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INSTRUCTIONAL ASPECTS AND TEST DESIGN FOR MEASURING TEACHING ABILITY IN CONTENT-BASED INSTRUCTION: A CASE STUDY AT MA CHUNG UNIVERSITY

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Abstract

Content-Based Instruction (CBI) is a fertile research area which calls for more intensive studies, especially in a country where English is a foreign language. Aiming at describing a typical profile of an initial stage of CBI in a private university, this paper reports a descriptive research that identifies instructional aspects of a CBI class, and sketches a preliminary specification of a test for measuring teaching ability in CBI. Qualitative data were collected through observation of the lecture sessions, open-ended questionnaires, and interviews with the students. A vocabulary profile analysis was also done to the lecture materials. The results were used as a basis for the test specification, which was later submitted to experts who judged the contents of the test. Important aspects that emerged from the data concerned linguistic performances, task, lecturer's assistance, and learning obstacles. Accordingly, the test specification puts special emphases on delivery technique, amount of assistance, quality of tasks and rapport with the students.

Keywords: Content-based instruction**,** test specification, teaching ability.

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INTRODUCTION

As English is becoming increasingly important in the academic realm, Content-Based Instruction (CBI) has come to receive more attention. Although the initial stage of CBI dates back to the 1980s, in fact, only few studies have been conducted to explore CBI. Pessoa et al. (2007), for instance, state that "although a substantial amount of professional literature argues for the potential benefits of content-based instruction, limited research exists on how this type of instruction actually is appropriated, understood, and carried out in practice by foreign language teachers". It is believed that in the context of Asian countries where English is a foreign language, more comprehensive and thorough studies on CBI have yet to be established. As Ma Chung University in Malang, Indonesia has determined to gradually turn the classes into CBI classes, it comprised a fertile research ground on which studies can be conducted to explore the readiness of the institution in applying this kind of instruction. This report is an effort to present a profile of the initial stage of CBI that may inspire deeper and more rigorous studies in the area.

Another equally important issue in CBI is the measurement of the teachers' teaching abilities. This is an area that has been hardly explored to some depth. Our study offers a glimpse at the specification of such test. Not only will the result benefit the writers' institution, but it will also lay a ground on which further studies about the test of teaching ability can be initiated in the future.

OBJECTIVES

The study aimed to achieve two objectives: (1) to identify aspects that are pertinent to an initial CBI, and (2) to draw a specification of a test design intended as an instrument for measuring teaching ability in CBI.

CONTENT BASED INSTRUCTION DEFINED

Davies (2003) defines CBI as a "teaching method that emphasizes learning about something rather than learning about language". Eskey (1992, p.11) maintains that "people do not learn language, then use them, but that people learn languages by using them". Thus, in a CBI class, the students learn the content of a discipline through English language. English is used as a medium of instruction, as well as in the reference books and other learning materials. It is also widely believed that in CBI, students will learn two things at the same time: the content and English.

According to Davies (2003), CBI has two different techniques: Adjunct Model and Sheltered Model. Adjunct Model prepares students in a special English class designed to facilitate the students' understanding about a given subject. This adjunct class is taught by an English teacher and, in principle, helps the students master word and sentence formation, vocabulary, and other language aspects that are likely used in the content lectures.

Meanwhile, Sheltered Model combines two kinds of teachers in one lecture: one teacher becomes a Content Specialist (a teacher teaching certain subjects), and the other becomes an English Specialist (an English teacher). The Content Specialist teaches the content of the subject and the English teacher supports them by addressing language problems that occasionally come up among the students. So far, according to Davies, Sheltered Model has been successfully implemented in the University of Ottawa.

RELEVANT THEORIES

There are at least three major theories that are relevant to CBI. The first theory is Krashen's Learning and Acquisition Hypothesis (1984), the second is BICS and CALP models by Cummins (1984), and the last is Cognitive Learning by Anderson (1983). Krashen (1984) states that learners exposed to English utterances and texts that they can understand will have a greater chance of acquiring the language. If this input-rich environment is also manifest in a CBI context, the learners have a better chance of increasing their proficiency.

Cummins (1984), meanwhile, states that English proficiency can be conceived of as consisting of two dimensions. The first is BICS (Basic Interpersonal Communication System), which comprises the use of English for non-academic purposes in daily situations; the second is CALP (Cognitive Academic Language Proficiency), which is the use of English for academic purposes. In the initial stage of CBI, it is vital that the teaching and learning activities display the uses of BICS and CALP in the right proportion. Students understandably have a more positive impression about their content class if the language enriches their linguistic knowledge. To some extent, this is in line with Richards and Rodgers's opinions (2001) that CBI learners have a greater chance to succeed if the materials in CBI suit their interests.

