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DISCOURSE ANALYSIS OF ENGLISH SCIENCE TEXTS –MOTIVATIONAL FACTORS IN IMPROVING ENGLISH LANGUAGE AND COMPREHENDING ABILITIES OF STUDENTS

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Abstract: This paper looks at the difficulties encountered by engineering students studying at colleges located in Tamilnadu region. The problems faced by students in understanding science text books are highlighted and a few solutions are also provided to avoid the problem.

The findings of this study are the outcome of a study done with more than three hundred students of different engineering colleges located in Tamilnadu. To identify the obstacles and difficulties faced by students' different methods were followed. Discussions were a part of this study with individuals as well as groups. The outcomes of this study reveal the difficulties faced by engineering students with different education background in understanding the text books of their major subjects.

English, Technical English, English for Engineers etc., are the various titles of subjects that students have in their engineering curriculum to help them master the language skills. Known scientific terminology in a complex sentence was much easier to comprehend compared to complex English sentences with only general English words. To help students overcome the problem of speaking and writing, discourse analysis method is the best option. This paper presents information on what actually motivates students when they read science textbooks.

Key Words: Discourse analysis, Science Text books, Motivational factors

Introduction:

The study of Discourse is gaining a multidisciplinary status in present time. Linguists refer to discourse as 'language in use'—be it in the form of a public speech or more generally, in any possible way of speaking. The evolution of Discourse as a distinct topic of study and analysis dates back to the 1960s alongside Pragmatics. It first emerged in the area of Ethnography and subsequently gained recognition in other related fields like Linguistics, Sociolinguistics and Pragmatics and also in the study of Cognitive Psychology.

The term, discourse analysis, has been used interchangeably in two separate contexts- spoken and written discourse (Kaplan and Grabe, 2002). There are obvious overlaps between the two and to some extent each can evolve its own direction. Written discourse analysis, the subject of this research, is closely connected with work in literacy. Discourse analysis, in this sense, emerged in the early 1970s. The purpose of written discourse analysis is to explore the actual structuring of the text via some consistent framework, by which how texts are understood, interpreted and used in context.

Statement of the problem

Locating where the problem lies is the first step in finding a solution for a problem. 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.

Motivation is very much required to all students in general and technical students in particular. This will be a driving force in finding what student is searching for. Without motivation, one cannot expect to achieve the desired results. How do authors motivate students with their science textbooks is the big question for this discussion.

Objectives

This study will be carried out

- To identify the shortcomings in book writing so that they can be modified/ corrected/ replaced in future edition.
- To find solutions for the problems faced by students at tertiary level in comprehending the science texts by providing them motivational factors.

Analysis and interpretation

Table: 1

Learner Inviting Reading Material

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	31	8.0
Disagree	35	9.0
Neutral	60	15.5
Agree	177	45.7
Strongly Agree	84	21.7
Total	**387**	**100.0**

Source: Primary Data.

It has been understood clearly from the table that learners have more interest in reading the science text books if the reading material has the learner inviting tendency. The statement is

supplemented with the students' choice of the options agree and strongly agree from the ratings. A total of 177 and 84 have chosen the options agree and strongly agree options. Hence, it can be understood that reading material with learner inviting nature has more use when compared with other techniques.

Table: 2

Learner Involving Reading Material

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	25	6.5
Disagree	41	10.6
Neutral	56	14.5
Agree	176	45.5
Strongly Agree	89	23.0
Total	**387**	**100.0**

Source: Primary Data

It has been understood clearly from the table that learners have more interest in reading the science text books if the reading material has the learner involving tendency. The statement is supplemented with the students' choice of the options agree and strongly agree from the ratings. A total of 176 and 89 have chosen the options agree and strongly agree options. Hence, it can be understood that reading material with learner involving nature has more use when compared with previous technique learner inviting.

Table: 3

Learner Interacting Reading Material

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	45	11.6
Disagree	55	14.2
Neutral	84	21.7
Agree	134	34.6
Strongly Agree	69	17.8
Total	**387**	**100.0**

Source: Primary Data.

It has been understood clearly from the table that learners have more interest in reading the science text books if the reading material has the learner involving and learner inviting tendency when compared with learner interacting tendency. The statement is supplemented with the students' choice of the options agree and strongly agree from the ratings. A total of 134 and 69 have chosen the options agree and strongly agree options which are considerably lesser than the options chosen by respondents in the previous two tables with regard to Learner inviting and learner involving. Hence, it can be understood that reading material with learner involving and learner inviting nature has more use when compared with previous technique learner interacting.

