

12-11-2015

Discipline-Specific Language Instruction for International Students in Introductory Economics

Trien T. Nguyen

University of Waterloo, nguyen@uwaterloo.ca

Julia Williams

Renison University College, University of Waterloo, julia.williams@uwaterloo.ca

Angela Trimarchi

Wilfrid Laurier University, angetrim@sympatico.ca

Follow this and additional works at: http://ir.lib.uwo.ca/cjsotl_rcacea

Recommended Citation

Nguyen, Trien T.; Williams, Julia; and Trimarchi, Angela (2015) "Discipline-Specific Language Instruction for International Students in Introductory Economics," *The Canadian Journal for the Scholarship of Teaching and Learning*: Vol. 6: Iss. 3, Article 7.

Available at: http://ir.lib.uwo.ca/cjsotl_rcacea/vol6/iss3/7

Discipline-Specific Language Instruction for International Students in Introductory Economics

Abstract

This paper explores student perceptions of the effects of pairing discipline-specific language instruction with the traditional method of course delivery in economics. Our research involved teaching content-based English as an additional language (EAL) tutorials to a small group of ten international students taking first-year introductory economics courses. These voluntary participants completed pre- and post-treatment assessments with exit interviews at the end of the project. Assessment results and interviews suggest that students perceive that discipline-specific language instruction such as our EAL tutorials assists in the development of increased content and language proficiency. They also believe that vocabulary development is one of the most critical activities to support these goals; reading skills are also important but require more time and commitment than students can afford to give. Despite the students' interest in the project, their heavy class schedules prevented many from participating; our group was limited to ten students which precludes any assurance of statistical significance. In spite of the limitations, we believe that the project can still contribute valuable qualitative lessons to the literature of content-based language instruction in which the discipline of economics has not been well represented.

Cette communication explore la manière dont les étudiants perçoivent les effets du jumelage de l'enseignement de la langue spécifique à une discipline avec l'enseignement d'un cours d'économie selon la méthode traditionnelle d'enseignement. Notre recherche a porté sur l'enseignement en tutorat de l'anglais langue additionnelle (ALA) fondé sur le contenu à un petit groupe de dix étudiants internationaux inscrits dans des cours de première année d'introduction à l'économie. Ces participants bénévoles ont complété une évaluation avant et après le cours et ont été interviewés à la fin du projet. Les résultats de l'évaluation et les entrevues suggèrent que les étudiants ont le sentiment que l'enseignement de la langue spécifique à une discipline, tel que nos cours d'ALA en tutorat, les aident à développer une meilleure compréhension du contenu du cours et de la langue. Ils pensent également que l'acquisition du vocabulaire est l'une des activités les plus importantes pour réaliser ces objectifs. Les compétences en lecture sont également importantes mais requièrent davantage de temps et d'engagement que ce que les étudiants sont en mesure de fournir. Malgré l'intérêt des étudiants dans le projet, leur emploi du temps très chargé a empêché plusieurs d'entre eux d'y participer. Notre groupe a été limité à dix étudiants, ce qui écarte toute assurance de signification statistique. Malgré ces limites, nous croyons que ce projet peut malgré tout apporter une contribution qualitative appréciable à la documentation qui existe sur l'enseignement de la langue spécifique à une discipline dans laquelle l'économie n'a pas souvent été représentée.

Keywords

content-based instruction, content and language integrated learning, discipline-specific language instruction, Economics, English as an additional language, perception, vocabulary

Cover Page Footnote

The authors would like to thank Khuong Truong for research assistance and the participants in the project. Financial support from the University of Waterloo 2009 LIF Grant Program is gratefully acknowledged.

