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研究課題名(和文) L1群とL2群が同じ科目で同等の学習効果を上げることができるかまたその要因は何か

研究課題名(英文) How do academic content learning gains in a CLIL course compare to learning gains in an equivalent L1 content course?

研究代表者

Malcolm Field (Field, Malcolm)

杏林大学・総合政策学部・教授

研究者番号：50381281

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研究成果の概要(和文)：L2習熟度の高い教育機関、中程度の教育機関、低い教育機関を対象とした。ケース1の低レベルはEMIコースであった。全員がチャプターの前に内容のプレテストを受けた。ケース1以外は1週間以内に読解の質問テストを受けた。ケース1では、その単元について2週間の授業があり、授業中に読解後のアンケートに答えることが求められた。ケース1以外は事前テストと事後テストで改善した。ケース1の平均点は52.42%から47.22%とマイナスになった。ケース1の回答はコピーペーストとして提示されたため、プレテストの平均点に偏りが生じた可能性がある。

研究成果の学術的意義や社会的意義

The study demonstrates more research of content learning gains in EMI courses in controlled studies is necessary. EMI courses are problematic when learners' L2 proficiencies are insufficient. The evidence indicates that guidelines need to be established to accredit EMI or global courses.

研究成果の概要(英文)：In 2022 a reduced study across 3 institutions: high-level L2 proficiency; mid-level institution, and low-level institution was conducted. Case 1 was claimed EMI program course. The previous institution was used as the control. All cohorts were given a pre-test about the content prior to the chapter. All except Case 1 were given the post-chapter reading questionnaire test on Google docs within one week. Case 1 were given two weeks of teaching on the unit and were required to complete the post-reading questionnaire in class. All except Case 1 improved pre- to post-test, Control from 77.67% to 91.53%, and Case 2 from 37.33% to 50.83%. Case 1 had a negative mean score, from 52.42% to 47.22%. Case 1 responses were shown as copy-paste from another site. This would skew the mean for the pre-test for Case 1. It may be, therefore, that the pre-test mean score could be lower and thus the post-test mean score would have shown a positive gain rather than the negative gain from 52.42% to 47.22%.

研究分野：Educational Learning and Pedagogy

キーワード：Research Methodology EMI Learning Content and L2 Learning

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## 1. 研究開始当初の背景

With the influx of globalization forces in many societies in East and Southeast Asia, there has come an equivalent pressure for educational institutions to prepare bilingual or multilingual students. More recently, additional pressure has been placed on institutions to educate students in an academic discipline, such as pharmacy, math, medicine, management, science and even agriculture, amongst others, through the second language, which is usually English. In 2018 we established at Khon Kaen University Pharmaceutical Sciences (KKUPS) that equivalent learning gains are possible between courses taught all in English (L2) with the same content-based course taught in Thai (L1). We found that the courses taught in Thai had higher content knowledge (64.41%) to the English-taught cohorts (59.14%) with mean overall of 62.78%. We concluded that the differences could be accounted for by the assessment design that favored the Thai-language cohort over the English-language cohort.

