RESEARCH ARTICLE

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DISCOURSE ANALYSIS OF ENGLISH SCIENCE TEXTS - TO IMPROVE ENGLISH LANGUAGE AND COMPREHENDING ABILITIES OF STUDENTS AT TERTIARY LEVEL IN ENGINEERING COLLEGES OF TAMILNADU

Prem Kishor[1], Dr. S. Karthik Kumar[2]

[1](Assistant Professor, Department ofEnglish, Saveetha School of Engineering, Chennai.)
[2]Assistant Professor, Department of English, Annamalai University, Annamalai Nagar, Tamil Nadu.)

Prem Kishor

Dr. S. Karthik Kumar

ABSTRACT

'Engineering' is the career that most students dream of in India at present. Mushrooming of engineering colleges in each and every state supports the statement. The students can realize their dream of becoming employable engineers if they understand the concepts related to the branch they choose. No engineering text book is published in the local language of Indian students other than English. The course demands the required language skills from the aspirants to be employable.

Tamilnadu, especially Chennai, has many engineering colleges where students get admissions from various other states. In this context, learning the concepts of science is the biggest challenge the students face at tertiary level. The general English is quite distinct from the English present in science textbooks. The science text books demand the best comprehensive skills of the learners.

The present paper talks about discourse analysis of English science texts. The language of science should avoid vagueness in meaning which is found in common language. The present paper also brings the details of research carried out focusing over 380 engineering students at tertiary level belonging to first, second, third, and fourth year of engineering course. This paper presents valid points which will help in improving language of the students and enhancing comprehending abilities in connection with science text books.

Keywords*: Language, Discourse analysis, Comprehending abilities*

INTRODUCTION

Discourse analysis may, broadly speaking, be defined as the study of language viewed communicatively and/or of communication viewed linguistically. Any more detailed spelling out of such a definition typically involves reference to concepts of language in use, language above or beyond the sentence, language as meaning in interaction, and language in situational and cultural context.

Discourse analysis stands for a meaningful chunk (large piece) of written language. It includes the following major aspects. They are:

Language

Content

Educational objectives

In connection with language, it includes parameters like grammaticality and acceptability. It also involves matters like whether the language is by a native or by a non-native writer or speaker.

STATEMENT OF THE PROBLEM

The first step to find a solution for a problem is connected with the success of finding where the problem lies. Language, since the beginning, has undergone much experimentation so as to make learners feel convenient. Every new research brings up some valid findings which would help either the language or the learner.

In general, students at tertiary level, in particular students in technical courses who have to read science text books encounter many issues and problems. These issues or problems may be either with the students or the science text books. This paper comes up with the details of language and comprehending hurdles students have while going through science text books.

OBJECTIVES

This study will becarried out to identify the knowledge of English language and comprehending abilities of target students so as to help them improve their ability in comprehending the content of science text books.

➢ To analyze the texts of the study materials and identifying the strong points in the texts so that they can be consistently used which improves the study materials while revising.

ANALYSIS AND INTERPRETATION

Data analysis is a systematic presentation of processed data in the form of tables or pictorial representation in order to meaningfully conclude the study and to address the research problems.

LEARNER - LANGUAGE

Table: 1

Education in English medium to comprehend Technical concepts

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	20	5.2
Disagree	16	4.1
Neutral	50	12.9
Agree	203	52.5
Strongly Agree	98	25.3
Total	**387**	**100.0**

Source: Primary Data.

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It is clearly understood from the above table that education of students in English medium at primary and secondary level is always a supporting hand in comprehending technical concepts at higher education level. This is evident from the outcome of the respondents' opinion. In a total of 387 a majority number in this section is 203 who agree the statement mentioned above the table. The second highest number is 98 where the respondents are strongly agreeing with the statement. Eventually we can understand that students with English medium in primary and secondary feel comfortable in understanding technical concepts in higher studies.

Table: 2

Education in Non-English medium a hurdle to comprehend Technical concepts

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	26	6.7
Disagree	25	6.5
Neutral	62	16.0
Agree	161	41.6
Strongly Agree	113	29.2
Total	**387**	**100.0**

Source: Primary Data.

This is considerably understandable from this table that students who had their primary and secondary education in their mother tongue (non-English medium) have had a great difficulty in comprehending technical concepts at higher education level. This is evident from the response of the respondents where a total of 161 agreed and a total of 113 strongly agreed with the statement. It denotes that education in English medium would make students feel at ease at higher education level.

Table: 3

Parental educational background- A helping hand to student

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	40	10.3
Disagree	61	15.8
Neutral	108	27.9
Agree	111	28.7
Strongly Agree	67	17.3
Total	**387**	**100.0**

Source: Primary Data.