Since the early 1990s, enrolment of international students at Canadian universities has been marked by continued growth. In 2000, Statistics Canada implemented its Postsecondary Student Information System (PSIS) with annual surveys on both domestic and international students. Using PSIS, Parsons and McMullen (2009) reported a strong growth in the share of international students among university graduates in Canada from 4.7% in 2001 to 7.4% in 2006. McMullen and Elias (2011) expanded the time frame and reported a steady growth from 4% in 1992 to 8% in 2008. The three leading provinces of Ontario, Québec, and British Columbia together continued to attract the bulk of international students (76% in 1992, 79% in 2008). The demographic profile however has shifted towards more undergraduate international students in the younger age group of 18-24 years (45% in 1992, 66% in 2008). The representation of females has also increased (39% in 1992, 45% in 2008). The preferred fields of study have changed: enrolment in traditional fields such as mathematics, computer science, and sciences was down (22% in 1992, 15% in 2008) in contrast with a rise in enrolment in social sciences such as business, management, and public administration (14% in 1992, 23% in 2008). The country of origin of international students coming to Canada has shifted with more Asians (50% in 1992, 53% in 2008), more Europeans (16% in 1992, 18% in 2008) and fewer Africans (17% in 1992, 12% in 2008). Statistics Canada (2013) reported that in 2010, students from China (26.9%) represented the largest group of international students from a single country of origin, more than three times the size of the next biggest groups: the United States (7.7%), France (7.4%), and India (7.4%) (Statistics Canada, 2013).

For many Canadian universities, this increase in the international student population has created a greater demand for English as an additional language (EAL) training. Despite having passed the university's minimum English language requirements, international students still find language a serious barrier to their academic success (Vogel, 2013). Belkhodja and Esses (2013) report that international students have a significant positive impact on Canada's economic and cultural spheres while enhancing diversity; however, insufficient language skills and cultural knowledge are the largest impediments to their ability to contribute to society. Therefore, it is essential to determine how language support can be delivered most efficiently so international students can overcome language barriers and become academically productive as soon as possible.

In the present world of globalization, we witness the increasing presence of international students on many campuses in Canada and other countries. These international students bring several new and interesting research issues to the scholarship of teaching and learning (SoTL) such as language proficiency, academic performance, motivation, work ethic, culture, and family ties. Our tutorials for EAL learners in Economics can help SoTL researchers better understand how learning outcomes can be traced to language proficiency. Our paper is relevant to SoTL by pointing out the language dimension of the traditional classroom teaching and learning environment, and hence expanding the scope of SoTL research.

Objectives

The objective of this paper is to explore student perception of the effects of pairing discipline-specific language instruction with the traditional method of course delivery in introductory economics. Our field experiment results from assessments and exit interviews show that students perceive that discipline-specific language instruction such as our tutorials for EAL learners in Economics assists in the development of increased content and language proficiency.

Students believe that vocabulary development is one of the most critical activities to support these goals; reading skills are also important but require more time and commitment than they can afford to give. Despite the students' interest in the project, their heavy class schedules prevented many from participating; and our group was limited to ten students which precludes any assurance of statistical significance.

In spite of the limitations, we believe that the project can still contribute valuable qualitative lessons to the literature of content-based language instruction in which the discipline of economics has not been well represented. For comparison, it is worth noting that our sample size ($n = 10$), though still small for standard statistical analysis, is more than twice that of an earlier experiment ($n = 4$) by James (2006) with international engineering students. We hope that further research can be done to continue our pilot project and probe deeper into this interesting and important topic.

The following research questions helped guide the design of our investigation: Does discipline-specific language instruction lead students to perceive the dual outcomes of increased content knowledge and language mastery? What type of English language skills (reading, writing, listening, and speaking) do international students need the most, especially at the first-year introductory economics level? What policy lessons can we draw from the research results to encourage language skill transfer in economics?

Literature Review

Content-Based Instruction

A common model for delivering second language instruction involves students studying their second language in courses that are separate from their content courses. For example, in elementary and secondary schools, students learn English in an English class, and math and science in separate classes. In tertiary educational settings, students may be required to complete English language training before they are admitted to the institution, or they are admitted on condition of completing an English language training program. In both of these instances, students must learn English before they embark on the study of their major. And in all of these cases, students are responsible for transferring their English language learning into other disciplines.

