



Use of Cohesive Devices in Engineering and Humanities Students' Spontaneous Texts to Achieve Coherence

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Abstract: Cohesive devices are explicit elements used to establish connections and transitions between sentences or paragraphs in order to create a unified text. This paper examines the grammatical and lexical cohesive devices used by Engineering and Technology and Humanities students to achieve coherence in their spontaneous texts, as well as the impact of students' academic discipline on their ability to develop coherent texts. The findings suggest that writers relied more on grammatical cohesive devices than lexical cohesive devices to accomplish coherence, and that the academic discipline influences students' writing abilities.

Keywords: Coherence, cohesion, cohesive devices, reference, anaphora, cataphora, substitution, ellipsis, anatomy, synonymy, hyponymy, emphatics, hedges

1. Introduction

Coherence pertains to the overarching structure or plan at the macro level in narratives or discourses, which is motivated by the plot or storyline.

(Berman & Slobin, 1994, p. 67). It is a property of texts that makes them hold together and is necessary for a text to be comprehensible (Fitzgerald & Spiegel, 1990, p. 263). Coherence can be established by

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effectively utilizing cohesive markers, which are lexical or grammatical devices that establish connections between different components of a text (Halliday and Hasan, 1989). Nevertheless, cohesive markers alone do not suffice to ensure the coherence and comprehensibility of a text. For example, a text may have correct use of cohesive markers but still be incoherent if the semantic relations between the key concepts are not clear (Halliday & Hasan, p. 95).

In addition, a text can be perceived as coherent and understandable even without cohesive devices, as demonstrated by Koshik (1999). Other means can also contribute to attaining coherence. For instance, the coherence of a text may be affected by reader expectations, which are formed by genre conventions, predictability based on setting and time sequence in narratives, and the structure of everyday conversation. These components enhance the coherence of a text. (Sacks, Schegloff, & Jefferson, 1974; Schegloff, 1990; Koshik, 1999). Even if a writer misuses reference markers or conjunctions, the reader may still be able to comprehend the intended meaning based on the conversational structure and context (Koshik, 1999).

A text's coherence is shaped not only by the author's intent, but also by the dynamic interaction between the author and the reader. Both parties draw upon their shared background knowledge outside the text to make sense of the content, contributing to the establishment of coherence within the text (Bamberg, 1984; Smith, 1984; Renkema, 1993; Koshik, 1999). For example, a text may lack explicit cohesion markers but still be coherent when the reader applies their knowledge of the world to interpret the text (Renkema, 1993). In summary, Coherence is a broader and pragmatic characteristic of texts, encompassing the overall sense of unity and logic in the content. In contrast, cohesion is a more specific, grammatical, and explicit aspect, relating to the formal and structural elements that bind the text together. Unlike cohesion, which can be dissected into discernible

subdimensions marked by explicit indicators, coherence is a more complex and holistic quality of a text that cannot be easily divided into distinct subdimensions with overt markers.

Achieving coherence in writing requires the following components: Both writers and readers are aided in understanding how sentences are interconnected and how they contribute to the text's overall coherence by macrostructure. (Hoey 1983; Martin and Rothery 1986); Cohesive Devices serve as guides for readers, facilitating the flow of ideas in the text and contributing to the overall coherence of the writing; Logical flow helps readers to follow the development of ideas and arguments, making the text more cohesive and comprehensible; Consistent Language and Style involves maintaining consistency in use of vocabulary, tone, and writing style which helps to create a unified and coherent text that is easy for readers to follow and understand; and propositional Unity refers to the logical connection between ideas and arguments within a text, ensuring that they are logically linked and support the overall purpose and theme of the writing. Understanding how these elements work in texts can help students use them effectively in their writing to enhance coherence.

For a text to be coherent and unified, it is necessary to establish and maintain the connections between different meanings using cohesive devices. These devices are instrumental in fostering inter-relationships among lexical items and creating a cohesive text (Halliday and Hasan, 1976; Eggins, 2004; Emilia, 2014).

1.1 Cohesive Devices

Referencing is the act of indicating or "pointing to" something that has already been mentioned elsewhere in a written text (Halliday and Hasan, 1976). It serves as a way to track and connect related ideas throughout a written work. There are different types of referencing, including homophoric, exophoric, and endophoric referencing (Eggins, 2004).

Homophoric reference is a type of referencing where a generic phrase or term takes on a specific meaning based on the social context. For example, the term "the Prime minister" can have different homophoric references in

different countries, referring specifically to the Prime minister of that country. In India, it refers to the Prime minister of India, while in United Kingdom, it refers to the Prime minister of United Kingdom. It is important to note that homophoric references are contextual feature.