It has been understood that majority of the respondents have agreed with the statement that parental educational background is always a helping hand in comprehending technical concepts. One time or the other, a graduate student may need the help of his/her parent while preparing at home. In a total of 387 responses, 111 respondents, the highest of all in this division, have agreed that it would be a good thing for students to comprehend technical concepts if they have parents with educational background. Quite surprisingly, 108 respondents, the second highest in this division, could not say whether it is useful or not to have educated parents.

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Table: 4

Reading habit to comprehend content of science textbooks

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	24	6.2
Disagree	32	8.3
Neutral	70	18.1
Agree	173	44.7
Strongly Agree	88	22.7
Total	**387**	**100.0**

Source: Primary Data

It is observed from the above table that majority of the students either have agreed or strongly agreed with the statement which says that the habit of reading English books is always helpful in comprehending science texts books at higher education level. It is quite understandable that good listening leads to good speaking and good reading leads to good writing, in other words good reading leads to good comprehension ability.

Table: 5

Difficulty in recognizing the meanings of all technical terms

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	65	16.8
Disagree	144	37.2
Neutral	84	21.7
Agree	50	12.9
Strongly Agree	44	11.4
Total	**387**	**100.0**

Source: Primary Data.

It is understood from the table that a majority of the respondents disagree with the statement of not having any difficulty in recognizing the meanings of all technical terms. Here, the key term in this statement is 'All'. It is considerably true that all students cannot guess the meanings of all words while reading the science text book. A total of 114 and 65 have disagreed and strongly disagreed with the statement respectively.

Table: 6

Skip the unknown word

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	41	10.6
Disagree	53	13.7
Neutral	38	9.8
Agree	176	45.5
Strongly Agree	79	20.4
Total	**387**	**100.0**

Source: Primary Data.

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The table mentioned above tells us that a total of 176 respondents, the highest number of all in this division, have agreed with the statement 'while reading the content of a science text, they will skip the word for which they don't know the meaning'. The second highest number in this table which has 79 respondents with strongly agree category for the statement. With this, we can understand that if a students at tertiary level doesn't know the meaning of a technical term, he/ she is in the habit of skipping it without any second thought and proceed forward.

Table: 7

Progression in comprehending concepts gradually

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	16	4.1
Disagree	18	4.7
Neutral	52	13.4
Agree	203	52.5
Strongly Agree	98	25.3
Total	**387**	**100.0**

Source: Primary Data.

The table mentioned above will tell us that the majority of the respondents in numbers 203 and 98 have agreed and strongly agreed respectively with the statement 'You will feel the progressive change in understanding the concepts of science texts gradually.' It is a known fact that practice makes a man perfect. With the outcome of this table, it is clearly understood that they feel the progressive change with the passage of years in comprehending science texts and concepts.

Table: 8

Comprehending the content in the very first attempt

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	86	22.2
Disagree	78	20.2
Neutral	60	15.5
Agree	90	23.3
Strongly Agree	73	18.9
Total	**387**	**100.0**

Source: Primary D

It is evident from the table that students cannot comprehend the content of science text books in the very first attempt. The respondents who agree and strongly agree for this statement are little lesser than the respondents who disagree and strongly disagree with the statement. This shows that there is some complexity, like they always have, with the science text books they have in their academics. Hence, it is understood that they cannot comprehend the content in the very first attempt.

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Table: 9

Comprehending the content in several attempts

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	59	15.2
Disagree	81	20.9
Neutral	59	15.2
Agree	117	30.2
Strongly Agree	71	18.3
Total	**387**	**100.0**

Source: Primary Data.

It is clearly understood from the table that students can comprehend the content of science text books in several attempts. The respondents who agree and strongly agree for this statement are very large in number than the respondents who disagree and strongly disagree with the statement. Hence, it is understood that they cannot comprehend the content several attempts.

Table: 10

Academic association- Good Vocabulary

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	30	7.8
Disagree	37	9.6
Neutral	51	13.2
Agree	205	53.0
Strongly Agree	64	16.5
Total	**387**	**100.0**

The table mentioned above clearly states that the association of students with English as a subject since the very beginning of their education helped them to have a good range of vocabulary. But a little concern here is that only 64 have strongly agreed and 205 have agreed with the statement. Another factor here is that 51 respondents couldn't decide whether this academic association with English subject will help them improve their vocabulary or not. Hence, we can understand that a special focus is needed mandatorily to have a good range of vocabulary.

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Table: 11

Academic Association- Grammar Expertise

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	38	9.8
Disagree	56	14.5
Neutral	51	13.2
Agree	158	40.8
Strongly Agree	84	21.7
Total	**387**	**100.0**

Source: Primary Data.