Content-based instruction (CBI), sometimes referred to as content and language integrated learning (CLIL), is an innovation on this common model of language delivery. CBI “encompasses any activity in which a foreign language is used as a tool in the learning of a non-language subject in which both language and subject have a joint role” (Marsh, 2002, p. 58). Early CBI initiatives have been well researched and have provided positive findings. CBI models are varied, but typically offer language instruction through readings and lectures based on a variety of themes. These models are generally credited for improving the target language proficiency while producing students who are as competent in their subject matter as students in control groups (Stohler, 2006). Recent European and North American research indicates that CBI produces strong second language (L2) proficiency and subject matter expertise while satisfying both students and teachers (Deen & Hacquebord, 2002; Jappinen, 2005). Grabe and Stoller (1997) state that increased motivation and engagement are attributable to CBI.

Despite the positive research findings for early models of CBI, other researchers have suggested that the transfer of language skills to content classes is a concern (James, 2006) and

that the transfer of language learning is essential and cannot simply be assumed (Spack, 1997). Snow (1993) suggests that conditions that promote transfer are not always clear; and content used in a CBI course may be a disciplinary mismatch with a student's other courses which may lead students to question the transferability of CBI course outcomes (Snow & Brinton, 1988). It is student perception of the transferability of language skills to content instruction that our research will address using a discipline-specific model of CBI.

Discipline-Specific Experience

James (2006) studied the conditions that encouraged language skill transfer (not skills improvement) in the context of a first-year engineering program at a large research-intensive university in Canada. Participants were international students who performed poorly on an English proficiency entry test (despite good marks in their discipline). The students had a regular course load, supported by a CBI course (two 2-hour sessions per week) designed to teach language through content. James found that transfer of second language skills was most likely to occur when content in the CBI course was as parallel as possible to that in the content course and that instructional tasks and text types in the language and content courses also needed to be similar. Furthermore, language knowledge transferred most readily when the timing of language instruction was provided just prior to the requirement for it in the content course and when the language instruction addressed students' strengths and weaknesses. These conditions are difficult to replicate if language and subject matter instructors do not collaborate. However, the ideal conditions should be possible to reproduce with close communication between the content and language professors using a discipline-specific CBI model.

Other models of CBI have been used at colleges and universities around the world (Crandall & Kaufman, 2002). In particular, studies have explored the provision of English language instruction in higher education through a variety of disciplines: architecture in Australia (Baik & Greig, 2009), psychology, sociology, history, health and physical education in the United States (Song, 2006), and geography in Italy (Rodgers, 2006).

Ontario Experience

In Canada, the discipline-specific model has produced excellent results in the past at the University of Ottawa. Ready and Wesche (1992) reported the results of a discipline-specific model (also known as the "adjunct model") used to improve L2 proficiency in conjunction with a range of content courses. Measures of proficiency indicated that over one term, students improved their second language skills. In fact, this CBI adjunct model was so successful that it is still being used at the University of Ottawa, which offers language immersion courses through its Official Languages and Bilingualism Institute (OLBI, 2015). The adjunct model pairs a second language course (either English or French as an additional language) with a regular academic course (e.g., history, political science, psychology, administration) to address both the course content and students' language-related needs.

The move towards designing language support systems to parallel content courses is mirrored in professional fields as well. Both federal and provincial governments in Canada now fund programs that span the technical and language gaps between foreign credentials and Canadian licensing requirements in fields such as accounting, architecture, nursing, pharmacology, engineering, dentistry, hospital administration, and social work.

A relevant CBI model for foreign-trained professionals is the International Optometric Bridging Program (IOBP, 2015) offered by the University of Waterloo's School of Optometry. The program targets English language proficiency as a priority and is designed with structured integration of language and optometry content to help international optometrists gain the critical language, academic, and clinical skills required for optometric practice in Canada. As these professional CBI programs are relatively new in Canada, there has as yet been little research about the effectiveness of discipline-specific language training in this context, but the trend has been established.

Economics Experience

While CBI studies have paired second language instruction with a wide variety of disciplines ranging from engineering to political science and history, research combining English language instruction with the discipline of economics is, to our knowledge, not well represented in the literature. Nor is research on student perception of the effectiveness of the dual language and subject-matter instruction prevalent.

