Science Teachers' Illocutions in Selected Senior Secondary Schools in Ondo State, Nigeria

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Abstract

This study was carried out to investigate pedagogic illocutions in Physics and Chemistry classrooms in public senior secondary schools in Ondo State, Nigeria. The survey research design was adopted. The multi-stage sampling procedure was used. Five local government areas from the existing six were selected from Ondo South. The purposive sampling technique was used to select 10 public SSSs (two per local government that had science classes. Twenty intact SSII classes (two per school; one each for Physics and Chemistry) and 20 teachers (two per school; one each for Physics and Chemistry) were purposively selected. The instrument used was Pedagogic Illocution Checklist (r=0.82). Data were analysed using descriptive statistics. The pedagogic illocutionary acts performed in Physics and Chemistry in order of preponderance were: explaining (49.8%; 42.8%), questioning (26.0%; 22.5%), directing (14.5%; 16.2%), affirming (5.2%; 5.4%), denying (1.9%; 10.4%) and correcting (2.6%; 2.7%), respectively. The pedagogic illocutionary acts of explaining (69.8%; 54.4%), questioning (66.0%; 62.5%) directing (64.5%; 56.7%), affirming (57.3%; 55.2%), denying (61.5%; 59.7%) and correcting (68.6%; 71.2%) on Physics and Chemistry, respectively were teacher-dominated. The pedagogic system in Physics and Chemistry classrooms is teacher dominated, depriving students the level of participation that can enhance learning. Based on this finding, teachers should pay attention to pedagogic illocutions for improved students' understanding of concepts and classroom participation.

Keywords: Pedagogic illocutions, Physics and chemistry classrooms, Code-switching, Languages of instruction, Conceptual understanding

Introduction

The science curriculum emphasises the need to make the teaching and learning of science participatory and interactive. Consequently, as put by Ogunkunle (2017), science teachers are expected to adopt collaborative instructional strategies and provide hands-on activities that could make the science classroom activity-based and interactive as well as enhance understanding of concepts taught. At the senior secondary school level, the desire for specialisation makes science to be broken down into the constituent subjects like biology, physics and chemistry. However, physics and chemistry are the focus of this study because they are characterised by algorithms and more complex terms than biology. However, reports from many research on physics (Ogunkunle, 2017; Ajadi, 2018) and chemistry (Omilani, 2015; Idika, 2019) instruction have shown that teachers largely dominate the instructional process of physics and chemistry using the greater part of lessons to explain concepts and ask questions, while students are made passive with very little or no contribution to the teaching and learning process. This classroom practice tends to limit students participation, resulting in poor understanding of concepts taught.

In Ondo State, the classroom practice in physics and chemistry is not in any way different from the scenario painted by Omilani (2015), Ogunkunle (2017), Ajadi (2018) and Idika (2019). An informal baseline observation conducted by the researcher revealed that teachers monopolise the teaching and learning process. Students only listen to teachers' explanations and give answer to questions from the teacher, which are not correct in most cases. This is the scenario in physics and chemistry classrooms in Ondo State. In this situation of limited students' participation in the teaching and learning process of physics and chemistry, it stands to reason that there will be poor understanding of concepts taught. For example, Olukokun (2013) reports in a study on students in chemistry classroom that due to passive nature of science classroom, many students could apply mathematical formula but could not explain what they stand for. According to Olukokun, even some of the best students who scored high in questions requiring calculations confessed that they have difficulties in explaining what they did in simple explanations because they only memorised the formulae.

In an ideal English as a second language (ESL) classroom, the teaching-learning activities should be participatory with the students taking the lion share of language use. It is also expected that illocutions (use of language in the teaching and learning process) should be evenly shared, if not dominated by students, such that the students should initiate when they want to contribute to the subject matter. They also initiate when they want to ask questions from the teacher. Unfortunately, in the classroom setting, the teaching and learning process does not reflect this. What we have is that the teacher dominates illocutions such that he/she is the initiator all the time and students hardly have to respond (Mercer and Dawes, 2008). This can limit the extent of students' participation, the extent of their understanding of the subject matter and ultimately affect their performance in the subject.