Exophoric references are grammatical features and occurs when a lexical item, referred to as an exophore, alludes to something that is present in the situational context but is absent from the linguistic context. They do not connect two elements in a text but provide a description of generics without identifying them which makes it difficult identifying an exophoric reference in a sentence (Halliday and Hasan, 1976).

The act of referring to something within a text is known as endophoric referencing (Eggins, 2004; Emilia, 2014; Halliday and Matthiessen, 2004; Christie and Derewianka, 2008). There are two types of endophoric references: anaphoric (backward-looking) and cataphoric (forward-looking) (Halliday and Hasan, 1976). When a referent refers to a previously mentioned entity in the text, it is called an anaphoric reference, whereas when it refers to something that will be mentioned later, it is known as a cataphoric reference. Endophoric references are important for establishing cohesion in a text, and thus, they are relevant to the present study (Halliday and Hasan, 1976). The tracking and identification of lexical items are facilitated through the use of reference systems.

To achieve lexical cohesion, it is crucial to consistently select appropriate lexical items that connect a text to its central theme or topic. (Eggins, 2004). General and instantial are two main categories of lexical cohesion (Halliday and Hasan, 1976; Halliday and Matthiessen, 2004; Emilia, 2014). The focus of the study is the general category which includes synonymy, antonymy, meronymy, hyponymy, and repetition, and it is. Instantial lexical cohesion, on the other hand, includes equivalence, naming, and semblance.

The writer conveys the logical relationships among different parts of the text with the help of conjunctions (Eggins, 2004). Elaboration, extension, and enhancement are three types of conjunctions (Halliday, 2004).

Emilia (2014) defines ellipsis as the omission of words, groups, or clauses within a sentence. Substitution, on the other hand, refers to the replacement of a clause component with a shorter word or phrase, such as "one," "some," or "do," to avoid repetition.

This study investigates grammatical and lexical cohesive devices in spontaneous texts authored by Engineering and Technology and Humanities students, and to examine the impact of students' academic discipline on their ability to develop coherent texts.

The focus of this paper is the explicit use of cohesion-building devices. These are explicit grammatical and lexical elements used to create connections and transitions between sentences or paragraphs.

2. Literature Survey

The scope of research on cohesion and coherence has primarily focused on ESL students who have migrated to English-speaking countries. Scholars such as Bamberg (1984) and Richards (1990) assert that "coherence" is a fundamental component of effective writing. However, Connor (1990) and Roberts and Kreuz (1993) offer a contrasting view, considering it as an elusive and ambiguous notion. Grabe and Kaplan (1996) further highlight the lack of consensus and a unifying concept of coherence in the field. In ESL writing classrooms, teachers often employ abstract phrases like "your writing lacks coherence," "lacks unity," or "ideas are disorganized" to describe and instruct on this concept.

There is a growing focus on ESL writing within the L1 (first language) setting, as researchers have renewed interest in investigating textual organization for analytical discussions. Emilia, Habibi, and Bangga (2018) have found that students are demonstrating an emerging ability to achieve cohesion at the clause level when creating a text. Notably, students are using simple cohesive devices in their writing, such as references, lexical cohesion, and conjunctions. Similarly, Karadeniz (2017) investigated the relationship between students' use of cohesive devices and their ability to produce a coherent text, revealing a significant but weak positive correlation between students' skill in producing coherent texts and their use

of cohesive devices such as references, elliptical expressions, narratives, and substitutions.

Aldera's (2016) research revealed that ESL writers often struggle with cohesive devices, inter-sentence relations, and organizational patterns, making composition a challenging task. Achili (2007) further highlighted that ESL students tend to heavily rely on cohesive devices due to the emphasis placed by teachers on linking sentences in the classroom, while ignoring other important discourse features. Tonder and Louise (1999) and Khalil (1989) established a significant relationship between lexical cohesion and coherence ratings. Neuner (1987) and Jonson (1992) found that the number of cohesive ties used to achieve coherence did not significantly differ between poor and well-rated ESL texts in terms of coherence. Jonson also emphasized that the overall quality of writing depends on coherence in context, organization, and style, rather than solely on the number of cohesive ties used. Zhang (2000) further reported that the frequency of cohesive ties did not have a significant relationship with the quality of writing in Chinese ESL texts. The emergence of second language writing as a distinct field of study, along with contemporary trends in written discourse analysis, provides ample evidence and motivation for conducting an empirical study on coherence in texts written by English as a second language students.