Table: 4

Learner Triggered Reading Material

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	69	17.8
Disagree	65	16.8
Neutral	60	15.5
Agree	137	35.4
Strongly Agree	56	14.5
Total	**387**	**100.0**

Source: Primary Data.

It has been understood clearly from the table that learners have more interest in reading the science text books if the reading material is presented other than learner triggered nature. It is clearly understood that the respondents have chosen Neutral, Disagree and strongly disagree ratings with a total of 60, 65 and 69 respectively. Hence, it can be understood that reading material with learner triggered nature has the lesser attention when compared with the other three processes namely Learner inviting, learner involving and learner interacting.

Table: 5

Concept Explanation from Difficult to Easy method

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	30	7.8
Disagree	45	11.6
Neutral	63	16.3
Agree	161	41.6
Strongly Agree	88	22.7
Total	**387**	**100.0**

Source: Primary Data.

It is quite evident from the table shown above that students have a little comfort in understanding the concept of science text books if it is presented in a way that leads readers from difficult to easy method. It is considerably understood that if the reader is clear with the first point, the second point may be known to him/her. Hence, it is concluded that only a total of 88 respondents have strongly agreed with the statement stating that content can be easily understood if it is presented from difficult to easy method.

Table: 6

Concept explanation from easy to difficult method

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	24	6.2
Disagree	31	8.0
Neutral	55	14.2
Agree	163	42.1
Strongly Agree	114	29.5
Total	**387**	**100.0**

Source: Primary Data.

It is quite evident from the table shown above that students have a great flexibility and comfort in understanding the concept of science text books if it is presented in a way that leads readers from easy to difficult method. It is considerably understood that if the reader is clear with the first point, the second point may be known to him/her. Hence, it is concluded that a considerable total of 114 respondents have strongly agreed with the statement stating that content can be easily understood if it is presented from easy to difficult method.

Table: 7

Ability to understand key points of concepts

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	24	6.2
Disagree	37	9.6
Neutral	61	15.8

Agree	180	46.5
Strongly Agree	85	22.0
Total	**387**	**100.0**

Source: Primary Data.

The table shown above tells us that only a minimal total of 85 out of 387 have strongly agreed with the statement regarding the ability to understand key points of concepts. The dilemmas with respondents in connection with the ability they have with them to comprehend key points made them choose the rating 'agree' rather than 'strongly agree'. Hence it is understood that a considerable attention has to be paid so as to enable the students understand key points of technical concepts.

Table: 8

Identifying the topic sentence in a paragraph

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	18	4.7
Disagree	26	6.7
Neutral	58	15.0
Agree	194	50.1
Strongly Agree	91	23.5
Total	**387**	**100.0**

Source: Primary Data.

The table shown above tells us that the second highest total 91 out of 387 have strongly agreed with the statement regarding the ability to identify topic sentence in a paragraph. The clarity with respondents in connection with the ability they have with them to identify topic sentence made them choose the ratings 'agree' as well as 'strongly agree' with majority in number. Hence it is understood that students at graduate level are able to recognise the topic sentences in paragraphs.

Table: 9

Referring to dictionary for meaning of an unknown word

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	36	9.3
Disagree	68	17.6
Neutral	44	11.4
Agree	166	42.9
Strongly Agree	73	18.9
Total	**387**	**100.0**

Source: Primary Data.

It is clearly understood from the table shown above that many respondents have accepted that they refer to dictionary when they encounter a word while reading a science text. This opinion is supplemented with the total responses for agree and strongly agree with numbers 166 and 73 respectively. Dictionary is the first master to any new learner and an experienced professor. Hence we can understand that students need the help of dictionary in comprehending meanings of several technical terms while reading science textbooks.

Table: 10

Predicting the meaning of a word based on the context

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	34	8.8
Disagree	43	11.1
Neutral	34	8.8
Agree	192	49.6
Strongly Agree	84	21.7
Total	**387**	**100.0**

Source: Primary Data.

It is clearly understood from the table shown above that many respondents have accepted that they are able to predict the meaning of an unknown word based on the context while reading a science text. This opinion is supplemented with the total responses for agree and strongly agree with numbers 192 and 84 respectively. Context based predicting is something that is known to many of the tertiary level students especially who are pursuing technical courses.

Table: 11

Concept from Known to Unknown

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	38	9.8

Disagree	33	8.5
Neutral	38	9.8
Agree	187	48.3
Strongly Agree	91	23.5
Total	**387**	**100.0**

Source: Primary Data.

