Achieving Cohesion through Grammatical Conjunctions in Selected English as a Second Language (ESL) English Language and Mathematics Classroom Discourses

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ABSTRACT

This paper examines how grammatical conjunctions are linguistically represented and categorised as a form of discourse system in ESL English Language and Mathematics classroom discourses. Using the linguistic categorization of the system of conjunction by Halliday and Matthiessen (2004), the study analysed the discourses as a system of linguistic components which are systematically connected by conjunctive elements. The analysis from the selected discourses in Ibadan revealed the way concepts, ideas in the subject contents in the discourses are consistently linked by means of elaborating (appositive), extending (additive, adversative and varying) and enhancing (spatio-temporal and causal-conditional) conjunctions. The overall results showed the highest rate of enhancing conjunctions in creating cohesion in both discourses. Although it was apparently higher in mathematics classes than in English Language classes, followed by extending conjunctions and elaborating conjunctions, respectively. Also, the selected discourses revealed the teachers’ preference for certain conjunctive devices in the discourses than some other.

1. Introduction

Classroom discourse involves the study of spoken language in the classroom, with the ultimate goal of finding meanings to different forms and patterns of language between the teacher and the students in the course of teaching and learning. The aim of the discourse which is specifically interpreted as a system of meaning beyond grammar and lexis is also interested in the understanding of the mechanisms of structuring a text. Cohesion in discourse, therefore, is an important linguistic feature in the discourse that produces texture (the basis which accounts for the unity and semantic interdependence within the discourse) among the clauses in the text. The system of cohesion which was introduced by Halliday and Hasan (1976) suggests the relations of meaning that exist within a text; a sequence where there is a relationship between one clause and the other in the same discourse. It is the interpretation of the dependency and the independency of some elements (grammatical or lexical) in the same discourse. Cohesion in English as a second language (ESL) texts or discourses is geared towards unfolding how ESL users construct discourses. The analysis of grammatical
conjunctions as a linguistic connective in classroom discourses thus provides an interesting means of understanding discourse constructions from the points of view of the teacher, as well as, the students. It would further show the cohesive ties among utterances in the discourse in such a way that the meanings of ideas in the classroom subjects would be easily understood. The analysis would reveal possible relationships among concepts in the subject content; thus providing an understanding of the discourse structure and semantic links in classroom subjects which are usually mediated in the English language in most ESL contexts. This study therefore, examines grammatical conjunction as a cohesive device that reveals linguistic and semantic relationships in selected ESL classroom discourses in Ibadan, Nigeria.

2. Research Objective

This paper is aimed at investigating how cohesion is achieved through the relationships among the linguistic representation of grammatical conjunctions in classroom discourses. The paper also identified and examined how and why the discourses are consistently linked by means of elaborating (appositive), extending (additive, adversative and varying) and enhancing (spacio-temporal and causal-conditional) conjunctions.

3. Research Methodology

For the purpose of the study, sixteen Classroom discourses from humanity and science subjects in the selected secondary schools in Ibadan, Nigeria were video recorded, transcribed and subjected to conjunctive analysis using Halliday and Matthiessen (2004)’s system of conjunction. The targeted audience was the students and the teacher during classroom teaching and learning exercises. The recording was done in the classroom with an MP5 recorder and a video camera but these were done in a way to minimize distraction in the natural conditions of both the teacher and the students in the classroom. The recordings were made for each period of about 40 minutes lesson and the non-linguistic behaviours of the targeted audience were got and analysed with the help of the video recorder. The findings were placed in tables, with an attached frequency depicting the various forms of conjunctions employed by both the teachers and the students in the course of teaching and learning in the classroom. The clauses in the tables were numbered for easy identification and cross referencing.

