



Content And Language Integrated Learning: Language Scaffolding And Speech Strategies

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Abstract

CLIL is an approach that is successively being adopted in Russian universities. The article reports the results of the empirical study focused on the process and specifics of the CLIL English courses implementation in N.I. Lobachevsky Institute of Mathematics and Mechanics of Kazan Federal University (KFU), Russia. The aim of the study was to define speech behaviour in the context of interaction between teachers and students. The learning process was examined by direct and structured observation and interviewing which helped to infer language scaffolding techniques, and speech strategies of the teachers and students in CLIL environment. All the techniques were examined on the basis of assessment parameters of scaffolding methods and techniques. The study displayed a number of problems and challenges that teachers faced practicing CLIL. Eventually some ways to overcome these challenges were explained to facilitate the learning process.

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Key words

CLIL, integrated learning, language scaffolding, speech strategy.

Introduction

Content and Language Integrated Learning (CLIL) is a developing pedagogical approach in education which combines different methods of integrated learning of content and language. In 1994 the acronym CLIL was proposed by D. Marsh (Finland). In 2005 he suggested making CLIL a term for diverse approaches which are focused on bilingual programmes for teaching both a foreign language and a discipline.

In tertiary education CLIL is being advanced gradually by theoretical and empirical studies, however, there is still no consistent concept of implementing this approach. European studies of CLIL implementation concern CLIL adaptation in many EU educational organizations of university level [1]. D. Coyle distinguished three main models [1-2] of CLIL based on the analysis of teaching different disciplines in a target language in European universities.

1. *Model 1: Plurilingual education.* Several foreign languages are used for teaching disciplines in CLIL programmes of different courses. As a result, students acquire languages for their professional purposes. This model, characterised as an elite one, is aimed at more motivated and gifted students around the world.

Model 2: Adjunct education. Second language learning and teaching a subject are combined with specific target of developing knowledge and skills in order to activate high-order thinking skills. Language is taught for specific

purposes: language teachers, working at different universities, are to support the educational process of future specialists. Students gain the ability to use target language in their field of study and work.

Model 3: Language-embedded content courses. Programmes of vocational education are designed to improve target language proficiency. The classes are conducted by both subject and language teachers. All students have language and cognitive scaffolding in the process of learning so that they can acquire content and a foreign language. The model is suitable for people of different nations and cultures.

N.I. Lobachevsky Institute of Mathematics and Mechanics, KFU, has been arranging the courses for preparing bilingual teachers of mathematics for five years already. The teachers are to master academic Russian and English. According to D. Coyle, the 3rd model is implemented in N.I. Lobachevsky Institute of Mathematics and Mechanics, KFU, as 5% of the disciplines are conducted in English [3].

CLIL uses a number of common educational principles like visualization, active performance, etc. Methodologists consider them to be indispensable components of a lesson or lecture structures (goal-setting, assessment, feedback) and main approaches of teaching a discipline in any language (native or foreign). Two of them are specific for CLIL: *authenticity of materials and language scaffolding*.

The aim of the research is to study the specifics of CLIL mathematics programmes implementation in English, particularly the use of scaffolding technique.

To meet the goal there were some questions to answer during the research:

1. What ways of language scaffolding do the teachers employ during the CLIL programme?
2. What speech strategies do KFU teachers and students use in the process of teaching and learning mathematics in English?
3. What is the teachers’ opinion on their experience in teaching a subject in English?

Methodology

The study was held in N.I. Lobachevsky Institute of Mathematics and Mechanics, KFU. 125 bachelor students of fourth and fifth year of education and 5 mathematicians took part in the experiment. The major of the students was “Pedagogics”, specialization “Teacher of Mathematics and English”.

To comprehend the theoretical background of the CLIL practice in the Institute of Mathematics and Mechanics we were to collect the data of methods and techniques consistently used by the teachers with students for whom English is not a native language. In the process of the examination we relied on the list of observations by O. Burdakova, A. Dzhaililova and N. Raud [4] who determined the assessment parameters of teachers’ methods and techniques (Table 1).