In spite of this scarcity of research work in the discipline, economics provides an appropriate context for a pilot project because it is a popular field of study for international undergraduates. However, students often have difficulties in assimilating economics concepts which have unfamiliar meanings or language connections. For example, terms such as "beggar thy neighbor," "keeping up with the Joneses," "lender of last resort," "the bandwagon" effect, "the Robinson Crusoe economy," and "the market for lemons" were coined by Anglophone economists in a cultural context not always clear to non-Anglophones.

Being aware of the language difficulties that international students have with their initial encounter with the discipline of economics, we wanted to experiment with a CBI model specifically designed for content-based instruction in economics with the goal of helping students achieve mastery of both course content and English language skills. We also wished to study their perceptions of the impact of these courses.

The Centrality of Vocabulary

Vocabulary knowledge is central to the development of language proficiency. In 1972, Wilkins argued that knowledge of vocabulary was even more important than mastery of grammar. He wrote, "Without grammar very little can be conveyed, without vocabulary nothing can be conveyed." More recent studies have demonstrated that vocabulary knowledge enhances proficiency across all language learning skills including reading (Cobb, 2008), listening (Chang, 2007), speaking (Joe, 1998) and writing (Engber, 1995; Ferris, 1994). With this in mind, we developed a program in which explicit vocabulary instruction played a significant role.

Method

This section describes the three stages of the research design for our project. Firstly, in the preliminary and planning stage, we secured the required research ethics clearance from the university, selected the economics teaching environment, surveyed international students in introductory economics regarding their language needs, and prepared for the tutorials. Secondly, in the implementation stage, we recruited student volunteers for the tutorials, reviewed the

English proficiency background of the students, and provided the content-based EAL instruction during the term as planned. Lastly, in the final stage, we conducted assessments including tests, exit interviews and follow-up email surveys about a year later.

Ethics Clearance

We obtained ethics clearance from the Office of Research Ethics of University of Waterloo before the start of the project. This office reviewed project documents such as statements of goals and purpose, our recruitment presentation, survey questionnaires, data collection plan, sample English tutorial materials, sample pre- and post- vocabulary and reading tests, and students' waivers giving the researchers permission to access their Economics course marks and English proficiency test scores. The co-operation of the volunteer students was thus essential to the success of the project.

Economics Teaching Environment

The research was conducted at University of Waterloo, a medium-size university in Ontario with a total enrollment of 35,000 full- and part-time students in 2014 (30,000 undergrads, 5,000 grads). International students comprised 13% of undergraduate and 35% of graduate students; these percentages are well above the national average of 8% cited in the introduction.

However, the number of international students in introductory economics classes is much higher than the 13% campus-wide figure. Our preliminary survey of three introductory economics classes in fall 2009 showed that international student representation varied from 20% to 25%, i.e., as high as a quarter of the class.

Each year, there are about 5,000, mostly incoming first-year students, taking two half courses in introductory economics, namely, microeconomics (ECON 101) and macroeconomics (ECON 102). These courses can be taken in any order but most students take microeconomics first.

The courses are offered concurrently in multiple sections with enrollment limits of 250 students per section. In such large classes, there are few opportunities for student-instructor interaction. Hence, classroom activities are mainly restricted to mass lectures. Midterms and final exams are in computer-readable multiple choice format. Use of modern online learning technology such as MyEconLab and Aplia is not encouraged as the university is concerned about provincial government regulations that restrict additional student course fees. The department runs a clinic that offers general help on course materials to students taking these courses. Given the mass teaching environment, students rely on close circles of classmates for support. This applies to Canadian and international students alike.

International Student Language Survey

We conducted a preliminary survey of international students' perceptions of their language needs. These students were taking introductory economics courses in fall 2009 (n = 85). While the survey was intended for the planning phase of our research project, it produced some valuable information of its own, and it is perhaps the first reported survey of international

student perceptions of their language needs while taking introductory economics courses in Canada.