The third theory is Information Processing Theory by Anderson (1983). In principle, this theory believes that a language learner moves from cognitive to associative and finally to automatic stage. While cognitive stage marks the deliberate learning of discrete linguistic items, associative stage level focuses on the constant restructuring and strengthening of the resulting

knowledge structures about the language and starts the application of the knowledge in written or oral production. Finally, automatic level allows the learner to use all the knowledge to write and speak fluently.

A small study which is in-line with this proposed study is a survey from Babenroth and Reidfeld (2004) in a university in Japan. They found out that generally students were very interested in CBI classes. The students are also interested in studying English as well as certain subjects delivered in English. Our study tries to find out not only the students' motivation to enroll in CBI classes but also some linguistic and instructional aspects that potentially impact the effectiveness of a CBI.

In classroom context of CBI, Shah (2003) studied two CBI classes to recognize feedback patterns derived from the teachers. The feedback revealed that teachers still tend to direct teir feedback to the learners' message rather than the language structure. This, of course, has some effects on the learners' efforts. Learners tend to convey the expressions without paying much attention to correct grammar or linguistic aspects. Our study aims at recognizing the types of feedback that takes place in an initial stage of CBI class.

Other studies on classroom situation highlight interactions between students and teachers. Musumeci (1996) finds out that, in fact, teachers mostly dominate with lecturing. Meaning negotiation rarely happens as there is only few interactions and correcting language mistakes become very minimal. Musumeci (1996, p. 230) argues that this is caused by "teachers and learners expectations for appropriate classroom behaviors, teachers sensitivity to affective variables in second language learning, power relationships, and time management considerations".

Pessoa et al. (2007) emphasized the importance of teacher talk in his study. He was certain that teacher talk is an important element determined the comprehension of students towards the materials. Miller (2009) adds that simplification of the spoken language and clear pronunciation lead to students' ease of understanding, and also note that use of visuals, attractive teaching style and preparation for students prior to the class promote favorable responses from learners. Our study looked into the same issue in a different instructional context.

Recent studies have even explored material development in CBI. Ullman and Becker (1997) state that when students are involved in choosing the materials relevant to their subject, CBI has more pootential to be successful.

In brief, the review of previous studies and theoretical bacgkround has provided more or less charted areas of exploration which merits further studies in different settings and contexts.

METHODOLOGY

Research Design

The nature of the problems to be investigated called for a descriptive research design. More specifically, because only one selected study program was selected to be the respondent and then investigated in some depth, this study was a case study.

Respondents

A class in Industrial Engineering Study Program at Ma Chung University was selected to be the respondent. The Study Program has four full-time lecturers, and in the previous academic year it had a student body of 26. All classes were taught using a combination of Indonesian and English language, with the latter being used mainly in the reading materials and Power Point slides.

Data Collection

The data were collected over four classroom meetings, each lasting 100 minute, by observation sheets, questionnaires, and an interview session with the students. The observation sheet was completed with a guideline derived from classroom management principles from the literature, notably from Master (1992) and Eskey (1992). The interview was conducted after the fourth class meeting, the responses to which were used as a basis to construct the open-ended questionnaires. The interview was carried out with all of the students after the fourth meeting.

The data for the second research objective were gleaned from two language education experts, who assessed the preliminary specification of a test instrument for measuring the teaching ability of CBI lecturers.

Data Analysis

The data gathered from the observation sheets, interview transcripts and questionnaires were tabulated and coded to attain the first research objective. The coding came in three stages, namely, open coding, axial coding, and thematic coding. While the open coding was done to find some salient key words and phrases, the axial and thematic coding sought to establish meaningful relationships among the key phrases.

In order to answer the second research problem, the outcome of the previous analysis stage was used as a basis for drawing a test specification aimed to measure CBI teaching ability. Performance indicators were made for each key aspect, and a scale of 1 to 7 was determined for each indicator (see Appendix A). The resulting specification was then submitted to two language education experts, who then assessed the content of the test and generate qualitative evaluation on the aspects to be tested.

In addition to that, the lecturer's Power Point slides were collected and analyzed to find its profile of lexical items. This step informed us the frequencies of academic words, high-frequency words, and technical words in the materials that the students were exposed to.

FINDINGS

The following section achieves the first research objective, namely, to identify instructional aspects that contribute largely to successful learning in a CBI class.

Following our review of theoretical background, three in-class observation sessions were conducted, each lasting 100 minutes. The observation focused on four main aspects, namely, (1) linguistic, (2) task, (3) teacher's assistance, and (4) obstacles. The observation was followed by interview and then data collection through questionnaires. The main findings are presented below.

