their needs, so it should be done need analysis. The students, lecturer, graduates, and experts' perspective of learning English for Math. In this phase, the writer conducted a need analysis procedure to identify present situation analysis, target situation analysis, and learning needs of the students of mathematics Education study program. The data of the needs were collected by giving questionnaires to the respondents of this study, i.e., students, teachers, and graduates. Interview was used to obtain in-depth information on the needs, and to cross-check the data gathered from the questionnaires.

THE OUTLINE OF PRESENT SITUATION ANALYSIS

This part explains the perceptions of the students, lecturers, employees of learning needs in the ESP classroom for Mathematics Education Department students. It covers general perception of English language used for mathematics education department students, the English language skills which are mostly required, and the learning and teaching activities that are mostly preferred.

The Outline of Learners' Level of Proficiency

The result of data analysis of the questionnaire related to the students' level of proficiency can be shown in the following chart:

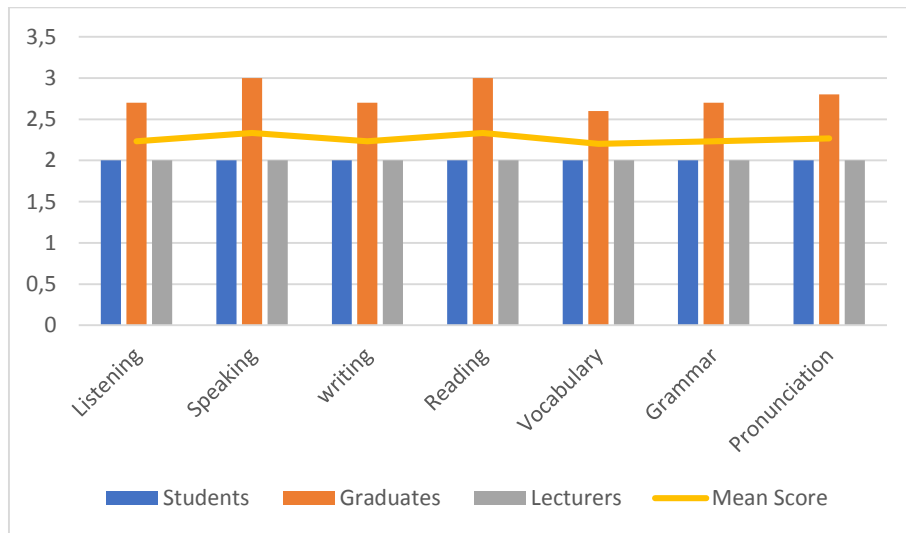


Figure 1. The Outline of the learners' level proficiency

The chart shows that the learners' proficiency level in four skills and three language components are in the fair category. Students, graduates, and lecturers have the same perception of the mathematics English education department students' level of proficiency.

The Outline of The Learners' Learning Difficulties

The result of data analysis of the questionnaire related to the students' learning difficulties can be shown in the following chart:

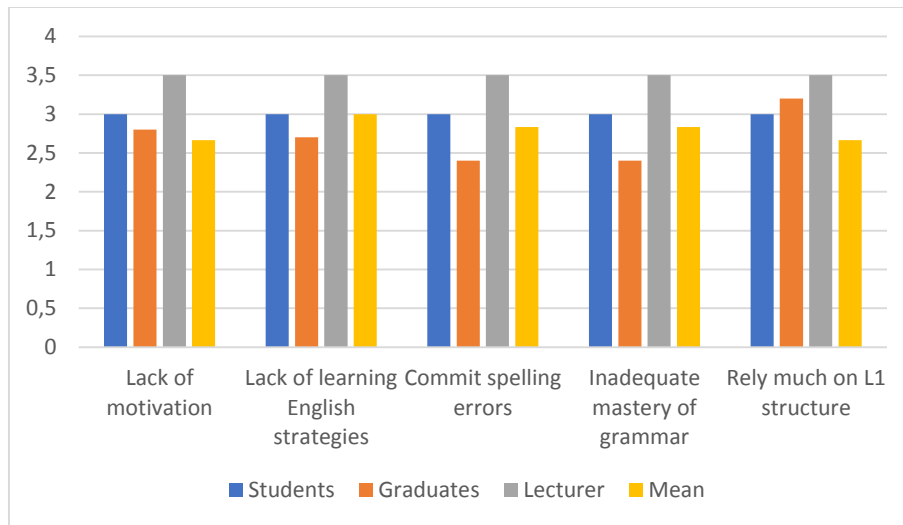


Figure 2. The learners' learning difficulties

The chart above shows that students often get a lack of motivation in learning English, lack of learning strategies, commit spelling errors, inadequate mastery of grammars, and rely much on the first language. The frequency of problems faced by the students is often category. Based on the means score, it shows that the most often problem faced by the student is lack of learning strategies.