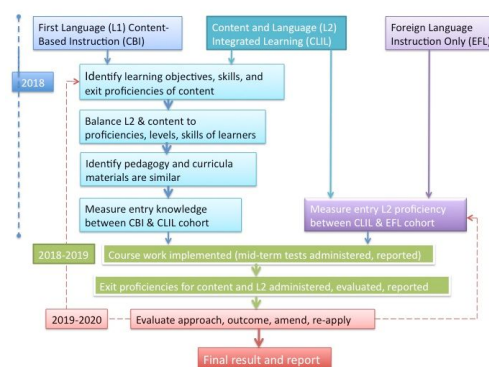
However, as educational systems do not exist in a vacuum, there was still a gap to evaluate the supporting organizational culture, infrastructure, course design, personnel and pedagogy that support the result. The term Content and Language Instruction Learning (CLIL) is more readily used for content-based foreign language instruction. CLIL is an instructional approach in which on-linguistic content, including subject matter, such as Pharmacy, is taught to students through a second language (L2), so that while they are learning curricular content they are also learning an additional language. The term English as the Medium of Instruction (EMI) has been adopted to include any content-based (not directly language focused) course taught in English in a context where English is not the first language. **Using Shimauchi (2018) quote of Dearden (2014):** “the use of the English language to teach academic subjects in countries or jurisdictions where the first language of the majority of the population is not English”. The difficulty for either approaches is situating the **goals in professional fields. For example, does ‘appropriate needs to specific group’ equal skill and proficiency in the profession or merely for course levels only? Does ‘sheltering content’ enable equal learning gains?** The theory that underpins these philosophies is that cognitive development and language development are interlinked and are not separate as presented in the traditional language teaching methods. This may not be problematic for L2 acquisition in immersion programs with early learners. However, in higher educational curricula, the foci become more complicated. There was and continues to remain a dearth of credible evidence supporting equivalent gains in the content.

## 2. 研究の目的

The goal of the research was to try to establish whether the learning gains between content-based classes taught in a second language, commonly referred to as either CLIL or EMIL courses, would be equal to the learning for students undertaking the same content-based courses in their first language (L1). Most education-based research are fraught with internal errors as they are unable to control the many variables that may influence an outcome, such as different teachers, different pedagogy, outside input, different content between classes or across languages, amongst myriad others. The objective of this study was to limit many of those variables, such as same teachers, content and pedagogy with limited outside course assistance. Due to Covid-19 restrictions, the original research methodology needed to be adjusted although the objectives remained the same. As much as possible, the same teacher (the principle researcher) taught all courses using the same content. However, pedagogy needed to be adapted to match the different language proficiencies between the different cohorts. Moreover, the principle researcher became a variable in the research, whereas the original plan limited his involvement in the process to reduce potential bias. Notwithstanding the constraints, two implementations were conducted in difficult conditions. The results outline the possible influences of the limitations. The research objectives remained constant even though the variables may limit how much the results can be applied to a wider context.

### 3. 研究の方法

After the 2018 pilot project, which had some promising results that learning gains were equivalent but the content understanding remained different, I felt confident that we could take the methodology and research to the next level, and then based on those results, apply it into a Japanese context. Access to KKU in Thailand was temporarily suspended but agreement was reached with CMRU in Thailand to continue the study. Implementation through to early 2020 had been conducted. Pre-test data (before course commenced) and mid-test (mid-semester assessment) had been collected. Some methodological concerns were identified (e.g. another teacher was teaching the course outside the control parameters of the study), but I had isolated those cohorts to evaluate as addition variable to consider. I had observed the courses being taught so I was aware of the materials and pedagogical variables.



### 4. 研究成果

SARS-CoV-2 Covid19 arrived in early 2020 and all courses went online. Access to the Thai data was terminated and all institutions (including my own) focused on moving to online teaching. The final data from the CMRU cohort was not collected as the variables changed too drastically to enable a meaningful result. In 2021, pre and post-test protocols were implemented to a university in Japan that had been providing EMI courses for at least 20 years. Although the methodology needed to be changed, such as I become the teacher of the course, the change enabled me to control the teacher variable under the Covid19 constraints. The results of this implementation were null. This was explained by the fact that the students L2 English level was near native proficiency or advanced proficiency that the variable proved to be not significant.

Therefore, an extension was requested for one year in 2022 to implement a reduced study across three institutions: high-level L2 proficiency (IELTS >6.0 – Case 2, English majors), Mid-level institution (TOEFL 530+ - Case 3, independent study course) and low-level institution (TOEIC-Bridge 440 or lower, plus one outlier – Case 1, claimed EMI program course). The previous not significant institution would be used as the control or base as the cohort were native speaker to > IELTS 6.5. All cohorts were given a Google docs questionnaire about the content prior to having access to a chapter of a textbook (since published and adapted for use, see impact and relevancy report). All except Case 1 were given the post-chapter reading questionnaire test on Google docs within one week of the pre-test. Case 1 were given two weeks of teaching on the unit (versus one week for the other cases) and were required to complete the post-reading questionnaire in class, although they could use translator software if necessary.