Linguistic Aspects

Although most of the textbooks used and the Power Point presentation were in English, the oral lecture was done mostly in Indonesian language. The lecturer only occasionally said a few words in English, especially when referring to the slide materials on the screen.

Most English words on the slides, that is, 69.61%, were among the 2000 most frequent words. Academic words made up 13.67% of all the words.

The slides contained only a few grammatical mistakes that did not seem to hamper comprehension. Complex noun phrase constructions were predominantly frequent. The video clips that were shown during the sessions were delivered in British English and American English.

Code switching occasionally occurred as the lecturer read the material on the slide and directly translated them to the first language.

Task

The lecturer rarely gave assignments or tasks during the sessions. The chance to ask questions was given after about 70 minutes of one-way lecture. The lecturer herself asked a few display questions with very brief waiting time. The only task given was in the form of a quiz at the end of the session. The quiz was of essay type, and was written in English. The students were allowed to use their first language to answer the items.

Lecturer's Assistance

The kind of assistance that was predominant during the lecture sessions were the lecturer's slowing down her pace, and using the white board to clarify some points. She hardly gave any linguistic assistance. It seemed that the students had no problem understanding the English slides.

Learning Obstacles

The following section discussed the learning obstacles that the students felt during the class sessions. As the table below shows, most students complained about the amount of materials delivered in one single session, the lack of varieties of the learning activities, and the slides that were written in English. The next most frequent complaints concerned the old-fashioned teaching style, the pace of the delivery, the noise level in the class, and the small number of actual cases related to a topic.

TABLE 1
Learning obstacles

No	Obstacles	Frequency of responses (in %)
1	Excessive amount of materials in each session	19.23
2	Lack of variety in activities	19.23
3	Slides written in English	19.23
4	Old-fashioned teaching style	7.69
5	Speed of delivery	7.69
6	Noise level in class	7.69
7	Lack of actual cases/examples from real life	7.69
8	Unclear explanation	3.85
9	Slides which are not uploaded to the Intranet	3.85
10	Materials which are too theoretical	3.85

Difficulties with the Learning Materials

There were two groups of students' responses concerning the learning materials. While the first group thought that the materials were difficult, the second group thought that they were reasonably easy, and mentioned the reasons.

The responses from the first group are summed up in the following table. As the Table shows, there are at least seven types of causes of difficulties that students perceived. These are (a) their low English proficiency level, (b) the limited time for comprehending the materials, (c) the large number of technical terms, (d) the fast delivery by the lecturer, and (e) the meager amount of detailed explanation by the lecturer.

TABLE 2
Causes of difficulty in understanding learning materials

No	Responses	Frequency of responses (in %)
1	Low English proficiency level	19.23
2	Limited time for comprehending the materials	11.53
3	The large number of technical words	7.69
4	The lecturer's fast delivery	3.85
5	The amount of detailed explanation	3.85

The Table below shows the responses from the second group, who thought that English did not hamper their understanding. Despite the small number, these students' responses pointed out important aspects worth considering in an initial stage of CBI, namely the need to maintain English and the lecturer's explanation in the first language.

TABLE 3
The beneficial aspects of English use

No	Responses	Frequency of responses (in %)
1	The use of English avoids misunderstanding, which otherwise would happen if the materials are translated into the first language	3.85
2	The lecturer's explanation in Indonesian still helps in understanding the material	7.69

SOLUTIONS

Solutions are defined here as acts or attitude that contribute to the solutions of the problems in the teaching-learning activities. There were nineteen solutions that the respondents thought could have solved the instructional problems. Two of them, as the table below shows, stand out, namely, intensifying the interaction between the lecturer and the students, and adding more clarity to the explanation.

TABLE 4
Possible solutions to the problems of teaching and learning

No	Solutions	Frequency Responses
1	Intensifying interaction between lecturer and students	3
2	Adding more clarity to the explanation	3
3	Varying teaching techniques	2
4	Studying independently by reading extra materials	2
5	Asking and discussing	2
8	Improving English proficiency	1
9	Visiting sites that are related to the topics	1
10	Making slides simpler	1
11	Listening to the lecturer's quietly with full concentration	1
12	Reviewing materials	1
13	Lecturer's guiding the independent learning	1
14	Lecturer's teaching in Indonesian	1
15	Presenting slides in English	1
16	Teaching technical terms of engineering	1
17	Ice breaking	1
18	Playing games relevant to the topics	1
19	Prior preparation before class	1

THE TEST SPECIFICATIONS FOR TESTING TEACHING ABILITY

The following section presents the result that achieves the second research objective, namely to draw a preliminary specification of a test design intended as an instrument for measuring teaching ability in CBI.