The Outline of The Topics

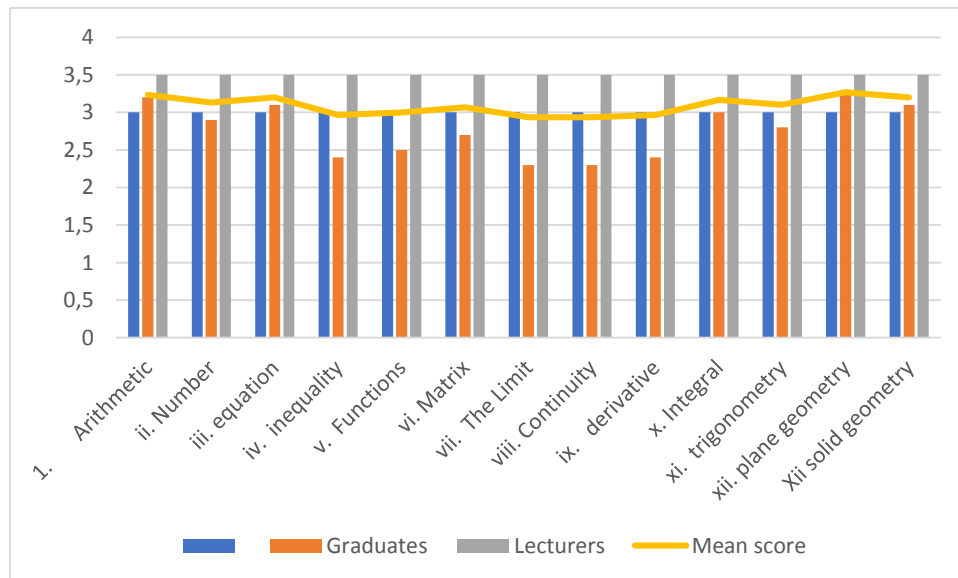


Figure 3. The Outline of the topics

The chart shows that all topics are categorized as important. The mean score ranges from 2.91 to 3.29. It is classified as important. While the grammar component that perceived by the students can be seen in the following chart:

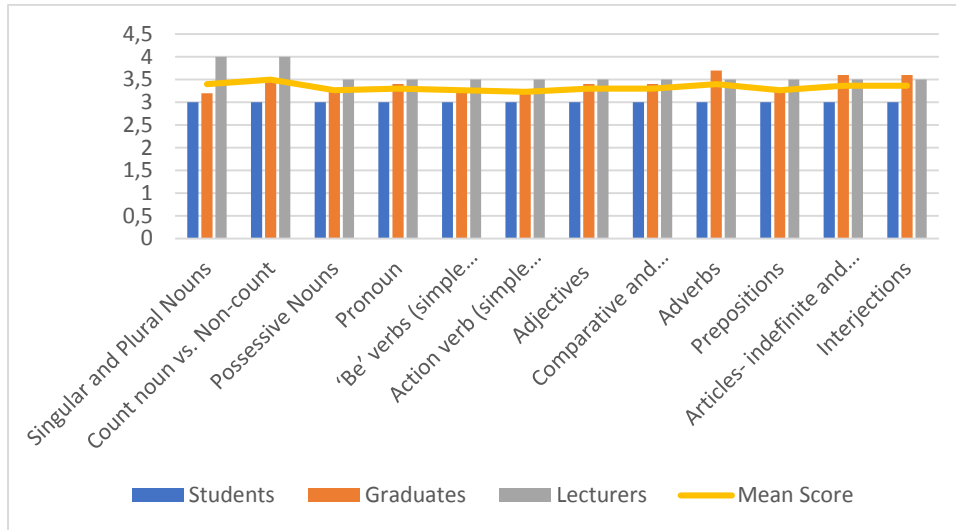


Figure 4. grammar component of students

The chart points out that all the topics in the grammar component are considered important by students, graduates, and lecturer. The mean scores are categorized as important.