4. Literature Review

Morris and Hirst (1991) assert that discourse is not just a random combination of statements; rather, it has a quality of unity and functions as a binding mechanism that ties statements together. Bloor and Bloor (1995: 98) describe grammatical conjunction as a cohesive tie between clauses or sections of text in such a way as to demonstrate a meaningful pattern between them. Halliday and Hasan(1984) note that conjunctive elements are cohesive not in themselves but indirectly by virtue of their specific meanings; they are not primarily devices for reaching out the preceding text, but they express certain meanings which presuppose the presence of other components in the discourses. For instance, Gonzalez (2015) researched the logical relationships in high school geometry classes and discovered logical category as the commonly used relationship by teachers in mathematics classroom. Also, Hessamy and Hemedi(2013) revealed ‘additive’ as the most frequently used conjunction in independent and integrated essays written by 95 upper-intermediate Iranian EFL learners, while causal, temporal, adversative and continuative conjunctions were all represented in the texts. Gonzalez and Herbst(2013) researched the logical relationships in mathematics classroom and submit that teachers and students often used the conjunctions ‘then’ and ‘if’ to denote consequences of events and premises.
of events, respectively. In another study by Ionescu (2011), results show that the use of sequential connective markers increase with age and the frequency of causal connectors decrease in Romanian and English as children grow older, but reached the lowest in adult. Although earlier researches, such as Sternberg (1979) have also tested students’ comprehension of logical connectives across ages, and discovered that it was more difficult for students to comprehend statements using consequence conjunctions than additive conjunctions. In other related studies on conjunction, Ketabi and Jamalv (2012) investigate the regular pattern of shifting conjunction devices from the English language into Farsi ('a language spoken in Iran'). In the analysis, additive and adversative devices are both in parallel corpus, which implies an over half of the total number of conjunctions, while both English Law texts (ELTs) and Farsi translational texts (FTTs) shared more similarities than differences in the use of conjunction because of the informative function and stylistic features of law texts.

From all indications, grammatical connectives and more importantly, the English conjunctions, play important functions in interpreting texts across disciplines and cultures. This study, among other objectives, would investigate conjunction as a linguistic and semantic cohesive device, which brings about the understanding of classroom discourses in ESL situation.

5. The English language in Nigerian education

Akindele and Adegbite (1992) are of the opinion that the quality of a nation’s education could considerably be determined by the quality of language which it adopts. In fact, the status of English as a world language provides various avenues for global communication, science and technology, international business, diplomatic relations and human development which would have been difficult to achieve if Nigeria had not adopted English as a second language. Akindele and Adegbite (1992) further state that the homogenous societies might not have the other language because they have one common language, but the situation in Nigeria is heterogeneous which is characterised by diversity of languages. The multiplicity of language is so obvious in Nigeria that within the major ethnic groups, there are still differences in languages and dialects. The situation is that some of the dialects found within a linguistic group are not mutually intelligible even though the speakers belong to the same linguistic group. Spencer (1962) and Bamgbose, (1990) see this situation as a barrier to national unity and development. To break this language barrier therefore, there is the need for a common language to facilitate a common and effective communication. The only option open to Nigeria is the English language which performs multifarious functions since its introduction by the English missionaries.

In education, the Federal Government of Nigeria demonstrates appreciation for the use of the indigenous languages as a language of education through the provisions of the (1981) National Policy on Education, particularly under the section: ‘The National Language Policy’ which states that: “government will see to it that the medium of instruction in the primary school is initially the mother tongue or the language of the immediate community and at a later stage, English”.

However, much as one would like to commend the sense of patriotism stated above, the fact remains that none of the indigenous languages has the linguistic capacity to handle the teaching of subjects like mathematics and other sciences. This fact is buttressed by Adedeji, (1984) when he points out that: “a science student needs language for acquiring and communicating knowledge and skills in science and technology. He needs language to help him define concepts and describe substances, objects, locations and processes, report facts, draw inferences, make conclusions, classify items and make generalizations”.

Major problems associated with the learning of English Language include the fact that the language is learned as a second language (L2) by students who are already proficient in the use of one local language.
6. The Nature of Mathematics Classroom Discourse in Nigeria

Perhaps more than any other subject, teaching and learning Mathematics depends on language. Mathematics is one of the compulsory subjects that students must take in any Nigerian senior secondary school, not minding whether such students are in science, commercial, arts or social science classes. It is also a requirement to proceed to higher level of education in Nigeria. The importance of mathematics carries with it an assumption that all members of our society should have the knowledge of the subject. The competence of mathematics is crucial and a critical determinant of the post-secondary education and the options available to young people (Sells, 1978; Ojo, 1986).