3. Method

3.1 Objective

The study explores the grammatical and lexical cohesive devices used by Engineering and Technology and Humanities students in their spontaneous texts to achieve coherence, and to examine the impact of students' academic discipline on their ability to develop coherent texts.

3.2 Data Collection

Convenient sampling technique was used to collect 276 texts on the topic "Are we too dependent on smartphones and computers?" from undergraduate and postgraduate students enrolled in universities located in

Delhi-NCR region. Students were informed of the purpose of the study and participation was entirely voluntary. The participants had thirty minutes to compose the paragraph.

3.3 Analysis of the Data

In the initial phase the collected texts were examined to eliminate the incomplete texts. Two sets of the complete texts were provided to two independent volunteers to categorise these texts into coherent and non-coherent categories using a reader-based approach Davis (1998). The volunteers rated these texts on a scale of 1-5. The texts which got a rating of 4 and 5 from both the readers were considered as coherent and included in the final analysis.

The classification of Halliday and Hasan (1976) was used to analyse the use of cohesive devices to attain coherence. It has two broad categories: grammatical cohesive devices which includes conjunctions, references (anaphora and cataphora), substitution, and ellipsis, and lexical cohesive devices which includes repetition, synonymy, antonymy, and hyponymy. 't-test' was used to determine the quantitative differences in the average use of cohesive devices in the texts of two groups.

4. Empirical Results

Firstly, within the domains the undergraduate and postgraduate texts were correlated to explore the differences in the use of cohesive devices. The results of Engineering and technology domain are presented in Table 1 below:

Table 1: Use of cohesive devices in Engineering domain

Variables	Engineering UG (39)		Engineering PG (40)		t-ratio	P-value
	Mean	S.D.	Mean	S.D.		
Conjunctions	3.95	1.62	3.17	1.58	2.87	0.00
Anaphora	1.92	1.17	1.85	1.12	1.93	0.05
Cataphora	1.13	0.86	0.22	0.47	0.92	0.35

Substitution	2.95	1.52	2.07	1.24	5.75	0.00
Ellipsis	0.21	0.40	0.37	1.44	-2.06	0.04
Repetition	0.51	0.68	0.20	0.40	2.04	0.04
Synonymy	0.77	0.74	0.32	0.52	5.27	0.00
Antonymy	1.13	1.08	0.82	0.95	3.20	0.00
Hyponymy	0.03	0.16	0.25	0.54	-3.25	0.00

Table 1 shows that undergraduate students used significantly more antonymy, synonymy, repetition, substitution, anaphora, conjunctions, and the postgraduate students of engineering used more ellipsis, hyponymy in the texts. It indicates that undergraduate students relied more on grammatical cohesion and the postgraduate students preferred lexical cohesion.

Table 2: Use of cohesive devices in Humanities domain

Variables	Humanities UG (47)		Humanities PG (56)		t- ratio	P- value
	Mean	S.D.	Mean	S.D.		
Conjunctions	2.97	1.37	3.46	1.40	-1.76	0.08
Anaphora	1.34	1.14	1.83	1.23	-2.11	0.03
Cataphora	0.95	0.93	0.39	0.56	3.79	0.00
Substitution	2.29	1.80	2.23	1.25	0.21	0.82
Ellipsis	0.21	0.41	0.21	0.45	-0.01	0.98
Repetition	0.19	0.44	0.42	0.59	-2.23	0.02
Synonymy	0.40	0.61	0.33	0.51	0.58	0.56
Antonymy	0.80	0.90	0.55	0.65	1.65	0.10
Hyponymy	0.17	0.37	0.10	0.36	0.85	0.39

Table 2 shows that undergraduate students of humanities used significantly more cataphora and the postgraduate students of humanities used more anaphora, repetition in the texts.

Table 3: Cohesive device in Engineering and Humanities undergraduate texts

Variables	Engineering (39)		Humanities (47)		t-ratio	P-value
	Mean	S.D.	Mean	S.D.		
Conjunctions	3.95	1.62	2.98	1.37	3.00	0.00
Anaphora	1.92	1.17	1.34	1.14	2.31	0.01
Cataphora	1.13	0.86	0.96	0.93	0.87	0.19
Substitution	2.95	1.52	2.30	1.80	1.78	0.03
Ellipsis	0.21	0.40	0.21	0.41	-0.08	0.46
Repetition	0.51	0.68	0.19	0.44	2.61	0.00
Synonymy	0.77	0.74	0.40	0.61	2.49	0.00
Antonymy	1.13	1.08	0.81	0.90	1.49	0.60
Hyponymy	0.03	0.16	0.17	0.38	-2.21	0.01

Table 3 shows that the students of engineering used significantly more conjunctions, anaphora, substitution, repetition, synonymy and the students of humanities used more hyponymy in the texts.