The table mentioned above clearly states that the association of students with English as a subject since the very beginning of their education helped them to have better knowledge in connection with grammar. Since the students have English in every academic year as an integral part of their academics, they have exposure to basic grammar every year. Since 50 respondents couldn't decide on either one, and 56 and 38 respondents stood on disagree and strongly disagree rating respectively, a little attention has to be paid to have firm grip on grammar. Mere academic association alone cannot help a student master grammar concept.

LEARNER-COMPREHENSION ABILITY

Table: 12

Ability to understand the tense of the sentence

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	24	6.2
Disagree	21	5.4
Neutral	45	11.6
Agree	195	50.4
Strongly Agree	102	26.4
Total	**387**	**100.0**

Source: Primary Data.

The table mentioned above tells us that many of the respondents are able to understand the tense of the sentence while reading a science text. Nobody can deny the importance of knowledge on tense is mandatory. Since a change in tense changes the meaning of the sentence in connection with the time, all the graduate students especially technical students are expected to have it without fail. With regard to the huge difference in number of respondents opting agree and strongly agree, a special focus may be needed to improve their knowledge on tenses.

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Table: 13

Missing the sequence of thoughts while reading technical content

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	23	5.9
Disagree	21	5.4
Neutral	49	12.7
Agree	175	45.2
Strongly Agree	119	30.7
Total	**387**	**100.0**

Source: Primary Data.

It is clearly evident from the table shown above that many students miss the sequence of thoughts while reading the content related to technical subjects. Since a total of 175 and 119 respondents have opted the options agree and strongly agree options, we can come to a conclusion that the students face a considerable difficulty in comprehending content which in turn is making them miss the sequence of thoughts. Hence, we can say that a little attention has to be paid after consultation with academic experts in formulating certain rules and regulations in writing science textbooks.

Table: 14

Using practical knowledge in understanding content

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	32	8.3
Disagree	56	14.5
Neutral	93	24.0
Agree	129	33.3
Strongly Agree	77	19.9
Total	**387**	**100.0**

The table shown above makes it clear that many students use practical exposure they have in laboratories to understand the content they read from science text books. A total of 129 respondents have opted the option 'agree'. A little concern here is that a total of 93 respondents opted the option 'neutral' since they might have a hesitation in this statement. Hence, we understand that students' practical exposure and the comprehension ability of content in science text books go hand in hand.

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Table: 15

Non-verbal Cues to comprehend content of a science text

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	53	13.7
Disagree	79	20.4
Neutral	86	22.2
Agree	99	25.6
Strongly Agree	70	18.1
Total	**387**	**100.0**

Source: Primary Data.

The table shown above makes it very clear that many students felt easier in understanding the content they read from science text books when it was complemented with non-verbal cues. It is considerably quite true that a total of 99 and 70 respondents have opted the options agree and strongly agree respectively. The outcome of the table makes it clear that it would always give a positive result when the technical concepts are supplemented with non-verbal cues.

Table: 16

Comfort with text books written by Indian authors

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	108	27.9
Disagree	138	35.7
Neutral	49	12.7
Agree	58	15.0
Strongly Agree	34	8.8
Total	**387**	**100.0**

Source: Primary Data.

The table shown above makes it very clear that many students have gone for the options strongly disagree and disagree. These two options have been chosen by 108 and 138 respondents respectively. From this table, we can understand that it is not the nationality of the author what makes the students feel comfortable in reading science text books, but the quality of language used by the authors of the textbooks concerned. Hence we can understand that the nationality of the authors has nothing to do with the comprehension ability of the students with regard to science text books.

Table: 17

Comfort with text books written by foreign authors

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	103	26.6
Disagree	136	35.1
Neutral	52	13.4
Agree	45	11.6
Strongly Agree	51	13.2
Total	**387**	**100.0**

Source: Primary Data.

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The table shown above makes it very clear that many students have gone for the options strongly disagree and disagree. These two options have been chosen by 103 and 136 respondents respectively. From this table, we can understand that it is not the nationality of the author what makes the students feel comfortable in reading science text books, but the quality of language used by the authors of the textbooks concerned. Hence we can understand that whether the nationality of the author is Indian or a foreigner has nothing to do with the comprehension ability of the students with regard to science text books.

Table: 18

Grammar is everything in understanding content

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	85	22.0
Disagree	155	40.1
Neutral	48	12.4
Agree	50	12.9
Strongly Agree	49	12.7
Total	**387**	**100.0**

Source: Primary Data.

It is quite obvious from the table depicted above that grammar is not everything in comprehending the content of a science text book. Many respondents have expressed their opinion that grammar is an integral part of comprehending content but not everything that one needs alone to comprehend. This is proved with respondents' choosing disagree and strongly disagree with 155 and 85 numbers respectively. Hence, we can say that mere grammar knowledge cannot help a person in comprehending the entire content of a science text book.