It is quite evident from the table shown above that students have a great flexibility and comfort in understanding the concept of science text books if it is presented in a way that leads readers from known to unknown method. It is considerably understood that if the reader is clear with the first point, the second point may be known to him/her. Hence, it is concluded that a considerable total of 187 respondents have strongly agreed with the statement stating that content can be easily understood if it is presented from known to unknown method.

Table: 12

Concept from Unknown to Known

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	32	8.3
Disagree	34	8.8
Neutral	60	15.5
Agree	181	46.8
Strongly Agree	80	20.7
Total	**387**	**100.0**

Source: Primary Data.

It is quite evident from the table shown above that students have a little comfort in understanding the concept of science text books if it is presented in a way that leads readers from unknown to known method. It is considerably understood that if the reader is clear with the first point, the second point may be known to him/her. Hence, it is concluded that only a total of 80 respondents have strongly agreed with the statement stating that content can be easily understood if it is presented from unknown to known method.

Table: 13

Concept from near to far

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	34	8.8
Disagree	25	6.5
Neutral	49	12.7
Agree	184	47.5
Strongly Agree	95	24.5
Total	**387**	**100.0**

Source: Primary Data.

It is quite evident from the table shown above that students have a great flexibility and comfort in understanding the concept of science text books if it is presented in a way that leads readers from near to far method. It is considerably understood that if the reader is clear with the first

point, the second point may be known to him/her. Hence, it is concluded that a considerable total of 184 respondents have strongly agreed with the statement.

Table: 14

Concept Explanation from Concrete to Abstract mode

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	19	4.9
Disagree	26	6.7
Neutral	64	16.5
Agree	183	47.3
Strongly Agree	95	24.5
Total	**387**	**100.0**

Source: Primary Data.

It is quite evident from the table shown above that students have a little comfort in understanding the concept of science text books if it is presented in a way that leads readers from concrete to abstract method. It is considerably understood that if the reader is clear with points one after the other, he/she can follow the sequence of sentences. If the meaning of the sentence is lost, the confidence of the reader will be lesser and lesser with completion of each sentence. Hence, this method is opted by less number of respondents.

Table: 15

Concepts from Abstract to Concrete mode

Rating	**Number of**	**Percentage**

	Respondents	**(%)**
Strongly Disagree	24	6.2
Disagree	41	10.6
Neutral	46	11.9
Agree	167	43.2
Strongly Agree	109	28.2
Total	**387**	**100.0**

Source: Primary Data.

It is quite evident from the table shown above that students have a great flexibility and comfort in understanding the concept of science text books if it is presented in a way that leads readers from abstract concrete method. Hence, it is concluded that a considerable total of 167 and 109 respondents have chosen the ratings ‘agree’ and ‘strongly agree’ respectively.

Table: 16

Skimming- A reading technique

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	20	5.2
Disagree	56	14.5
Neutral	45	11.6
Agree	168	43.4
Strongly Agree	98	25.3

Total	**387**	**100.0**

Source: Primary Data.

It is quite evident from the table shown above that students have flexibility and comfort in understanding the concept of science text books if skimming method is implemented in reading. A total of 168 and 98 respondents have opted ratings ‘agree’ and ‘strongly agree’ respectively. Hence, we can understand that almost 68% of respondents are in favour of this reading technique.

Table: 17

Scanning: A reading technique

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	22	5.7
Disagree	28	7.2
Neutral	52	13.4
Agree	175	45.2
Strongly Agree	110	28.4
Total	**387**	**100.0**

Source: Primary Data.

It is quite evident from the table shown above that students have more flexibility and comfort in understanding the concept of science text books by using scanning technique when compared with skimming method in reading. A total of 175 and 110 respondents have opted ratings ‘agree’ and ‘strongly agree’ respectively. Hence, we can understand that almost 74% of respondents are in favor of this reading technique.

Table: 18

Need of both skimming and scanning methods

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	22	5.7
Disagree	28	7.2
Neutral	52	13.4
Agree	175	45.2
Strongly Agree	110	28.4
Total	**387**	**100.0**

Source: Primary Data.

It is quite evident from the table shown above that students have more flexibility and comfort in understanding the concept of science text books when both skimming and scanning methods are used in reading. A total of 175 and 110 respondents have opted ratings ‘agree’ and ‘strongly agree’ respectively. Hence, we can understand that almost 74% of respondents are in favour of these two reading techniques.

Table: 19

Meaning of a word as glossed

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	31	8.0
Disagree	27	7.0
Neutral	43	11.1
Agree	176	45.5
Strongly Agree	110	28.4
Total	**387**	**100.0**

Source: Primary Data.