TARGET SITUATION ANALYSIS

The Outline of The Important of Language Component and Language Skills In Learning English For Mathematics

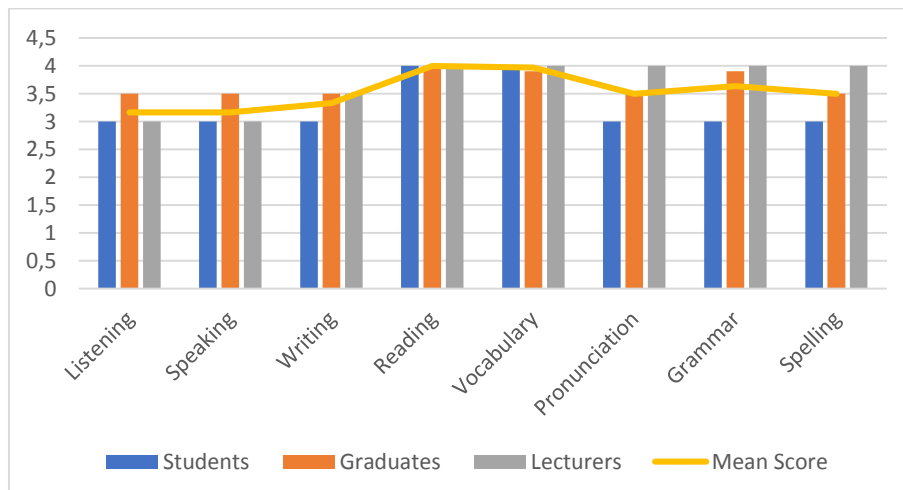


Figure 5. The importance of Language skills and Language component

The chart illustrates that the mean score for each element is in important categorization. The most important skills among skills were reading, followed by writing, speaking, and listening. While the most important language component was vocabulary, followed by grammar, pronunciation, and spelling. It means that all of the skills and language components should be included in instructional material.

Writing Micro Skills

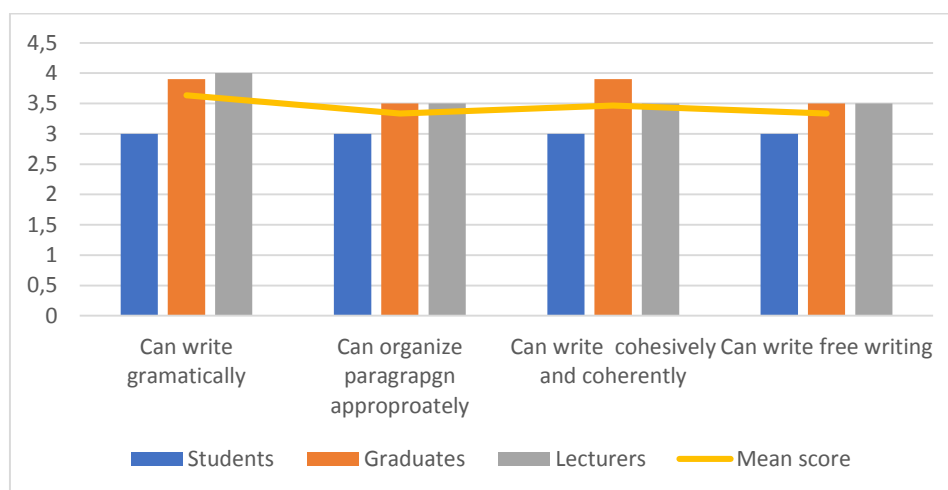


Figure 6. Micro skills of writing

The chart describes the micro-skills that is most important in writing. Writing grammatically is considered as most important micro-skills. It is followed by writing cohesively and coherently, organizing paragraphs, writing free writing.