In the secondary school curriculum, according to National Policy on Education (2004), there are core subjects, as well as electives which students must pass before graduation. These subjects are English Language, one of the Nigerian Languages (i.e. Hausa, Igbo and Yoruba), Mathematics, one of Physics, Chemistry or Biology; one of Literature in English, History or Geography and Agriculture or a vocational subject. In his submission, Odusoro (2002) affirms that the knowledge of science remains superficial without Mathematics. It has also been described as the queen and servant of all subjects. Johnson and Rising (1972) have note that:

No other subject has greater application than mathematics. It is the prime instrument for understanding and for exploring our scientific, economic, and social world. Today more than ever before, all fields of knowledge are dependent on mathematics for solving problems, stating theories and predicting outcomes. It is an indispensable tool in creating new knowledge.

Mathematics is about relationships: relationships between numbers, between categories, between geometric forms, between variables among others. In general, these relationships are abstract in nature and can only be brought into being through language. Even mathematical symbols must be interpreted linguistically. For students still developing their proficiency in the language of the classroom, the challenge is considerable. Indeed research has shown that, while many ESL students are quickly able to develop a basic level of “conversational” English, it takes several years to develop more specialized “academic” English to the same level as a native speaker. It has a lot to do with reasoning not memorisation. It is not about remembering and applying a set of procedures but about developing understanding and explaining the processes used to arrive at solutions. And most importantly, mathematics discourse which is based on inquiry and problem solving holds special premise and challenge for language minority students who tend to learn English as their second language.

One of the problems researchers have found is students’ inability to articulate their strategies, discuss ideas and concepts critically, and communicate mathematical meaning. These inabilityes have put pressure on students who do not have English as their first language. For instance, it was confirmed in African Newspaper of Nigeria Plc (21-09-2010) that out of, 1,132,357 who sat for NECO (National Examination Council) examination, only 279,974 passed Mathematics. This brings to mind immediately that other than factors that hinder students from passing mathematics, the inability to understand and to express mathematical concepts is another issue. Such difficulties arise when the first language does not have the vocabulary to express the mathematical ideas that they learn in the classroom, for instance, words like: division, quotient, and coefficient. These words like many others are new to Nigerian students and there is no translation for them in the local languages. Fasi (1999) in his comprehensive study of the effects of bilingualism on Tongan students’ mathematical achievement argues that the absence of many westernised concepts in the social, and cultural lives of Tongan people, means that finding Tongan words for mathematical terms and
concepts is a complicated task, because concepts like “absolute value”, “simultaneous equations”, “standard deviation”, have no equivalent functions in the activities of the Tongan people. Dale and Cuevas (1987) also note that the task of learning the use of mathematical words must be done within particular mathematical contexts and it is not enough to learn lists of standalone words. Hence, it becomes a very difficult task for Nigeria students to contextualise the mathematical words to their social languages. As a result, students may circumlocute to convey meanings and produce large quantities of talk or utterances they write. “By saying too much or too little, students may give the impression that they do not understand when they simply lack specific language or communication patterns to express precise meanings ....” (Denise Jarrett, 1999).

In all, students need a comfortable environment to express and to justify their claim and in this sense, the mathematics teacher should try and bring the students closer to the content. Teresa Maguire and Alex Neill (2006) also state that classroom culture in mathematics can be done by expecting students to explain and justify their answers, whether they are correct or not; emphasising the importance of contributing to the discussion by explaining their strategy rather than producing correct answers; expecting students to listen to and attempt to understand others' explanations; commenting on or redescribing students' contributions while notating the reasoning for the class on the board.

7. Theoretical Background

Halliday and Mathiessen (1994:18) state that ‘logogenesis’ which stands for meaning allows us to explore language options in order to create a text. These options include grammatical units and other elements that combine to create a text. The elements are considered as logical relations that characterise clause complexes and transcend the boundaries of clause. They are textual meta-functions, collectively known as the system of cohesion. The system of cohesion works in four ways: conjunctive, reference, ellipsis and lexical organization. Since this paper is limited to grammatical conjunctions in classroom discourses, the framework would address the system of conjunctions. Halliday and Matthiessen (2004) identify the logico-sematic relations that are manifested in the system of English conjunction. The system marks the relations which elaborates, extends or enhances the texts or discourses.