In most physics and chemistry classrooms in Ondo State, instruction is highly teacher-centred. The teacher dominates illocutions such that the students make minimal contributions or are not made to contribute at all and this becomes a problem. The teacher does all the talking, while the students are only to sit down, listen to the teacher and carry out instructions as directed by the teacher. Only the teacher talks in the classroom without the students participating (Olukokun,2013). The teachers do not allow the students to contribute in the classroom discourse, and

the students are not even allowed to discuss among themselves in order to make for an interactive class. They are just passive in classroom discourse. Students are not part of their own learning. They are involved only when the teacher wants them to do some class exercises or to answer oral questions, which are usually polar questions (Dewaele and Furnham, 2005; Ubadiniru,2017). This tends to limit students' conceptual understanding of the subject matter. This has been attributed to the fact that the teacher sees himself as one who has all the ideas because he sees himself as an encyclopedia of knowledge so, he dishes out his ideas all the time not considering that the students can have information which the teacher can gain from. He only expects the students to listen attentively while the lesson is going on.

Illocution is the act performed by the speakers of a language. It is related to communicative effect of utterance (Ubadiniru,2017). In the classroom, the speakers are teachers and students, and teachers illocutionary acts that the English language is used to perform as the medium of instructon could be one or a combination explanation, asking and answering questions, defining concepts, and giving examples. On the other hand, students can use the target language to answer question, explain concepts and to greet teachers. When illocutions are used to perform these acts, it is referred to as pedagogic illocution

Pedagogic illocution is the function performed with language in the teaching and learning process in class. In the words of Akinseye (2017), pedagogic illocution is purposeful and goal oriented. It is concerned with how language is used to promote or hinder opportunities for learners to understand, use and practice subject content using the target language (the English language). As such, in the course of pedagogic illocutions, the teachers assigns to himself/herself a particular speech role and in so doing, assigns to the students a complementary role thereby making for an interactive lesson. Therefore, teachers of physics and chemistry in ESL context should be prepared to support and help students to use the English language when defining and explaining concepts in the teaching and learning process of these subjects in order to improve conceptual understanding and class participation.

According to Austin (1972), language is not only used in saying things, but also in performing actions. The basic emphasis of is what an utterer means by his utterance. In this research, illocutions come into play by looking at instances of English speech acts, Yoruba speech acts and the bilingual (code-mixing and code switching) speech acts. The English speech acts refer to statements that are uttered in English language in the classroom interaction, Yoruba speech acts refer to statements that are uttered in Yoruba language in the classroom interaction while the bilingual speech acts are the statements that are uttered by code-mixing English and Yoruba in the classroom interaction.

In the teaching and learning process of physics and chemistry, the language that is expected of the teacher to use is English because it is the approved language of instruction (Federal Republic of Nigeria, FRN,2009, 2013and 2014), but in order to ensure that students understand what is being taught, the teacher and the students occasionally switch illocutions from English to Yoruba in order to explain better so that the students can comprehend what is being taught. This deviation from the sole English medium to the use of indigenous languages and combination of the two is because many public senior secondary students have a low-competence in the English language. This, therefore, reveals that the English language is not the sole medium of instruction in reality in physics and chemistry classrooms. This is the situation in science classrooms in Ondo State where, in reality, the act of code-mixing and code-switching between English and Yoruba is common because there are some concepts in science that teachers will need to explain in Yoruba for proper understanding by the students (Olukokun,2013).

Discourses in physics and chemistry *are often characterised by expressions that are conceptually rich, and at the same time dense and abstract; they use registers that students are often not familiar with. They also present expressions in ways that students do not encounter in their everyday uses of language (*Ohwovorione, 2013*).* The dense and abstract nature of expressions in physics and chemistry requires that students are assisted in learning and constructing meaning from them (*Kirchik, Gingras, and Larivière ,2012).* In the words of Brooks and Donato (1994), effective teaching of physics and chemistry entails mutual exchange of illocutions through effective language use both in teachers' presentation as well as students' responses and contributions. It is in this context that Barnes and Todd (1995) also argue that balanced pedagogic illocutions between teachers and students help to make physics and chemistry lessons participatory. It also aids understanding of the subject-matter of physics and chemistry.

A teacher needs statements to press home, and/or to give information to the students on the subject matter being taught. He also uses statements or questions to engage the students in rational thinking. He/she uses questions to find out what the students know about the subject matter and the extent to which the students have understood what he had said.