Speaking Micro Skills

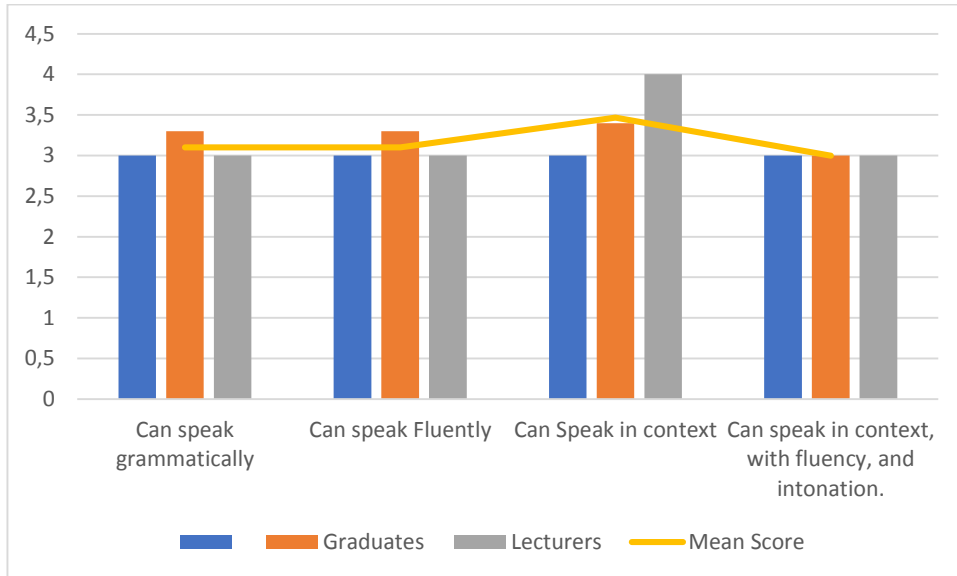


Figure 7. Micro Skills of Speaking

The chart describes the micro-skills that the students think most important. Speaking in context is considered the most important micro-skills followed by speaking grammatically, speaking fluently, and speaking in context, fluent, and appropriate intonation.

Listening Micro Skills

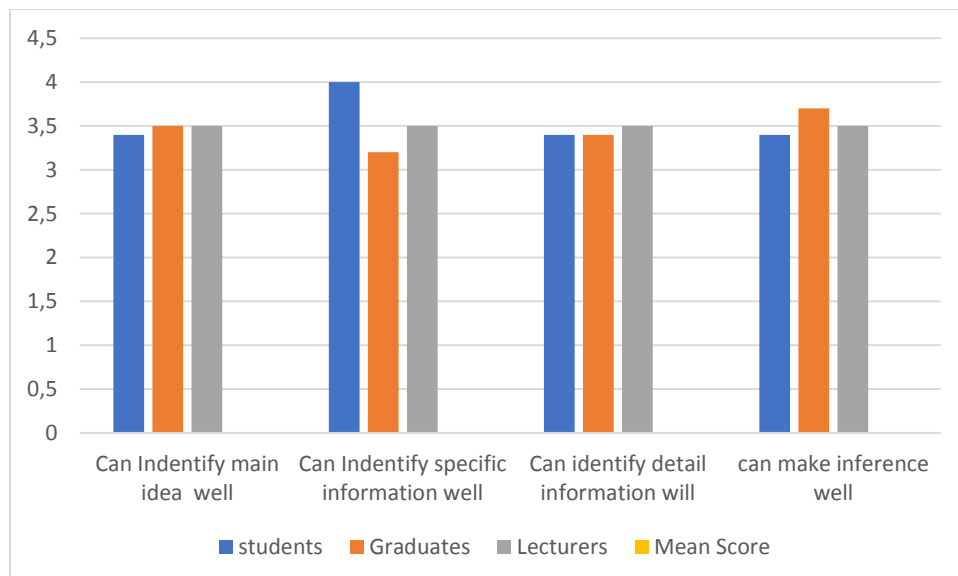


Figure 8. Micro Skills of Listening

The chart describes that all micro-skills are in important categorization. It means that all the components should be in instructional material with the same percentage.