Table 4: Cohesive devices in Engineering and Humanities postgraduate texts

Variables	Engineering (40)		Humanities (56)		t-ratio	P-value
	Mean	S.D.	Mean	S.D.		
Conjunctions	3.17	1.58	3.46	1.40	-0.94	0.34
Anaphora	1.85	1.12	1.84	1.23	0.04	0.96

Cataphora	0.22	0.47	0.39	0.56	-1.53	0.12
Substitution	2.07	1.24	2.23	1.25	-0.60	0.54
Ellipsis	0.37	1.44	0.21	0.45	0.78	0.43
Repetition	0.20	0.40	0.43	0.59	-2.09	0.03
Synonymy	0.32	0.52	0.34	0.51	-0.13	0.89
Antonymy	0.82	0.95	0.55	0.65	1.64	0.10
Hyponymy	0.25	0.54	0.11	0.36	1.54	0.12

Table 4 shows that the students have significant difference only on one cohesive repetition. Humanities students have used more repetition as compared to the students of engineering in the texts. Other cohesive devices are used equally by both the groups.

Table 5: Cohesive Devices in Engineering and Humanities domains texts

Variables	Engineering (79)		Humanities (103)		t-ratio	P-value
	Mean	S.D.	Mean	S.D.		
Conjunctions	3.55	1.63	3.24	1.40	1.39	0.16
Anaphora	1.88	1.14	1.61	1.21	1.54	0.12
Cataphora	0.67	0.82	0.65	0.80	0.16	0.86
Substitution	2.50	1.44	2.26	1.52	1.09	0.27
Ellipsis	0.29	1.06	0.21	0.43	0.67	0.50
Repetition	0.35	0.57	0.32	0.54	0.40	0.68
Synonymy	0.54	0.67	0.37	0.56	1.91	0.05
Antonymy	0.97	1.02	0.67	0.78	2.27	0.02
Hyponymy	0.13	0.41	0.14	0.37	0.05	0.95

Table 5 shows that the students of Engineering and Humanities differ significantly in using synonymy and antonymy. Engineering used more synonymy and antonymy as compared to the students of humanities in the texts. Other cohesive devices are used equally by both groups.

Qualitative analysis was done to understand the difference in the use of cohesive devices in these texts after getting mixed results in quantitative analysis. The most common cohesive device used in these text is the use of conjunctions. Conjunctions are words or clusters of words used to connect words, phrases, clauses, or sentences within a sentence or written work. There are several types of conjunctions:

Coordinating conjunctions are used to join together words, phrases, or clauses of equal grammatical rank. "and," "but," "or," "nor," "for," "so," and "yet" are the most frequently used coordinating conjunctions. For example: Staying more close to nature and living a holistic way of life can reduce this dependency.

Subordinating conjunctions show the relationship between the dependent clause and the main clause, such as cause and effect, time, condition, contrast, etc. Commonly used subordinating conjunctions in these texts include: 'after,' 'although,' 'as,' 'because,' 'before,' 'if,' 'since,' 'though,' 'unless,' 'until,' 'when,' 'while,' etc. For example: Nowadays smartphones and computers are very essential in our life as it saves our time and money

Correlative conjunctions are used in pairs to join together words, phrases, and clauses. The most common correlative conjunctions are: 'either...or,' 'neither...nor,' 'both...and,' 'not only...but also,' 'whether...or,' etc. For example: either we should start using these devices for less time or be ready to face the side effects.

Conjunctive adverbs are used to connect clauses or sentences and show relationships such as contrast, cause and effect, time, etc. Common conjunctive adverbs include: 'however,' 'therefore,' 'nevertheless,' 'meanwhile,' 'consequently,' 'besides,' 'in addition,' 'on the other hand,'

etc. For example: Therefore, let us all be nature lover not the destroyer and we should use less of the internet.

References are a type of cohesive device that refer back to previously mentioned words, phrases, or ideas. References are of three types: personal, demonstrative and comparative. "Students are so preoccupied with themselves that they cease to consider others" is an example of a personal pronoun referring to students. An example of a demonstrative reference is "Students are encouraged to complete their assignments using ICT tools." It has also increased our reliance on intelligent devices." 'It' in this example refers to use ICT tools. A comparative reference used is "Most important reason of people's dependency on smartphones is facilities like online banking, tickets booking and food orders made their life easy. Another reason is internet has made students' learning easy", here 'another' refers to reasons. All three types of references are used in the text of both groups.