Effective communication in chemistry and physics lessons is a function of illocutions by teachers and students both in individual and group discussions. He/she gives instructions when he/she wants the students to carry out some activities or to do some exercises. He/she gives the students necessary information to broaden their knowledge and to guide their activities. Effective illocutions could also enable the learners to contradict or corroborate the teacher's statement or to respond to the teacher's question. They also use illocutions to contribute to the information which the teacher is trying to pass across and they ask questions when they need clarification from the teacher (Luk and Lin, 2007).

Pedagogic use of language has been an important area of concern in education over the years. It has been an area of concern mostly to linguists and ESL teachers. This can be in the form of conversation in the classroom, question and answer exchanges or it can equally be in the form of information and response/reactions in the classroom (Chukwunyeremunwa, 2013). Wedhaugh (2006) notes that language is not only used to convey meaningful thoughts and feelings to people, it is also a strong factor in interpersonal relationships. It is therefore imperative for interlocutors in communicative contexts to carefully choose their words and expressions so as to achieve the goal of communication. When the teacher uses appropriate language in the classroom, it will help the students to develop warm, supportive relationship and the students experience enjoyment and excitement about learning. They feel comfortable in the classroom and experience appropriate level of independence or autonomy as they are involved in their own learning process (Chukwunyeremunwa, 2013)

Pedagogic illocution, language function in the classroom context, has been an important area for linguists and discourse analysts over the years (Centre for Education in science and Technology,2009). Many of these researches have contributed to the understanding of texts/discourses and further revealed teaching and learning go on in the classroom. It is in the classroom that formal teaching and learning takes place so, it becomes very important to give detailed attention to the teacher and students' illocutions as the lesson is going on because this also determines the students' understanding of the lesson.

Classroom conversation has been considered one of the most important pedagogical issues in language classrooms in recent decades, mostly due to the influence of the Russian psychologist Lev Vygotsky. Vygotskian socio-cultural theory (Bardovi-Harling, 1992) views the act of learning as a social activity in which children build their knowledge through the help and scaffolding of more knowledgeable peers or teachers. Conversations in science classrooms are important social activities for students through which they not only construct knowledge, but also build confidence and identity as competent language users (Luk and Lin, 2007).

In an in-depth ethnographic study of teacher-student interactions, Luk and Lin (2007) found that students develop multiple identities through their classroom conversations with their teachers. Illocution in the classroom refers to the conversation between teachers and students, as well as among the students, in which active participation and learning of the students become vital.

Given the limited linguistic resources the senior secondary students possess in their school years in EFL contexts like Ondo state, Nigeria, illocutions could be carried out using their first language or code-mixing and code-switching between English and their first language. When physics and chemistry classrooms are participatory, everyone can participate, get respected and get the decisions made jointly (Mercer & Dawes, 2008). Students' participation in interactions, therefore, can help them enrich their linguistic resources and build their confidence to communicate with others in science classrooms.

Efforts to scale up students' conceptual understanding and participation in science classrooms have focused largely on interventions through the use of effective teaching strategies, use of mood and modality in the teaching and learning processes of English language and Mathematics (Akinseye,2017), with less emphasis on looking into pedagogic illocutions of teachers and students, and the way they influence the students understanding of physics and chemistry concepts taught. at senior secondary schools in Ondo State, Nigeria.

Statement of the Problem

The teaching-learning process of science is expected to be participatory. However, evidence has shown that the teaching-learning process of physics and chemistry in many public senior secondary schools in Ondo State, Nigeria is not participatory owing to the problem of pedagogic illocutions. Consequently, teacher dominated illocutions and classroom expressions, leaving students to be passive listeners in class. Efforts to scale up students' conceptual understanding, classroom participation and academic performance in physics and chemistry lessons have focused largely on interventions through the use of interactive instructional strategies such as case study, constructivist-based and card sorting strategies, with less emphasis on pedagogic illocutions, which are the functions that language is used to perform in teaching-learning process. Through illocutions, he/she gives instructions when he/she wants the students to carry out some activities or to do some exercises. He/she gives the students necessary information to broaden their knowledge and to guide their activities. Effective illocutions could also enable the learners to contradict or corroborate the teachers' statements or to respond to the teachers' questions. They could also use illocutions to contribute to the information, which the teacher is trying to pass across and they ask questions when they need clarification from the teacher. This study, therefore, was carried out to investigate pedagogic illocutions in physics and chemistry classrooms in public senior secondary schools in Ondo State, Nigeria.