The age profile of this particular group of international students was 17-25 years which is the about same age range (18-24 years) of international students reported in Canada (45% in 1992, 66% in 2008). There were fewer females (31% females) than the national average (45% females in 2008). For these international students, the dominant non-English first language was Chinese (62%) followed by German (8%), French (3%), and others (28%).

Table 1 presents survey responses on language skills of these international students. It is interesting to note that slightly over half (54%) of the students agreed that they would perform better in the course if they commanded stronger English language skills. Similarly, slightly under half (47%) agreed that they would perform better if they knew more *general* vocabulary. Thus, as much as half of the group recognized the importance of strong English language skills, and in particular, general vocabulary, to succeed in their academic performance.

However, when asked about *economics* vocabulary, there was an overwhelming majority (80%) that saw the important role of discipline-specific vocabulary in academic performance. This result was reinforced by 57% of the group finding the language or vocabulary in multiple choice questions difficult to understand. Furthermore 46% revealed that they used dictionaries while reading their textbooks, in contrast with 54% never using dictionaries.

When asked about the number of hours they required to read a chapter in their textbooks, the students were divided almost equally among five subgroups: over two hours, about 1.5 hours, about an hour, less than an hour, and interestingly, some indicated they do not read textbooks at all. Overall, 64% spent at least an hour or more to read a chapter in their textbooks.

Finally, when asked if they would participate in free EAL tutorial sessions, only 19% gave a definite yes while 48% gave a clear no, and one third (33%) were undecided. We believe the reason for such a low response at this stage was that students did not see how the tutorials would actually help them. In addition, it is also likely that their reluctance was attributable to their awareness of their time constraints. Students with full course loads are wary of committing time to a new initiative until they can clearly see the benefit. This lack of enthusiasm from students despite the recognition of their weaknesses in English skills suggested that recruiting participants for CBI field research might be difficult.

Table 1
Language Skills of International Students in Introductory Economics, Fall 2009 (n = 85)

Question	Response				
If I had stronger English skills, I would have done better in the course	strongly agree	somewhat agree	somewhat disagree	strongly disagree	
	25%	29%	18%	28%	
If I had known more <i>general</i> vocabulary, I would have done better in the course	strongly agree	somewhat agree	somewhat disagree	strongly disagree	
	20%	27%	21%	32%	
If I had known more <i>economics</i> vocabulary, I would have done better in the course	strongly agree	somewhat agree	somewhat disagree	strongly disagree	
	40%	40%	7%	13%	
The language or vocabulary of multiple choice questions is difficult to understand	yes	sometimes	no		
	16%	41%	43%		
Number of times I stop reading textbook in order to look up words in a dictionary	> 10 times	between 5-10 time	between 1-5 times	never use dictionary	guess meaning
	8%	19%	19%	33%	21%
Number of hours it takes me to read a chapter in textbook	> 2 hrs	1.5 hrs	1 hr	< 1 hr	no read
	19%	21%	24%	18%	18%
Interest in EAL for Economics tutorial (free, 1.5 hrs/week)	yes	maybe	no		
	19%	33%	48%		

Note. “Guess meaning” indicates the response “never use dictionary, but if there is a word I didn’t know, I guessed the meaning and kept reading”.

Planning and Preparation

The language survey results above suggested that international students in introductory economics perceive that they need help mostly in the areas of discipline-specific vocabulary and reading skills. Hence, we focused our research efforts on these two particular areas of EAL instruction. The students taking the survey did not identify speaking and writing as their major concerns, likely because they did not have to do much of that in lower-year economics classes. This is the reason why we did not concentrate on the “productive” skills of speaking and writing.

In terms of course scheduling, the microeconomics class (ECON 101) was a better choice for our EAL project than the macroeconomics class (ECON 102) as microeconomics is usually the first economics course that incoming first-year students take in the fall term. In addition, if we had chosen the macroeconomics class, the international students who had already successfully completed the microeconomics class in a previous term might be less likely to participate in the project.