Table 1

Assessment Parameters of Methods and Techniques in CLIL

1. Teaching Methods and Techniques	2. Assessment Parameters	
3. Lectures	1. Speech quality	1.1. speech consistency and cohesion; 1.2. following the rules of literary language.
	2. Language scaffolding	2.1. in case of explanation in native language; 2.2. in case of visual aids explanation (including sign language); 2.3. in case of explaining language means, phrases, word (synonyms, periphrasis).

		– «mixed» language; 2.3. change of speech strategies in accordance with teacher’s speech.
	1. Instruction material and visual aids	3.1. language of the instruction material; 3.2. authenticity of instruction material; 3.3. form of the instruction material (a course book, a workbook); 3.4. language of the visual aids.
6. Assessment	1. Oral assessment; 2. Feedback from students.	

Qualitative analysis was the dominant analysis of the research, though quantitative examination was employed as well. The total number of analyzed lessons is 20. The method for organization of the observations is “cross section”.

Results

The educational work of N.I. Lobachevsky Institute of Mathematics and Mechanics teachers, who carried out content learning in English, was reviewed to study specific principle of CLIL – language scaffolding.

1. Ways and methods of words and expressions’ semantization

There is quite a number of existing techniques of language scaffolding for students studying in a target language [5-10]:

- partial use of the native language;
- visual aids;
- synonyms selection;
- periphrasis;
- reiteration;
- «echoing», etc.

Some of the methods can be used in the educational process regardless of teaching approach (lectures, inductive talk, group work, seminars). The regularity and scope of teacher’s practicing methods should depend on the level of students’ language proficiency, complexity of the instruction materials and efficiency of the class. The other techniques can be employed only in the context of teacher-student interaction (for instance, “echoing”).

The results analyses showed that from all possible ways of language scaffolding teachers, providing Math lessons in English, prefer to define unknown words and expressions through their semantization: finding synonyms, periphrasis, and reiteration. Semantization through finding synonyms and periphrasis is a favourable way to let students both to extent their vocabulary and to activate receptive vocabulary linking the paradigms of new and familiar lexical units.

Consequently, this way turned to be the *principle* one. During the lectures and inductive talks, 63% and 77% of teachers chose it (Table 2).

The *second* most popular way is defining new words and expressions through translation into the students’ native language (37.5% of teachers used it) (Table 2).

In inductive talk section the *second place* goes to visuals aids: 55.6% of teachers explain words through kinematics (Table 2).

Teachers could employ all the methods and techniques of semantization in different cases.

Table 2

Methods and ways of semantization in CLIL course “Mathematics”

7. During lectures		8. During inductive talk		9. During group work	
10. Semantization techniques	11. Number of classes	12. Semantization techniques	13. Number of classes	14. Semantization techniques	15. Number of classes

	(%)		(%)		(%)
16. translation into the native language of students	17. 38 %	18. translation into the native language of students	19. 33 %	20. translation into the native language of students	21. 40 %
22. visuals aids (including sign language)	23. 25%	24. visuals aids (including sign language)	25. 56%	26. visuals aids (including sign language)	27. 20%
28. finding synonyms, periphrasis, reiteration	29. 63%	30. finding synonyms, periphrasis, reiteration	31. 78%	32. finding synonyms, periphrasis, reiteration	33. 40%
34. no scaffolding	35. 5%	36. no scaffolding	37. 0%	38. no scaffolding	39. 0%

3.

2. Speech strategies of teachers and students in CLIL

Active speech interaction between a teacher and students happens during the inductive talk, in the process and then assessment of pair and group work. A teacher and a student are constantly replacing each other as a listener and a speaker.

In cases of split-level language proficiency of students, the range of speech strategies during the interaction is quite diverse. There are various speech strategies during teacher-students interaction in the context of CLIL for Mathematics: *utterance-incentive* and *utterance-response*.

Utterance-incentives in cases of teacher-student interaction

Strategy 1. Teacher uses utterance-incentives only in a target language. First he addresses this utterance to the students with more developed skills, then to those who have low proficiency level.

Strategy 2. Teacher uses utterance-incentives only in a target language. From time to time he asks the students with high scores to translate particular words and phrases for those students who don't comprehend the target language.

Strategy 3. Teacher uses mostly a target language in class. Key questions and tasks are announced in both languages: first in a target language, next – in a native one.