Research Questions

The following research questions were answered.

1. What are teachers' illocutionary acts in physics and chemistry classroom?
2. Who dominates pedagogic illocutions in science classrooms in Ondo State?

Scope of the Study

The study analysed pedagogic illocutions (use of language) in physics and chemistry classrooms in Ondo South Senatorial District, Ondo State, Nigeria.

The science teachers' illocutions covered in physics and chemistry lessons were the use of illocutions for explaining, questioning, giving directives, affirming, calling names, denying, correcting and making promises/threats. It also investigated who dominated pedagogic illocutions in these two subjects. The study covered senior secondary two (SSII) science teachers and students in chemistry and physics classrooms in 10 public senior secondary schools two having science classes in Ondo South Senatorial District, Nigeria.

Significance of the study

The study analysed pedagogic illocutions in physics and chemistry classrooms in selected senior secondary schools in Ondo State, Nigeria. Findings revealed the pedagogic illocutions of teachers in science classrooms. It also revealed the illocutionary acts in chemistry and physics lessons. This study has also contributed to the existing body of knowledge on how to improve classroom participation in the science classroom. Finally, curriculum planners will benefit in the sense that they would see the need to design science programmes which accommodate linguistic challenges faced by English as a second language learners in science lessons.

Methodology

The study adopted the survey research design. The participants were 20 science teachers (10 for Physics and 10 for Chemistry in 10 public senior secondary schools in Ondo State. Two intact classes of SSII science class (one for chemistry and one for physics) were purposively selected from each school making a total of 20 intact classes. The instruments used in the collection of data was Teachers' Illocutions Observation Checklist (r=0.82). During the observation process of the classroom interaction, the trained research assistants observed the science classroom conversations and measured the occurrence of illocutions using the checklist. Tallies were used to represent each occurrence, while the expressions were tape-recorded. Two classroom interactions (one each for Physics and Chemistry lessons) were observed and recorded per school. These made a total of 20 recordings of classroom interactions in the 10 schools. After the recording, the tape was played back to ensure that the occurrence of all events was properly captured by tallies. Data collection lasted 10 weeks. Data were analysed using frequency counts and percentage. The events observed in the class were subjected to descriptive statistical analysis.

Results

Answering the Research Questions

Research Question 1: What are the teachers' illocutionary acts in science (Physics and Chemistry) classrooms in Ondo South Senatorial District?

Table 4.1c: Teachers' Illocutions in Science (Physics and Chemistry) Classroom

Use of Language	Text 1	Text 2	Text 3	Text 4	Text 5	Text 6	Text 7	Text 8	Text 9	Text 10	Total	%
Explaining	140	62	139	285	86	138	169	209	291	347	1,866	45.9%
Questioning	151	56	82	71	20	19	110	181	138	154	982	24.2%
Directives	124	94	20	62	25	37	100	66	45	53	626	15.4%
Affirming	68	31	17	18	6	16	10	21	4	25	216	5.3%
Calling Names	18	33	17	11	9	14	-	10	1	3	116	2.9%
Denying	61	44	6	10	3	7	-	4	9	4	148	3.6%
Correcting	-	-	7	14	4	3	3	14	14	16	75	1.8%
Promises/Threats	3	4	5	3	4	3	4	1	2	3	32	0.9%
Total	565	324	293	475	157	237	396	505	504	605	4,061	100

From table 4.1c, Out of the four thousand and sixty one (4,061) illocutions used in the twenty science lessons watched, one thousand, eight hundred and sixty-six (1,866) expressions which is 45.9% were used for explaining, nine hundred and eighty two (982) which is 24.2% were used for questioning, six hundred and twenty-six (626) which is 15.4% were used in commanding or giving directives, two hundred and sixteen (216) which is 5.3% were used in affirming or accepting correct responses from students, one hundred and sixteen (116) which is 2.9% were used in calling names of students to answer questions or regulating their behaviour, one hundred and forty-eight (148) which is 3.6% were used in rejecting wrong answers from students, seventy-five (75) which is 1.8% were used in correcting wrong answers from students, and thirty-two (32) which is 0.9% were used in promising or threatening the students.