Another example, There is a huge difference between talking on phone and talking in person. People need to understand this. In this example to understand what "this" stand for we need to refer back to the previous sentence. It is an example of anaphoric referencing. Similarly, writers have used cataphoric (forward) reference though less in number to connect two sentences. For example: If we want to reduce our dependence, we need to limit our smart phone use.

Substitution refers to the use of one word or phrase to replace another. There are several types of substitution: pronominal substitution involves using pronouns to replace nouns or noun phrases; clausal substitution involves using clauses to replace nouns or noun phrases; verbal substitution involves using one verb or verb phrase to replace another. In these texts pronominal substitution is most common, other types are less frequent. For example: " We are getting addicted to smartphone more than the computer." In this example use of word 'more' is substitution of verb addict.

Ellipsis refers to the omission of one or more words in a sentence or clause, which are understood from the context or implied. There are several

types of ellipsis: nominal ellipsis involves the omission of a noun or noun phrase, which is understood from the context; verbal ellipsis involves the omission of a verb or verb phrase; and clausal ellipsis involves the omission of an entire clause. In these text, nominal ellipsis is visible but verbal and clausal ellipsis are not used by writers. For example: To improve the situations we should stop checking social media apps again and again; try to inculcate habit of reading books instead go with google and Encyclopaedia. The pronoun 'we' is understood to be repeated after the ellipsis in the second clause.

Repetition refers to the act of repeating words, or phrases for emphasis. The repetition of the last word or phrase of a clause or sentence at the beginning of the next clause or sentence is common in these texts. It can create a sense of continuity or connection between ideas. For example: On smartphone and computer we have become overly dependent. This dependency has a negative impact on our lives.

Synonymy refers to the relationship between words or phrases that have similar or identical meanings, or nearly so, in a given context. In these texts, for example, the synonyms of 'dependency' like 'reliance,' 'need,' 'counting on,' and 'leaning on' are commonly used.

Antonymy refers to the relationship between words or phrases that have opposite or contrasting meanings. 'Engage- avoid,' 'Positive-negative,' 'advantages-disadvantages and 'eradicating-inculcating' are the example of antonymy used in these texts.

Hyponymy refers to a hierarchical relationship between words or concepts, where one word or concept is more specific or subordinate to another. Smart-devices has been used as a superordinate for mobile phone, tablets, laptops, computer.

5. Summary and Conclusion

The primary finding is that academic discipline influences students' writing abilities. The use of references, conjunctions, and lexical cohesion in the writing of students majoring in Engineering and Technology is significantly different from that of students majoring in the Humanities. The absence of verbal and clausal substitution and verbal and clausal

ellipsis was observed in both domains. The study also revealed that students used more grammatical cohesive devices than lexical cohesive devices to achieve coherence in their writing. This finding highlights the importance of sentence-level grammar instruction in classrooms. Although students demonstrated proficiency in using grammatical cohesive devices, they were not as proficient in using lexical cohesive devices such as repetition, synonyms, antonyms, and hyponyms. The most frequently used lexical cohesive device in the texts was repetition. This may suggest that cohesive ties are emphasized in classroom exercises, with more attention given to conjunctions rather than other lexical cohesive devices. As argued by reference (McCarthy, 1991), the use of lexical cohesion in learners' discourse should not be ignored.

Studies suggest that students learning English as a second language often prioritize individual words and sentences in their writing, while overlooking the crucial aspect of overall coherence in a text (Ferris and Hedgecock 1998; Bamberg 1984). Many second language learners rely heavily on their knowledge of grammar as their sole tool for writing English essays, seeking a sense of security from it (Leki 1996; Silva 1992). The findings of the studies are consistent with the empirical evidences available, the writes have used more grammatical cohesive devices than the lexical cohesive devices to achieve coherence.

Therefore, it is crucial to incorporate alternative strategies to improve students' writing abilities. By placing emphasis on coherence in pedagogy, students can be encouraged to shift their focus on discourse features like textual organization and propositional unity, which play a crucial role in constructing meaningful texts, from sentence-level grammar. Indeed, guiding students in enhancing the coherence of their writing should be a key component of second language writing instruction, as it enables them to effectively convey their ideas with clarity and coherence.

To facilitate students in developing coherence in their writing, It is crucial that instructors help students develop a deep awareness of the key

components that contribute to a text's coherence. Students must learn how to create interconnections between sentences (McCrimmon, 1980). Students must be taught how to explicitly use cohesive devices at the paragraph level (Bander 1983; Lauer et al. 1985; Dodds 2000) and how to use connective devices such as pronouns, repetitive structures, and transitional markers to link textual elements.**References**

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