It is quite evident from the table shown above that students have more flexibility and comfort if the meaning is given as glossed. A total of 176 and 110 respondents have opted ratings 'agree' and 'strongly agree' respectively. Hence, we can understand that almost 74% of respondents are in favour of this method.

Table: 20

Meaning of the word on the same page

Rating	Number of Respondents	Percentage (%)
Strongly Disagree	43	11.1
Disagree	42	10.9
Neutral	43	11.1
Agree	175	45.2

Strongly Agree	84	21.7
Total	**387**	**100.0**

Source: Primary Data.

It is quite evident from the table shown above that students have flexibility and comfort a little lesser if the meaning of the word is given in the same page than giving the meaning of a word as glossed. A total of 175 and 84 respondents have opted ratings 'agree' and 'strongly agree' respectively. Since the limited number of respondents have opted 'strongly agree' rating, we can understand that students like to check the meaning when it is given as glossed.

Table: 21

Meaning of the word at the end of the book

Rating	**Number of Respondents**	**Percentage (%)**
Strongly Disagree	35	9.0
Disagree	44	11.4
Neutral	30	7.8
Agree	183	47.3

Strongly Agree	95	24.5
Total	**387**	**100.0**

Source: Primary Data.

It is quite evident from the table shown above that students have more flexibility and comfort if the meaning is given as glossed. A total of 183 and 95 respondents have opted ratings 'agree' and 'strongly agree' respectively. Hence, we can understand that almost a majority of the respondents have chosen 'strongly agree' rating for this method than the previous two methods.

Recommendations

- The curiosity and attention that a writer can create to connect the reader with the text makes a big difference with the outcome. Motivation is a concept that has always been associated with education be it primary, secondary or higher. It is clearly understood from the outcome of this research that students at tertiary level do like the content of science textbooks if it is presented in a way that involves them. Hence, the content written in 'learner involving' method usually tops of all other methods. The other methods which are a little behind this 'learner involving' are 'learner inviting, learner interacting, and 'learner triggered'.
- It is observed from the research that students are quite comfortable with science text books when the content is explained by their authors from concrete to abstract rather than abstract to concrete mode. The majority of the respondents have chosen this since they find the technique is very helpful. This is, for sure, going to be a motivating factor in connection with comprehension of science texts by tertiary level students.
- Authors of science text books do follow different techniques in presenting the content of several concepts related to the topics concerned. The two traditional ways opted by authors are presenting information from 'difficult to easy' and 'easy to difficult'. These two challenging techniques have always been part of several textbooks. In connection with science text books, where the technical concepts which demand the best attention from readers need the best one. It is observed and understood after a detailed research with a little over 350 respondents that many students like to have the information from

easy to difficult method rather than ‘difficult to easy’ one. It is convincingly true that if the reader feels comfort with the initial points only, he/she can go ahead and comprehend the rest. Hence, it is recommended to the authors of science textbooks to follow the technique that motivates students.

- It is observed from the research that students are quite comfortable with science text books when the content is explained by their authors with both reading techniques i.e. Skimming and Scanning. The majority of the respondents have given highest rating for this statement. Hence we can considerably understand that both the reading techniques are mandatorily needed in connection with comprehension of science texts by tertiary level students.
- It is recommended that there should be a flexible language when key points of a particular concept are being presented in the science textbooks. It is observed from this research that many respondents have opted ‘agree’ rather than ‘strongly agree’ when asked a question on their ability to recognize key points in a concept. Hence, it is understood that students are in need of a helping hand in the form of flexible language to comprehend key points.
- It is observed from the research that students are quite comfortable with science text books when the content is explained by their authors from known to unknown rather than unknown to known points. The majority of the respondents have chosen this since they find the technique is very helpful. This is, for sure, going to be a motivating factor in connection with comprehension of science texts by tertiary level students.
- Authors of science texts follow different methods in presenting meaning of words in various modes. The popular ones of all are meaning given as glossed, meaning given on the same page, meaning given at the end of the book. After the research on this point, it is recommended that students will be benefited much if the meaning is given as glossed. This is the option that has got the highest rating of all the three modes.

Conclusion

The study is aimed at finding best motivational ways to help students avoid common problems in language and comprehending aspects of science textbooks at tertiary level in general and

engineering courses in particular. A laborious research and observation is made to know the common problems faced by students and the motivational techniques are brought mentioned here to help authors present well in textbooks. 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.

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