Reading

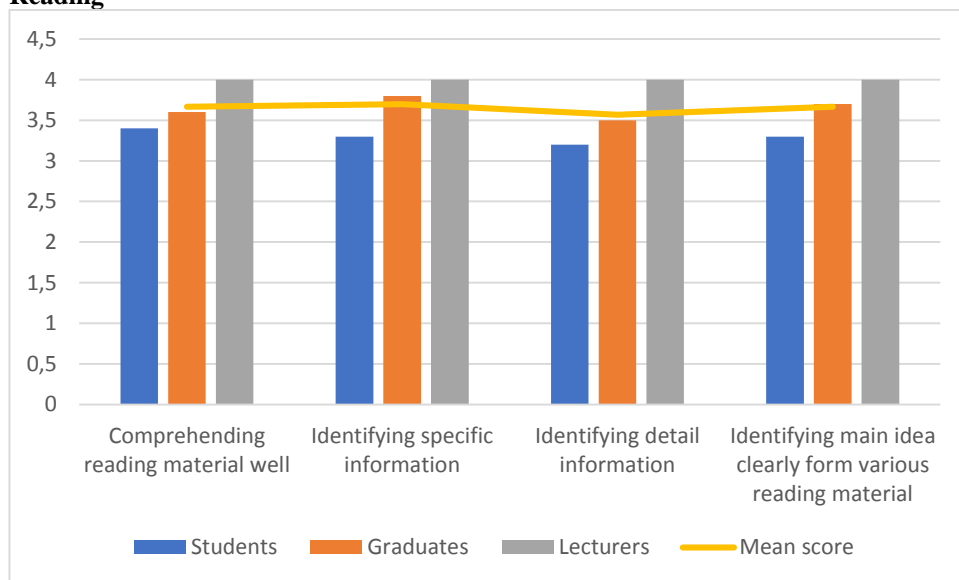


Figure 8. Micro skills of Reading

The chart describes that all micro-skills is reading are in very important categorization. It implies that all the components should be included in instructional material.

The Outline of The Purposes of Learning English The Topic Important For The Students

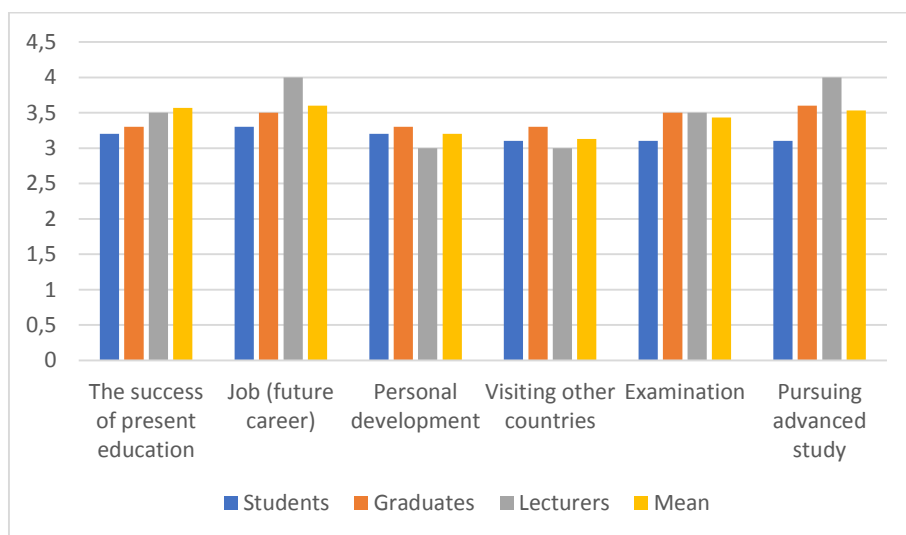


Figure 9. The outline of learning purposes

The chart shows that the English language is recognized to be at the important level (between 3.1 and 4) as a tool to pursuing advanced study followed by as tool of succeeding in present education and getting the examination. Personal development and visiting other counties are also in important categorization, comes after the previous component.