The preliminary test specification was constructed on the basis of data gleaned from the observation, questionnaires, and interview with the

students (see Appendix A). The following details how the data were interpreted to form components in the test specification.

Delivery Technique

Our data indicates the importance of the lecturer's clear pronunciation and comprehensible spoken English in the delivery of the lesson. Closely related to this is the ability to pace the delivery in a way that permits the students to grasp the materials. When pacing the delivery in this manner, the lecturer is also excepted to break down the dense materials into several manageable units that the class can comprehend with reasonable ease. A variety of techniques in presenting the materials will promote an even more favorable learning atmosphere. In addition to that, the lecturer should bring up examples and illustrations from the real world that are relevant to the materials being discussed. Finally, the lecturer should be able to wrap up the main points of the lecture.

Guidance

Guidance is defined here as the lecturer's assistance that helps the students understand the lessons better. Our inference on the data collected from the previous stage suggested three necessary acts, namely the ability to explain difficult materials, providing glossaries, and giving feedback over the students' works.

Materials

Our previous data suggested that the learning materials should be free of spelling and grammatical errors, and should contain a considerable amount of technical vocabulary.

Task

Task is defined as any activity that allows the students to enhance the understanding of the materials by applying the new knowledge they have learned to a given situation, which can be either simulated or real. In a CBI class that we observed, the tasks may come in the form of the following activities. First is the lecturer's display questions with sufficient waiting time of 1.5 to 2 minutes. Next is a task that makes the students apply the knowledge they have learned. Of equal importance is an activity that makes them use English to accomplish it. Finally, the task may also be in the form of regular tests.

Following Bachman (2004), who states that validation can be done by submitting the test specification to a panel of experts, we drew a test specification and gave it to a panel of language education experts to be judged. The experts gave their qualitative judgment as to whether our specification suited the intended purpose of measuring the CBI teaching ability.

The resulting table of specification (see Appendix A) accommodated the experts' opinions concerning the necessity of good rapport between the lecturer and the students, and the mastery of classroom language.

THE ENGLISH PROFICENCY LEVEL

As the findings above show, the difficulty in understanding the learning materials was attributable to the generally low English proficiency of some students. Viewed from Anderson's (1983) Information Processing theory, these students may have been at what he calls the cognitive stage. At this level, they had got at least the declarative knowledge about English but had not yet gained fluency in comprehending academic words and other technical words that characterized the learning materials. If such abilities were the demand of the CBI class, a sufficient amount of the lecturer's assistance would have to be provided for these students. The assistance, as the students suggested in the findings, could be the provision of glossary in the materials that were made available beforehand, in addition to deliberate slowing down of the delivery pace. The lecturer might just as well consider reducing the number of Power Point slides for the class.

To students who had difficulties understanding the lecture, what the lecturer presented may not have comprised comprehensible input for them. This is where Krashen's (1984) hypothesis came to play. In order for the lecturer to expose the students to comprehensible input, she should have provided some assistance like glossary, occasional translation of important phrases on the slides, some collaborative arrangements which made the highly proficient learners help the less advanced peers, and even some tasks which focused on the language. Reed and Railsback (2003) even reiterate the significant role of using the students' native language to increase comprehensibility of the lessons.

The finding above also points out the need for attending to the distinction between CALP and BICS proposed by Cummins (1984). For CBI students, having the ability to use and understand English in daily communication may not have been sufficient to enable them to fully grasp the contents of the course. While their daily communication may be very much of BICS type, the English used in the CBI class was apparently of CALP type. Again, to help the students keep up with the demand of CALP

mastery, a variety of assistance from the lecturer or from the entire course arrangement should be given. The latter may come in the form of adjunct class where a language specialist lecturer equip the students with some knowledge of CALP prior to the CBI class.

PERFORMANCES IN THE IMPORTANT ASPECTS OF TEACHING

Our finding in this area shares much in common with a research by Miller (2009). She found that CBI classes in Hong Kong favor lecturers' simplification of the spoken language, familiar pronunciation, and preparation for students before the class sessions. Interestingly, Hong Kong students in her study also react positively to the lecturers' attractive teaching style and use of visuals.

CBI is actually not very different from any content classes. Like any other content class, CBI must also strive to attain effective teaching skills whose components are stated by Jordan, Schwartz and McGhie-Richmond (2009, p. 535) as follows:

Effective teaching skills consist of high levels of student engagement based on good classroom and time management skills, the ability to scaffold learning that is adapted to students' current levels of understanding, cognitively engaging students in higher-order thinking, and encouraging and supporting success.