The analysis revealed that teachers predominantly use illocutions to explain concepts. This was because the main action the teacher performed in the classroom was to express, convey and communicate ideas to the students and this involved describing, informing and explaining to the students. The second main use of illocutions was for questioning. This was because apart from explaining to the students, the teacher also performed the action of asking the students questions so as to know how far the students understood the lesson. Another use of illocutions by the teachers was to give directives or command. This was because apart from explaining concepts and asking questions, the teacher gave instructions/command to

the students. The teacher gave commands and directives which the students had to follow in order to understand the lesson and achieve success in their academic works. Illocutions were also used to accept and reject students' responses as well as making promises to do one thing or another in the next lesson or threatening students that they would be punished if they do not do assignments. This is graphically illustrated in figure 4.1c in the next page.

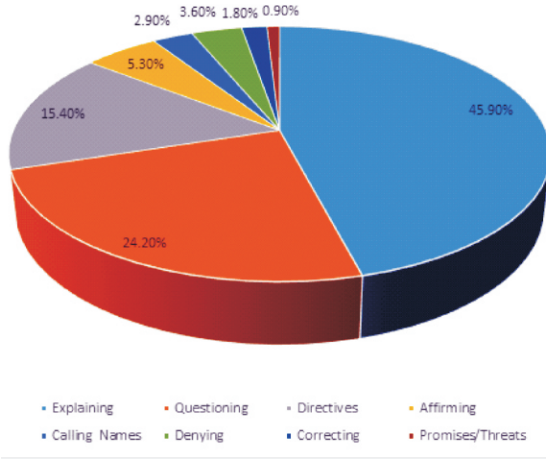


Figure 4.1c: Graphical illustration of teachers' illocutions in Physics and Chemistry combined.

Discussion of the Findings

Findings revealed that teachers predominantly use language to explain concepts. This was because the main action the teacher performed in the science classroom was to express, convey and communicate ideas to the students and this involved describing, informing and explaining to the students. The second main use of language was for questioning. This was because apart from explaining to the students, the teacher also performed the action of asking the students questions so as to know how far the students understood the lesson. Another use of language by the teachers was to give directives or command. This was because apart from explaining concepts and asking questions, the teacher gave instructions/command to the students. The teacher gave commands and directives which the students had to follow in order to understand the lesson and achieve success in their academic works. Language was also used to accept and reject students' responses as well as making promises to do one thing or another in the next lesson or threatening students that what would happen if they did not do assignments.

This is truly not unexpected because chemistry and physics are subjects that deal with a lot of theories, mathematical calculations, laws and concepts, tables, experimentations which are sometimes abstract and left to the imagination of students hence, a teacher needs statements to press home his/her points and to give information to the students on the subject matter being taught. He/she also needs to use statements or questions to engage the students in rational thinking. He/she has to use questions to find out what the students know about the subject matter and the extent to which the students have understood what he had said. The teacher also uses questions to engage the students in group discussion. The teacher also gives instructions when he wants the students to carry out some activities or to do some exercises.

These findings agree with those of Mercer and Dawes (2008) Behnam B. Pouriran(2009) and Ohwovorione (2013) who found in separate studies that in science, so much of the work is concerned with describing observations and complex concepts that are far removed from learners' background knowledge and this put a huge responsibility on the teacher to explain clearly and clarify repeatedly through questioning.

Conclusion

This study set out to analyse the science teachers' illocutions in English as a second language science classroom in Ondo State. From the analysis, it was revealed that teachers predominantly used illocutions to explain concepts, ask questions and control the class in the course of the lesson. It could be concluded that teacher domination of illocution is responsible for teacher-dominated classroom interaction in Physics and Chemistry classes.

Recommendations

In the light of the findings from this research, which underscore the importance of illocution as an instrument of getting the students involved in the teaching- learning process of Physics and Chemistry, it is recommended that:

1. Teachers should pay attention to these pedagogic illocutions for improved students' conceptual understanding and classroom participation in Physics and Chemistry lessons.
2. Science teachers should always adopt activity-based, interactive and collaborative teaching strategies in Chemistry and Physics lessons in order to give learners opportunities for illocutions and enable them to contribute maximally to lessons.
3. Appropriate instructional materials and hands-on activities should be used in science lessons in order to maximise students' participation and involvement in class discussions.

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