LEARNING NEEDS

The Outline of Student's Learning Preference and Styles

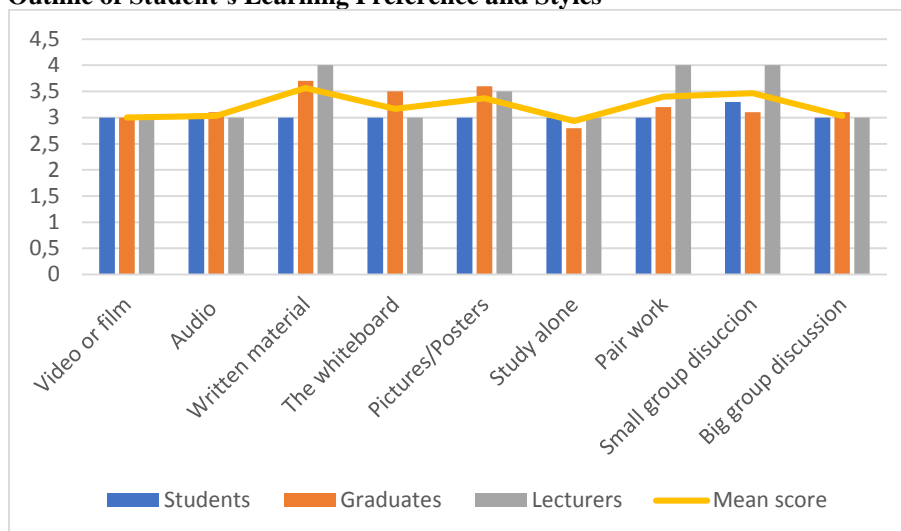


Figure 10. The outline of students' preferences and styles

The chart shows that students like learning using written material and pictures more than audio, video or film, and the whiteboard. The students also like studying in small group discussions more than big group discussion. The students also prefer pair work than studying alone.

DISCUSSION

Therefore, to make students easy in catching information from any English literature, so it should facilitate English printed sources that fulfill students' needs. Therefore, it is important to design English for Math material based on integrated need analysis.

Based on the data analysis, it can be inferred the need inventory of English for Math Instructional Material as follows:

Table 1. Students' Learning ability

Learning ability	inference
Fair in listening	Students need to learn all the skills and component because all categorization is in fair.
Fair in reading	
Fair in writing	
Fair in speaking	
Fair grammar	
Fair in vocabulary	
Fair in pronunciation	

Table 2. Students; learning Problem

	Learning Problems	Mean	Explanation
1	Lack of learning English strategies	3	Facilitate instructional material with strategies to learn it
2	Commit spelling errors	2.83333333	More exercises in spelling
3	Inadequate mastery of grammar	2.83333333	More exercises in grammar
4	Lack of motivation	2.66666667	Facilitate material that can motivate students
5	Rely much on L1 structure	2.66666667	Give more exercises on target language structure

Table 3. The Outline of The Topics

Topics	Mean Score	Grammar Component	Mean Score
Plane geometry	3.26666667	Count noun vs. Non-count	3.5
Arithmetic	3.23333333	Singular and Plural Nouns	3.4
equation	3.2	Adverbs	3.4
Solid geometry	3.2	Articles- indefinite and Definite	3.36666667
Integral	3.16666667	Interjections	3.36666667
Number	3.13333333	Pronoun	3.3
trigonometry	3.1	Adjectives	3.3
Matrix	3.06666667	Comparative and Superlative	3.3
Functions	3	Possessive Nouns	3.26666667
Inequality	2.96666667	'Be' verbs (simple present 1)	3.26666667
Derivative	2.96666667	Prepositions	3.26666667
The Limit	2.93333333	Action verb (simple present 2)	3.23333333
Continuity	2.93333333		

Target Situation Analysis

Table 4. The importance of language skills and language component

Language skills and Language Component	Mean Score
Reading	4
Vocabulary	3.9666667
Grammar	3.6333333
Pronunciation	3.5
Spelling	3.5
Writing	3.3333333
Listening	3.1666667
Speaking	3.1666667

Table 5. The Micro Skills of English Skills

Listening	Mean Score	Speaking	Mean Score	Writing Skill	Mean score	Reading	Mean score
Can Identify specific information well	3.567	Can Speak in context	3.47	Can write grammatically	3.63	Identifying specific information	3.7
can make inference well	3.533	Can speak grammatically	3.1	Can write cohesively and coherence	3.47	Comprehending reading material well	3.67
Can Identify main idea well	3.467	Can speak Fluently	3.1	Can organize paragraph appropriately	3.33	Identifying main idea clearly from various reading material	3.67
Can identify detail information will	3.43	Can speak in context, with fluency, and intonation.	3	Can write free writing	3.33	Identifying detail information	3.57
0 – 1.50 = Not important		1.51 – 2.50 = Less important		2.51 – 3.50 = Important;		3.51 – 4.00 = Very important	