Utterance-responses in case of teacher-student interaction

Strategy 1. Teacher uses only a target language (English). When students are doing tasks and answering teacher's questions they can use the native language (Russian) as it does not violate the consistency of conversation. The conversation in such circumstances is accompanied by continuous code-switching.

Strategy 2. Teacher uses only a target language (English) and accepts the usage of the native language by students. Nevertheless teacher is to translate student's answer given in a native or "mixed" language into the target one. This model of a teacher's speech behaviour does not put the class under pressure or lead to conflict among conversation partners. Two out of five observed teachers chose this model.

Strategy 3. If a student asks a question in a native language, a teacher replies in a mother tongue too, but then replicates it in the target language.

Strategy 4. A teacher ignores students' questions, answers and phrases in a native language.

3. Teacher feedback on conducting classes in English

It is interesting to hear math-teachers' opinion on carrying out Mathematics lessons in English. For this reason at the end of lectures or seminars teachers were invited to participate in a short informal interview that encouraged them to reflect on the conducted class and experience of teaching in a foreign language on the aggregate.

Challenges in the process of CLIL implementation

The main challenge that teachers face in CLIL class is the level of students' language proficiency. The teachers mentioned that most of students had difficulties with being engaged into a talk in English and preferred to interact in Russian.

Teachers shared their ways to overcome such problems. Some of the teachers used only English in class so that to provoke the class to speak in the target language. Other strategies implied the adaption of the instruction material language to the students' abilities. The teachers think that personification works in case there are no more than 10-12 students in a group. A lot of teachers mentioned that the students had strong motivation to learn Mathematics in English.

Selecting instruction material

Designing the instruction material based on diverse principles. A number of educators prepare parallel bi-text in English and Russian. That means they work with authentic material and its translation. This approach is quite time-consuming as teachers are to write the text in English or in Russian and then translate it. The others select adapted mathematical English texts and ignore the principle of authenticity. Finally, there are instructors who choose merely genuine mathematical texts from foreign resources.

Language scaffolding

Language scaffolding in CLIL for Mathematics consists of the following conditions:

1. translation of unknown terms into Russian or finding other ways to define them;
2. unobtrusive correction of errors or even no correction of students' speech in order not to cultivate the diffidence in them;
3. translation of questions;
4. encouraging students to provide their less capable peers with language and cognitive scaffolding;
5. full language immersion to create realistic foreign language environment;
6. transferring the target language to the level suitable for students' language proficiency;
7. design of course material for specific mathematical purposes;
8. active usage of visual aids.

Discussion

The results of the study, based on the direct structured observation and interviewing, are the following: the target of the research is achieved as we examined the implementation of CLIL for Mathematics in English in tertiary education (KFU).

In the process of study, methods of language scaffolding were revealed and analyzed on the foundation of assessment parameters of methods and techniques for teaching a foreign language. We may conclude that, out of all methods and ways of language scaffolding, semantization (selecting synonyms, periphrasis and reiteration) is more popular for explanation of unknown mathematical terms.

To answer the second research question we collected the data about speech strategies of KFU teachers and students, which they used in the process of learning mathematics in English through CLIL. Among those strategies we distinguished three utterance-incentives and four utterance-responses that occur during teacher-student interaction.

In accordance with the interview results, conducted during the third stage of the research, some challenges of teachers were revealed. They also explained how they managed to overcome them. The first challenge mentioned was about the various level of students' language proficiency. To pull through this challenge teachers employed a number of methods and techniques, such as using only English in class, lowering the level of the instruction language, personification to assess academic achievements of the students during seminars, design of instruction material, selecting adapted or authentic instruction materials using thee range of resources.

CONCLUSIONS

The feedback of instructors-mathematicians on the language scaffolding was particularly noteworthy for the research.

Comparative analysis of the results displayed that subject teachers are absolutely responsible and deliberate in using language scaffolding in the process of teaching Mathematics through CLIL in tertiary education.

It goes without saying that it is impossible to eliminate all cases of the educational process as this study was limited by math disciplines at the university. There were no findings on psychological and pedagogical aspects of teaching students in a foreign language (self-evaluation, personal and contextual anxiety, motivation). However, these results can be used for design and implementation of English educational programmes in other universities of Russian Federation.

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