7.1 Elaboration

Elaboration suggests restating a clause by means of expansion. It presents additional details, comments and examples. Elaboration includes appositive and clarifying conjunctions. The former presents elements that are re-presented, restated either by expository, exemplifying, correcting, distracting and dismissing, while the latter elaborates elements are not only restated but also reinstated, summarized and made more precise (Halliday and Matthiessien, 2004:541). Clarification includes particularizing, resumptive, summative and verificative.  

<table>
<thead>
<tr>
<th>ELABORATION</th>
<th>APPOSITIVE</th>
<th>expository</th>
<th>in other words, that is, I mean, to put it in another way</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>exemplifying</td>
<td>corrective</td>
<td>for example/instance, to illustrate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>or rather, at least, to</td>
</tr>
</tbody>
</table>
be more precise,
distractive incidentally, by the way.
dismissive in any case, anyway, leaving that aside
particularizing in particular, more especially
resumptive to resume, as I was saying
summative in short, briefly, to sum up
verifiable actually, verificative

Table 1: Elaborating Conjunction And Examples

7.2 Extension

Halliday and Matthiessien (2004) state that extension involves either addition, adversative or variation. Addition is either positive or negative, adversative but yet, on the other hand, however, while variation includes replacive instead, subtractive except and alternative.

<table>
<thead>
<tr>
<th>EXTENDING</th>
<th>ADDITIVE</th>
<th>positive</th>
<th>and, also, moreover, furthermore</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>negative</td>
<td>nor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ADVERSATIVE</td>
<td>but, yet, on the other hand, however</td>
<td></td>
</tr>
<tr>
<td></td>
<td>VARIATION</td>
<td>replacive</td>
<td>instead, on the other hand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>subtractive</td>
<td>apart from that, except for that</td>
</tr>
<tr>
<td></td>
<td></td>
<td>alternative</td>
<td>or(else); alternatively</td>
</tr>
</tbody>
</table>

Table 2: Extending Conjunctions

7.3 Enhancement

Here, the conjunction creates cohesion that relates to spatio-temporal (which relates to places), manner (which creates cohesion by comparison, reference), causal-conditional conjunction (this relates to the results, reason and purpose, and matter (relates to matters that have gone before such as spatial metaphors like point, ground and field).

<table>
<thead>
<tr>
<th>ENHANCING</th>
<th>MATTER</th>
<th>positive</th>
<th>here, there, as to that, in that respect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>negative</td>
<td>in other respects, elsewhere</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MANNER</td>
<td>comparative</td>
<td>likewise, similarly, in a different way</td>
</tr>
<tr>
<td></td>
<td>means</td>
<td>in the same manner</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SPACIO-TEMPORAL</td>
<td>simple</td>
<td>simple</td>
</tr>
<tr>
<td></td>
<td></td>
<td>following: then, next, secondly simultaneously: just, then, her, now preceding:</td>
<td></td>
</tr>
</tbody>
</table>
The findings on the discourses are summarised and presented in the table below.