In preparation for the EAL project in fall 2010, the EAL instructor attended the spring 2010 class in order to familiarize herself with the economics content, develop EAL support materials, and run four test sessions with volunteer students (n=4).

The microeconomics class meets three times per week for twelve weeks. The class is regularly taught by an experienced economics instructor who already taught in a way that facilitated the learning of international students. Specifically, she makes skeleton lecture notes available online before class which significantly reduces the note-taking burden for students. Students then bring these skeleton notes to class and complete them during lectures. Reading

assignments are also posted well ahead of time. Furthermore, the instructor is aware of possible vocabulary gaps her students might be experiencing and regularly provides definitions of words she feels might be new or unknown for EAL students. It is a bonus that she speaks clearly and at a moderate speed as students, EAL and native alike, need time to absorb both the language and course content of the lectures. Students are assessed through two midterms and one final exam all of which are in multiple choice format. From a language instruction point of view, the fact that all tests are in multiple choice format is significant as students are not assessed on their use of productive skills, namely, speaking and writing, and this was another reason for our focus on teaching the receptive skills of listening and reading, with an emphasis on vocabulary development.

Recruitment and Participants

The “EAL for Economics” project was launched in the fall 2010 term. On the first day of microeconomics class, the EAL instructor gave a recruitment presentation and offered free 1.5 hours/week “EAL for economics” tutorials (EAL tutorials for short) on both English and economics. The time frame of 1.5 hours/week was chosen in an effort to attract participation. A longer time commitment each week would probably be too demanding and discourage students from participating. First-year undergraduate students are typically busy. In particular, international students, arriving at a new university and possibly in a new country, need to make adjustments to living independently and may not be inclined to participate in a project that would consume too much study and free time. For this reason, we did not assign extra homework during the EAL tutorials. Despite these measures, the number of participants in the tutorials was small due to students’ heavy schedules rather than a lack of interest.

Interested students completed “reply cards” in class to express an interest in participation. The EAL instructor contacted them and the first EAL tutorial began in the second week of the term. Seven students from the target class volunteered to participate in the project (hereafter referred to as “recruit” for short). It is noteworthy that one recruit student actually grew up in Canada as a native English speaker. In addition, three more students from two different sections of the microeconomics class arrived unexpectedly and asked to join the project. These students were not in the target class to hear the recruitment presentation, but learned about the project by word of mouth (we will call this group “non-recruit” for short). In total, the project had ten volunteer students who remained committed until its conclusion. The remarkable fact that there was no attrition among the students in spite of their busy schedules during the midterm exam periods gives a strong indication of their genuine interest in the project.

EAL Student English Proficiency

Once the EAL students had been recruited, we had the ethics clearance from the university to access their past English proficiency test scores. Table 2 shows the variety of English backgrounds among the group: three students came straight from overseas (having only English test scores); four students had been in Canada less than three years (having both test scores and high school marks); three students had been in Canada more than three years (with only high school marks); and there was one lone native English speaker.

Table 2 reveals that the average English proficiency test scores and average English marks demonstrated significant variability. The average IELTS (International English Language

Testing System) score is 6.8 which is slightly below the university’s minimum entrance requirement of 7.0. That means students are accepted even with scores lower than the minimum requirement. The overall TOEFL (Test of English as a Foreign Language) score of 91 just barely passes the minimum score of 90 but the speaking sub score of 20 is well below the minimum required score of 25. A 91 score on the TOEFL and a 6.8 score on the IELTS (although lower than the required minimum score of 7) are still good, and many universities accept scores for admission lower than these. It is really the high school English scores that show mediocrity in English language proficiency.