A similar opinion in the same line of thought is proposed by Borich (2007, p. 9), who argues that effective teaching lies in the clarity of the materials, varied learning activities, task orientation, students' involvement in the instructional processes, and the students' achievements. Our study indicates that these components were not carried out fully and satisfactorily in the class, which then prompted us to include these aspects in the test specification for measuring teaching ability in CBI.

Another crucial ability is scaffolding, which may manifest in translation and provision of glossary. Our respondent made very little attempt of translating the lesson materials into the students' first language, and provided no glossary for the materials. Since this ability to provide scaffolding is vital, it was included in the test specification.

Our finding also indicates the highly dominant role of lecturer in the classroom. The respondent in our study did one-way lecturing for almost 50 minutes, a phenomenon that was also noted by Musumeci (1996). Because CBI aims to promote a conducive learning condition through teacher and

student interactions, a CBI teacher should encourage more interactions among the students and between the students and the teacher.

A study by Laufer and Hill (2000) suggest the use of dictionaries, either electronic or conventional, to help the learners master new lexical items. Hyperlinks to the meanings of new words can be added to the Power Point materials which the students can access prior to the class. As Laufer and Hill found, these new words learned in this fashion can be retained longer in their long-term memory.

The provision of the lecture materials beforehand, as Babb and Ross (2009) point out, may have positive impact on the learners' attendance and participation.

THE IMPORTANCE OF ACADEMIC WORDS

The outcome of our analysis of the lecturer's materials indicates that academic words made up a significant portion in the course materials. This is in line with a few other studies. Chen and Ge (2007), for instance, found that in medicine textbooks the academic words make up around 10% to 12% of the total words. Another study by Vongpumivitch, Huang and Chang (2009) on applied linguistics journals arrived at a similar figure, 11 %. Thus, since academic words evidently make up a large part of the lesson materials, it is strongly desirable that CBI lecturers and students have good command of these words.

COMPONENTS MEASURED BY THE TEST SPECIFICATIONS

The result of the expert validation of our test specification was a preliminary blueprint of the test. What follows below is a further discussion on several important components that we and the experts deemed vital in the test.

As mastery of academic words has been shown to be one of the keys to an effective CBI class, we put it as a performance to be measured. Morris and Cobb (2004) point out the importance of a good command of academic words, and suggest further that the mastery be measured with a vocabulary profiler.

The experts we consulted with suggested the inclusion of the mastery of classroom language, a notion that is supported by Pessoa et al. (2007) and Lee (2009) who essentially argue that such language has clearly discernible structures and can therefore be taught to teachers. Lee (2009) sees beyond classroom language to address the issue of establishing rapport with the learners. Following this principle, we included rapport as an element to be measured in testing CBI teaching ability.

Another equally important aspect in CBI teaching is the degree to which the lecturer assigns tasks that make the learners have a hands-on approach to the topics they are learning. Such feature of the task suits those learners who are inclined toward kinesthetic learning style. In some disciplines, this is a very effective technique that promotes synthesizing and analytical skills (Borich, 2007).

Still, another feature that contributes much to the instructional aspect of CBI is what is commonly called waiting time. Borich (2007, p. 319) states that an ideal waiting time is at least 15 seconds. Considering the instructional value of waiting time, we included that aspect in our test specifications.

CONCLUSION

This study aims to achieve two major objectives, namely, identifying instructional aspects of a CBI in its initial stage, and draw a specification of an instrument to assess teaching ability in CBI. There are three theoretical perspectives that serve as the framework, namely, language acquisition and learning hypothesis by Krashen (1984), BICS and CALP models (Cummins, 1984) and cognitive learning theory by Anderson (1983).

The findings of this research are in line with some previous studies in the same area of interest. It is found that that the lecturer dominates the class with one way teaching interaction. The lecturer rarely conveys display questions, and even if there is any, gives a very short waiting time. Many of the students complain about the wide coverage of the materials, and they also find English teaching materials difficult to grasp. Accordingly, it is not surprising that the solution from students focuses on the importance to build a more intensive interaction between students and a lecturer, to have more lecturer's explanation about the materials, and to create a variety of interesting teaching techniques. Another finding of this study is related to the characteristics of the teaching materials. The finding shows that the teaching materials contain a high portion of academic words, a trend also captured by previous studies.

The result of the data analysis above was used to design a specification of a test for measuring CBI teaching ability. The design was verified by an expert validation and generated a list of major categories of skills to be included, namely delivery technique, guidance, material, task, and rapport. Clearly further studies should be done to refine the test for CBI teachers.

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