### Table 3: Enhancing Conjunction

<table>
<thead>
<tr>
<th>CONJUNCTION TYPES</th>
<th>ENGLISH</th>
<th>MATHS</th>
<th>FREQ. 1</th>
<th>FREQ. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELABORATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APPOSITIVE (for instance/example)</td>
<td>4</td>
<td>1</td>
<td>1.7</td>
<td>0.2</td>
</tr>
<tr>
<td>CLARIFICATIVE</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>EXTENSION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADDITIVE (and, also)</td>
<td>60</td>
<td>56</td>
<td>26.1</td>
<td>11.2</td>
</tr>
<tr>
<td>ADVERSATIVE (but)</td>
<td>21</td>
<td>32</td>
<td>9.1</td>
<td>6.5</td>
</tr>
<tr>
<td>VARIATION (Alternatively, or)</td>
<td>23</td>
<td>21</td>
<td>10</td>
<td>4.2</td>
</tr>
<tr>
<td>ENHANCEMENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPATIO-TEMPORAL (now, next, before, until)</td>
<td>34</td>
<td>65</td>
<td>14.8</td>
<td>13.1</td>
</tr>
<tr>
<td>Causal conditional (then, therefore, if, hence, though)</td>
<td>88</td>
<td>321</td>
<td>38.3</td>
<td>64.7</td>
</tr>
</tbody>
</table>
From the summary above, the results revealed the high frequency in the use of Causal-conjunctions and additives in both discourses, respectively. The analysis revealed that the teachers in the selected discourses are more comfortable using conjunctions ‘and’ as well as ‘also’ in expressing additions, when constructing classroom discourses, while other additives such as ‘moreover and furthermore’ are not used. Also, the result presents more causal-conditional conjunctions, with the use of ‘then, therefore, if, hence, though, because and so, as the predominantly used conjunctions in both discourses. The spatio-temporal conjunctions (now, next, before and until) are mostly deployed in mathematics classrooms as discourse markers, opening marker and time marker, than in English language discourses, while the use of additives is slightly higher in English language discourses than in mathematics. The study recorded few occurrences of other conjunction types such as appositive and variation in the discourses, while clarificative conjunction was not represented in the selected discourses.

<table>
<thead>
<tr>
<th>Conjunction</th>
<th>English</th>
<th>Maths</th>
<th>Frequency 1</th>
<th>Frequency 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELABORATION</td>
<td>4</td>
<td>1</td>
<td>1.7</td>
<td>0.2</td>
</tr>
<tr>
<td>EXTENSION</td>
<td>104</td>
<td>109</td>
<td>45.2</td>
<td>22</td>
</tr>
<tr>
<td>ENHANCEMENT</td>
<td>122</td>
<td>386</td>
<td>53</td>
<td>77.8</td>
</tr>
<tr>
<td>TOTAL</td>
<td>230</td>
<td>496</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 5: Related comparison of English Language and Mathematics CD bases on the different Subcategories of conjunction

9. Discussion

9.1 Elaboration as a cohesive device in the discourses

Text 1 (Mathematics)

T: ...It’s the best student. Am I communicating? The but there is that, once when we pick 54 and 50. Then, 51 and 52 will be saying why not me? But they said, please, its not your turn, we don’t need you. But they will now say that I am ... of the marks se you understand what we’re saying? Is it clear? Though, the simplest but it has its own fault. It doesn’t make use of all the members of the data. Are you ok?

T: Now, for example:

T: Find the range of the set of data
(Repeat) 85, 80, 45, 50, 65, 60, 35.

From these what is the range?....

The teacher deployed the elaborating conjunction in exemplifying the range of the set of data in Mathematics classroom. The exemplification is an appositive conjunction which restated the explanation of the subject content by providing examples to justify initial assertions on the subject topic. Mathematics classroom discourses deploy exemplification as a device for achieving cohesion and in fact, mathematics classes may not be successful without adequate provision of relevant examples that support the subject contents.

A variant of the above appositive was also deployed as a device in some English Language discourses. The variant was used in restating or re-presenting the topic at hand in form of ‘for instance’. Example includes:

Text 1 (English Language)
T: ...So, to achieve all those. You’ve to know what you’ve to do when it comes to stress and the likes. For instance, now, let’s look at this. ‘My SISTER is a nurse.’ Who can tell me the word that is stressed?....

Also, elaboration can be expository. Here, the teacher puts her words in another way so that the students can understand the content. Examples of such include:

Text 9 (English Language)

T: ...well, well... no no
What I’m trying to say is that this one is an article. What type of article is this?
Definite article
In English, anytime a definite article preceded a noun, that article in making a reference to a particular object or thing ‘Bring the box on the table’ shows that there is a particular box that the speaker and the listener has the knowledge of. And that the particular box is placed in a particular table. If I say, bring the box on a table.
In that case, the listener will be confused on ‘which table’ will he get the box. But there is a particular table and a particular box that is being... so, this is article ‘the’ is making reference to a particular box and to a particular table. So, it is different from when you say a box and a table. Now, when you say a box and a table, the speaker is not definite and he or she is not referring to a particular box or a particular table. Let’s look at other examples. So, in other words, here this person is making reference to already known box and already known...