Table: 19

Grammar is not needed in understanding content

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	31	8.0
Disagree	38	9.8
Neutral	57	14.7
Agree	161	41.6
Strongly Agree	100	25.8
Total	**387**	**100.0**

Source: Primary Data.

It is quite obvious from the table depicted above that grammar is not everything in comprehending the content of a science text book. Many respondents have expressed their opinion that grammar is an integral part of comprehending content but not everything that one needs alone to comprehend. This is proved with respondents' choosing agree and strongly agree with 161 and 100 numbers respectively. A little contradiction is felt here because of the percentage that was chosen by respondent for Neutral and disagree ratings. Hence, we can say that mere grammar knowledge cannot help a person in comprehending the entire content of a science text book.

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Table: 20

Knowing Language functions of all words in a sentence

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	30	7.8
Disagree	42	10.9
Neutral	63	16.3
Agree	187	48.3
Strongly Agree	65	16.8
Total	**387**	**100.0**

Source: Primary Data.

The table shown above makes it evident that students are not confident in terms of language functions of the terms they find in science text books. Since a minimal total of 65 have chosen the option 'strongly agree' it is considerably understandable that they need a little push up to know the language functions of words they encounter in their science text books. Steps needed for improvement of this skill have to be taken so that the students can easily go through the content and meaning as well.

RECOMMENDATIONS

The following recommendations are made after the detailed observation and research with the large number of respondents.

➢ Many students who had their entire education in English medium opined that they felt it a little easier in comprehending science textbooks at tertiary level. Hence, it is recommended to the new learners to have the education with English as a medium of instruction mandatorily. Students admitting in private schools have it as a mandatory thing. Schools governed by local government authorities have to take steps in implementing this rule. Learning new language for academic benefit doesn't mean neglecting mother tongue.

➢ Since many respondents have strongly felt that their reading habit helped them to comprehend science text in a better way, it is recommended that there should be a special focus on vast reading from the beginning.

➢ Many respondents have accepted that they have little difficulty in understanding technical terms at tertiary level while reading science textbooks; a special focus has to be paid to improve their technical vocabulary.

➢ It is observed that many students are in the habit of skipping words if they don't know the meaning. Hence, it is recommended that the teaching staff of engineering colleges have to motivate the students by telling them that they can guess the meaning of the words based on the context.

➢ Since many respondents have opined that they could understand the content of science text in several attempts, it is recommended to all students at tertiary level to have patience and focus while reading science texts.

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➤ Many have agreed that their academic association alone couldn't help them improve their vocabulary; it is recommended that students have to pay special focus on improving their vocabulary. Staff members have to encourage students towards attaining this goal.

➤ It is recommended that students at this level have to focus on basic grammar which is very much needed and mandatory to understand science texts very well.

➤ Missing the sequence while reading science text books is one of the major problems observed during this study. Hence, it is recommended that the writers of the science text books have to keep the language level of the students in mind and write in a way that can challenge students only to help them improve their language and comprehension abilities.

➤ It is recommended that more practical exposure is needed for students at tertiary level since they use their practical experience while reading the theoretical content of science text books.

➤ Non-verbal cues are recommended to be made part of the science text books since they help the students understand content in a better manner.

➤ It was found that respondents neither support Indian authors nor oppose foreign authors in terms of language. Since the nationality of the writer of a science text book doesn't matter for students and readers, it is recommended that writers of science text books have to write in a way that make students feel challenged while reading or comprehending.

➤ Basic grammar is needed for better understanding of concepts.

➤ Language functions of words are to be known and learnt on a regular basic.

CONCLUSION

The study is aimed at finding common problems with students at tertiary level in language aspects and comprehending aspects of science textbooks at tertiary level in general and engineering courses in particular. After a laborious study and observation, the problems, solutions and recommendations are mentioned in this paper. This paper will help students understand their problems and will help writers of science text books to write in a way that can be understood by the readers.

ABOUT THE AUTHORS

Mr. Prem Kishor carries 22 years of teaching experience. He is pursuing his doctorate programme in Bharathiar University, Coimbatore, Tamil Nadu, India under the guidance of Dr. S. Karthik Kumar. He focuses on Discourse Analysis. He is working in Saveetha University, Chennai, Tamil Nadu, India.

Dr. S. Karthik Kumar, Assistant Professor of English, carries 16 years of teaching and research experience in Annamalai University, Annamalai Nagar, Tamil Nadu, and India. He offers guidance to ELT/ESP and English Literature scholars. He publishes many research articles in both national and international journals. His contributions towards research are unique. He has been a member of various reputed professional societies.