All, except Case 1 (< TOEIC BRIDGE 440 plus one outlier) showed improvement from pre- to post-test questionnaires, for example the Control from 77.67% to 91.53%, and Case 2 from 37.33% to 50.83%, Case 3 had anomalies in the post-test so the data has not been included, although their pre-test scores were higher than Case 1 cohorts (see comment in following paragraph). Only Case 1 had a negative mean score over the group, from 52.42% to 47.22%. The n was too low to consider significance.

Although it could be claimed that the post-test protocol may have skewed the result, there was clear evidence from several Case 1 responses to the questions that they had been merely copied and paste directly from another site. That is, pasting in a correct answer from the Internet rather than their own answer. This would skew the mean for the pre-test for Case 1. It may be, therefore, that the pre-test mean score could be lower and thus the post-test mean score would have shown a positive gain rather than the negative gain from 52.42% to 47.22%.

In summary, it is important to draw attention to the impact and significance of the study.

- (a) The study continues to demonstrate the question of content knowledge and learning gains in EMI courses to the same courses taught in the L1 remains unanswered and needs addressing in controlled methodological studies that can limit and/or account for the influencing variables in educational settings. Such a methodology is possible. Unfortunately, Covid19 interrupted the study to provide evidence for this claim. I remain open to collaborating with KKU again in the near future addressing the research design question. We are communicating about the possibilities.
- (b) The reduced study in 2022 demonstrated that EMI courses are problematic when learners' L2 proficiencies are insufficient. As outlined in the initial JSPS grant application, the cognitive overload reconciling the new content and the L2 is too higher load. The evidence from this study added to the anecdotal evidence at the institution that hosted the EMI program in Case 1 that the program was struggling. As a result, the program is under review and a new curriculum will be submitted to MEXT for 2023 commencement. It is likely that the EMI courses will be greatly reduced. Furthermore, MEXT should initiate an L2 minimum proficiency before allowing any institution to teach EMI courses (under the definition provided above).
- (c) Several conference presentations and a textbook have been influenced by the data. These include Assessing Content Learning in EMI Courses: What are the Realities in 2022 at the Asian Conference of Education; Back to the Future and the Pedagogical Luddite (a presentation on the impact Covid19 had on preparing material for EMI courses) at Theta in 2023, Perspectives of Education and New Norms, a discussion at CMRU Mae Hong Son campus in 2023, and the editing and publication of a textbook for the course from which the content was used for the pre- and post-tests. A 'short' version has been written for the Case 1 EMI students but has yet to be tested. It is expected that the text will be tested with the 2024 cohorts.
- (d) Although there are many researchers investigating EMI courses in Japan from 2022-, the evidence from this limited study indicates that clear guidelines need to be established by MEXT before any program be accredited as EMI or global or international. There is also a need to define EMI outside of second-language frameworks and situate it into the professional skills development framework. The arrival of the new powerful language technologies changes the paradigm of education and EMI courses. Educational design must be led by the evidence and not on the trends.

5. 主な発表論文等

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3. 雑誌名 International Journal of Educational Development	6. 最初と最後の頁 "-"
掲載論文のDOI（デジタルオブジェクト識別子） 10.1016/j.ijedudev.2021.102373	査読の有無 有
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〔産業財産権〕

〔その他〕

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6. 研究組織

氏名 (ローマ字氏名) (研究者番号)	所属研究機関・部局・職 (機関番号)	備考
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7. 科研費を使用して開催した国際研究集会

〔国際研究集会〕 計0件

8. 本研究に関連して実施した国際共同研究の実施状況

共同研究相手国	相手方研究機関
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