T: ...Okay, to cut it short, in summary, we can have as many Mary as possible but the point is that your own particular name. The name she bears is Mary, she also bear Mary but the particular person that bear the particular name are Mary which is also different from each other because each has a special name, labeled to him/her. So, in other words, the Mary you bear is a label. It is a special name to you. Not minding how many people bear it, that is why it is a proper noun, that is why it is a special name given to a particular person. So, likewise this one, the Ivory Coast, that means in Africa, there is only one country known as Ivory Coast and that it is ....

Apart from the above, there was an evidence of dismissive appositive conjunction in the English discourse, where the teacher was explaining the difference between a definite article ‘the’ and an indefinite article ‘a’. The use of ‘in that case’ implies ‘in a situation like this’. It presents at least two options before the speaker which only one is appropriate based on certain condition(s). Example includes:

Teacher:.... In that case, the listener will be confused on ‘which table’ will he get the box. But there is a particular table and a particular box that is being... so, this is article ‘the’ is making reference to a particular box and to a particular table. So, it is different from when you say a box and a table. Now, when you say a box and a table, the speaker is not definite and he or she is not referring to a particular box or a particular table. Let’s look at other examples. So, in other words, here this person is making reference to already known box and already known...
Further analysis revealed that few instances of elaborating conjunctions in the discourses are exemplifying, dismissive and expository, while others, such as corrective, distractive, particularizing, resumptive,summative and verificative conjunctions are not represented in the discourses.

9.2 Extension as a cohesive device in the classroom discourses

Positive additives:
The discourses have a lot of positive additives as extending conjunction in both discourses; however, there was no occurrence of the negative additive in the discourses. The additives suggest the sense of ‘there is still more to say’. Below exemplifies ‘and’ and ‘also’ as structure signal between and among noun phrases.

Text 1 (mathematics)

T: ...Measure of variation or dispersion and measure of variability. Okay?...
T: Under measure of central tendency, they are just three. These are what?
Ss & T: The mean, the median and the mode.
T: ...So, we are to take them one by one.
   One, range. Range is the difference between the greatest and the smallest distribution of a set of data.
   What ... call range. The difference, abi?
   And what is difference?
   Subtraction
   Se?....
T: Now, listen, this formulae and this formulae will give you the same answer. Also, this formulae and this formulae will also give you what?

Text 4 (MATHEMATICS)

T: Now, yesterday we treat the determinant of matrix
Ss: Yes Sir
T: We said that the determinant of a matrix x a,c,b. We want to find the length, x
What did we say again?
We will multiply this one by x
We have a – abc
That was what we did on it yesterday.
I will give you examples. Also, we did singular or non-singular. Are you getting me now?

Text 10 (mathematics)

T: Now, we also have another law, that is law (writing on the board)
   I told you to put the law inside the box.
   So, we have x raised to power a (x^a) multiply by x raised to power b (x^b)
   For the second law, x^a ÷ x^b is equal to x^{a-b}

There are more instances of additives in English language discourses than in mathematics discourses. However, other variants of additives such as, ‘in addition to, not only that but, additionally, besides, again etc’ are not used in the selected classroom discourses.
Apart from the additives, there are also instances of adversatives in both discourses. Here, the adversatives suggest ‘contrary to the expected’. Examples include:

Text 1:
T: …Meaning that the one with the highest mark does not make any meaning. Do you understand? Is it clear? A is an all round student. He knows all the subjects equally. But here, the first subject …is Maths followed by Biology but he failed English. This one will make him to retake WAEC.
Ss: Yes….
T: This is still the variance but the square root is turning it into standard deviation. Are we there?
Ss: Yes

The instances of adversative conjunctions above revealed the contrast from the former, and the unexpected from the norm, respectively. The analysis showed that adversative conjunction can be used many times in a single turn to portray a contrast, introduce a phase or indicate impossibilities. Adversatives are mostly deployed in mathematics discourses than in English Language discourses. Example:

T: …It’s the best student. Am I communicating? The but there is that, once when we pick 54 and 50. Then, 51 and 52 will be saying why not me? But they said, please, its not your turn, we don’t need you. But they will now say that I am … of the marks so you understand what we’re saying? Is it clear? Though, the simplest but it has its own fault. It doesn’t make use of all the members of the data. Are you ok?...