Table 6. Students' Purposes in Learning English

Purpose	Mean score
Job (future career)	3.6
The success of present education	3.57
Pursuing advanced study	3.53
Examination	3.43
Personal development	3.2
Visiting other countries	3.13

Learning Needs' of The Students

Table 7. Learning preferences

Learning Preference	Mean score
Written material	3.5666667
mall group discussion	3.4666667
Pair work	3.4
Pictures/Posters	3.3666667
The whiteboard	3.1666667
Audio	3.0333333
Big group discussion	3.0333333
Video or film	3
Study alone	2.9333333

The students of mathematics education department have fair ability in English. This finding was supported by the students statement as follows:

Saya tidak mampu berbahasa Inggris. Saya hanya mengetahui sedikit, sedikit kosakata, sedikit grammar, sedikit kemampuan mengucapkan, mendengarkan, menulis, apalagi bercakap. Tapi diantara keterampilan berbahasa yang lain, reading lebih mudah dan lebih dibutuhkan (students 7, April 2019).

I cannot speak English. I know just a little, a little vocabulary, grammar, pronunciation, listening, writing, even speaking. However, among language skills, reading is easier dan needed more.

Another students states that:

Menurut saya, yang sangat kami butuhkan sebagai mahasiswa jurusan Pendidikan Bahasa Matematika adalah Bahasa Inggris yang bisa membantu kami untuk mengakses sumber-sumber informasi dari internet yang kebanyakan berbahasa Inggris (students 5, Interview, April, 2019).

In my point of view, As a student of the Mathematics education department, we need English that can we need to access information from the internet, which is most of it written in English.

The students reckon that English is very important as a pre-requisite for success in learning. Hence, for success in their field, the issue of internalizing the English language needs to be addressed jointly by them.

Bahasa Inggris tentu sangat penting untuk dipelajari karena sekarang sudah era global dimana bahasa inggris dibutuhkan di semua area baik di dunia akademik maupun ditempat kerja nantinya. Di dunia akademik sekarang ini., banyak sekali materi-materi yang berkiatan dengan jurusan matematika yang berbahasa Inggris. Kalau tidak mampu berbahasa Inggris, akan sangat sulit buat kami untuk mampu mengaksesnya.
(Interview, April 13, 2019)

A quite similar statement was also found in the interview which was addressed by another student who stated that: Student 32)

Mempelajari Bahasa Inggris bukan lagi pilihan tetapi kebutuhan. Era sekarang ini menuntut perguruan tinggi untuk mampu berkompetesi secara global dan untuk bias berkompetesi secara global, maka Bahasa Inggris adalah syaratnya. Dengan demikian kita harus belajar Bahasa Inggris tidak hanya di ruang-ruang kelas tapi juga di luar kelas.

Learning English is not only a choice but a need of the learners. This era requires the university to be able to compete globally, and to be able to compete globally, English is a requirement.

4. CONCLUSION

Based on the finding and discussion, it can be concluded that

1. Students have the fair ability in English skills – listening, speaking, reading, writing, vocabulary, and grammar, and pronunciation, therefore, material developed should be in line with the level of the student's level of proficiency.
2. All components of language and language skills are categorized as important. Therefore, they need to accommodate instructional material.
3. Students need to learn more in reading than other skills, vocabulary related to their major, and grammar.
4. Students prefer to learn from written material, pictures rather than the prowl whiteboard. The students prefer to learn in pairs of work and small groups.

Acknowledgments

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References

- [1] T. Hutchinson and A. Waters, *English for Specific Purposes: A Learning-centred Approach Excerpt More information.* .
- [2] J. D. Brown, *The elements of language curriculum : a systematic approach to program*

development. Heinle & Heinle, 1995.

- [3] T. Dudley-Evans and M. J. St. John, *Developments in English for Academic Purposes: a multi-disciplinary approach*. Cambridge, UK: Cambridge University Press, 2006.
- [4] M. Ellis and C. Johnson, *Teaching business English*. Oxford University Press, 1994.
- [5] F. Chambers, "A re-evaluation of needs analysis in ESP," *ESP J.*, vol. 1, no. 1, pp. 25–33, 1980.
- [6] S. Nurpahmi, "English for specific purposes : integrated approach," 2014.
- [7] C. Alan, *Evaluating and Selecting EFL Teaching Materials*. Great Britain: Biddles Ltd., 1984.