The discourses also deployed variation as a cohesive devise. It revealed instances where the teacher presents something a little different from other of the same type. It presents alternative options to the existing concepts used in the course of teaching and learning English Language and mathematics in the classroom. The analysis revealed more usage of varying conjunctions in English language discourses than in mathematics discourses.

Text 1

T: …(rubbing off the board). So, let me stop here. Alternatively, standard deviation can be obtained using the formulae. You now come back here. You’ll now say SD is this. Then you use what?....

Text 1(English language)

T: …Look at you…

    We talked about primary stress and tertiary stress. And I told you that stress is laying emphasis on a particular syllable or a word when you’re pronouncing it. And there are different reasons of making use of stress…. 

T: So, if you have your textbook, you can turn to page 58. Stress is placing emphasis on a word. A syllable or word that is stressed is said to have a higher pitch or voice than the other. If you don’t have textbook and you’re sharing with others, that means, you’re used to sharing...
9.3 Enhancing Conjunction

Here, the conjunctions can be spatio-temporal or causal conditional.

Spatio-temporal conjunctions:

These conjunctions can either be simple or complex. The occurrence of simple conjunctions is more than the complex conjunctions in both discourses. This is because classroom discourses demand more simultaneous conjunctions than interruptive, terminal conjunction which are related to complex conjunctions. Examples of simple include:

Text 9 (English language)

T: ...Now, let us look at some other examples

‘the Ivory Coast is a country’. (Repeat again)

Everybody know that Ivory Coast is a country where?

TEXT 10 (Maths)

T: Law of Indices

The following are true for all values

\[ a, b \text{ and } x \]

Law 1 = \( x^a x^b = x^{a+b} \)

Example

(a) Simplify \( 10^5 \times 10^4 \)

\[ \text{Solution}: 10^9 = 10^5 \]

(b) \( 5y \times 4y = 5 \times 4 \times y \)

In the first law of indices \( x \) raised to power \( a \), times \( x \) raised to power \( b \). \textbf{Then, we are talking about the index; we are going to add the index.}

\textbf{Now, we have y, so, instead of repeating y, the next thing to do is to check the index of y here and that is what?}

The simple conjunctions ‘then’ and ‘now’ are simultaneous conjunctions. These two suggest the sequence of time in classroom discourses. The findings from the analysis revealed that mathematics discourses use more spatio-temporal conjunctions than English Language discourses. This is because of the simultaneous demand of the sequence of time required in the construction of Mathematics discourses. Other example of simultaneous spatio-temporal conjunction is as below:

Text (English Language)

T: ...Iyen ni wipe (that means). ‘Yours faithfully’

It must take ‘yours faithfully’ not ‘yours sincerely’

Then, you will sign, \textbf{before} you write your full name

The surname in capital letters, others in small letters

You write your two names. Your surname will come last. Is that clear?....

In achieving cohesion in the discourses, the analysis revealed that three conjunction types are interrelated such that there is a link from one conjunction to the other in the same turn across the entire classroom discourses. The implication of this is that a single conjunction type may not.

Example includes:
Text 9 (English Language)

Teacher: …**In that case**, the listener will be confused on ‘which table’ will he get the box. **But** there is a particular table and a particular box that is being mentioned. **So,** this is article ‘the’ is making reference to a particular box and to a particular table. **So,** it is different from when you say a box and a table. **Now,** when you say a box and a table, the speaker is not definite and he or she is not referring to a particular box or a particular table. Let’s look at other examples. **So,** in other words, here this person is making reference to already known box and already known...

This discourse above, with seven sentences has sixteen conjunctive elements that cohesively linked them together. The various forms of the conjunctions include, elaborating, extending and enhancing conjunctions. The subject topic on (definite and indefinite articles) were semantically brought forward with the conjunctive markers.

**Causal-conditional conjunction**

The most prominent of all the conjunction types is the causal-conditional conjunctions in the selected classroom discourses. Halliday and Matthiessien (2004) noted that causal-conditional conjunctions are prominently deployed as cohesive agents across many discourses. Below are examples from the selected ESL English Language and Mathematics classroom discourses in Ibadan:

**Text 2 (Mathematics)**

T: …Everything divided by 13
Ss: 13
T: **Therefore, we will have**

\[ x = -1 + \sqrt{\ldots} \]

**Now,** if you look at this place we have minus 15.

**By the time I open the bracket,** we will multiply this one by 4. **Therefore,** I am going to have 1 plus? Then multiply this one by 4....

In the above text, the teacher used the general causal conjunction ‘therefore’ to imply an equation with formulae (quadratic formulae) in the mathematics classroom. Other causal conjunctions in the same discourse include:

T: …**Hence,** from what is on the board, we have known standard deviation. **Though,** like I said, they may ask you to use a particular method, please try to use that method. If you use that method apart from that method, you will not be given mark for method of solving (teacher moving around to see the class works)....
Text 5 (English Language)

Teacher: …Because, an introduction will be an open door or an opener that open the door of the mind of the reader to what your letter entail. This introductory paragraph should be brief, interesting, attracting, captivating and informative as well. Once again, it should be brief and straight forward. And at the same time, the introductory paragraph of any letter, formal letter should be interesting but straight forward first. Besides, interesting and must contain what you have to discuss in the body of your letter.

Though the use of an introductory paragraph, the reader must be able to get at least an hint of what you are to discuss in the body of the letter.

You want to request for social amenities, in your area. How do you think we can introduce this?

How do you think we can start?

If you start well, we will end well. It is important. So, how do you think we can open the letter?....

The study revealed that we have more occurrences of causal conditional conjunctions in mathematics classrooms than in English language classes. One reason is that mathematics discourses require a lot of results with reasons and purposes.

10. Findings and Conclusions

The results from the analyses revealed the following findings:

i. The study showed the predominance of causal-conditional conjunctions with the use of ‘then, therefore, if, hence, though, because, and so’ more than other conjunctions in the discourses. Also, the selected discourses revealed that ESL teachers of English language and mathematics in Ibadan are sometimes familiar with the use of some selected conjunctive devices than the other, such include and, also, but, or; rather than others like moreover, furthermore, nor, however, additionally, in addition etc.

ii. The study also suggests the non-deployment of clarifying conjunctions in the selected ESL class discourses. These include: particularizing, resumptive, summative and verificative conjunctions.

iii. The discourses imply the usefulness of spacio-temporal relations in creating coherence in mathematics classroom discourses than in English Language discourse. It revealed the relationships between and among variables and figures in the mathematics classroom. Some of these conjunctions include, ‘now, next, before and until’.

iv. The overall results showed the highest rate of enhancing conjunctions in creating cohesion in the entire discourses. Although it was apparently higher in mathematics classes than in English Language classes. Also, the conditional conjunctions are as well higher the temporal conjunctions in both discourses.

v. The study also presented extending conjunction as the second in ranking. This is because fewer additives, adversatives and variations were used in both discourses. Other extending conjunctions such as; replacive are subtractive not represented in the entire discourses.

vi. The least employed were items of elaboration, with only 4 instances in English Language discourses and only 1 in mathematics classes.

The system of conjunction has been examined as a cohesive resource for marking transition in English Language and mathematics classroom discourses in ESL context. These conjunctive elements are not
cohesive in themselves but a device that expresses meaning and helps in the interpretation of discourse. The analysis from both the selected mathematics and English Language discourses in Ibadan has revealed the way concepts, ideas in the subject contents in the discourses are systematically connected by means of elaborating, extending and enhancing conjunctions. Conjunction as a cohesive device in the discourses has specifically and vividly displayed how sentences in the discourses are sequentially linked with one another, as well as the function they have in relating with one another as a discourse system.

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