Table 2
English Backgrounds and Test Scores

	n	English Test Scores		High School English Marks		
Straight from overseas	2	yes		n/a		
In Canadian high school under 3 yrs	4	yes		yes		
In Canadian high school over 3 yrs	3	n/a		yes		
Native English speaker	1	n/a		yes		
English Language Proficiency Scores	n	M	SD	Min	Max	Mdn
IELTS	6	6.8	0.6	6.0	7.5	7.0
English 4U/M	5	80	4.9	73	85	80
Ontario Grade 12 English	2	63	7.8	57	68	63
		Overall	Speaking	Listening	Writing	Reading
TOEFL	1	91	20	23	25	23

In summary, although the students maintained high academic performance standards, their English backgrounds were not particularly strong. The participants were aware of their weaknesses in English language skills. They participated in the EAL project because they hoped to address their underlying concerns regarding their English proficiency while enhancing their economics scores.

Content-Based EAL Instruction

The EAL tutorial materials were developed based on the content of the economics class. Given that students in large classes of introductory economics do not get to speak in lectures or write in multiple choice exams, we focused the tutorial materials on selected areas such as broadening and deepening vocabulary knowledge, improving reading and note taking skills, multiple choice exam strategies, and clarifying culturally bound references. In this way, the EAL tutorials were authentic in that they reinforced the skills required for success in economics. Language tutorial materials were presented in a manner that attempted to replicate James’s (2006) ideal conditions for skills transfer; that is, language materials (vocabulary, reading, listening and note-taking strategies) were presented prior to student need for those skills in the microeconomics textbook and class. This was possible through close collaboration between the economics and the language instructors.

As the research method required an assessment of the students' English skills, both before and after the EAL tutorials, the researchers developed pre- and post- reading and vocabulary assessments to use during the project. Reading assessments were developed using readings from the macroeconomics textbook (Parkin & Bade, 2010). These readings were appropriate for pre- and post- EAL tutorial assessments as they contained economics-related materials at a first year level. It was also unlikely that ECON 101 students would have seen the ECON 102 textbook and so would not have the advantage of text familiarity when completing the assessments.

Two readings were selected from the middle chapters of the textbook in an attempt to ensure the comparability of content difficulty between pre- and post- reading assessments. It would be reasonable to assume that content difficulty would increase throughout the textbook, and we wanted to maintain a consistent level of difficulty for both pre- and post- reading assessments. Consistency was also achieved through text length, and established measures of readability such as the Flesch Reading Ease test (Flesch, 1948) and the Flesch-Kincaid Readability test (Kincaid, Fishburne, Rogers & Chissom, 1975).

Pre- and post- vocabulary assessments were also developed. These were developed based on a vocabulary bank that was constructed during the spring 2010 preparation phase. Vocabulary was collected from lectures and textbook readings. Words were selected based on level of difficulty as indicated by the voluntary participants in spring 2010, and on vocabulary we anticipated EAL students might be unfamiliar with. The words were grouped into general academic, economics-related, and idiomatic use categories. Two tests were developed with the same number of questions on each test targeting words from each category. Selected words were distributed throughout the term (i.e., there were words from every chapter and lecture throughout the course). Test items for both vocabulary and reading pre- and post- tests were in multiple choice format which was consistent with all test items in the economics course. While these efforts were made to ensure the vocabulary and reading assessments were valid and reliable, the small number of participants meant that statistical reliability could not be established. Therefore, the results of the assessments, while providing some objective measure of skill levels, cannot be interpreted as statistically reliable in terms of large samples. Given the time constraints of the students, it was beyond the scope of this project to test actual language development with a standardized language testing procedure.

Assessments

EAL tutorials continued for 10 weeks, from the second week of term to the second last week of term. There were no EAL tutorials in the final week of term as students needed time to study for their final exams.

At the beginning and ending of term, students were tested on performance in vocabulary and reading skills. Although attending the tutorials and taking the tests were completely voluntary and did not appear in the official academic transcripts, the students took them seriously.

In addition to tests, we had an opportunity to interview each student in private on a one-on-one basis before the EAL tutorials ended. The small number of student participants made it possible to conduct this type of informal exit interview. These exit interviews captured student perceptions of their learning experiences in a way that would not have been possible through the usual survey format.

About a year after the end of the project, we followed up with the students through email. The response rate was less than half probably because they had gone their own ways, some even returning home for the summer. Those who responded were still positive and appreciated the experience of the tutorials.

Results and Discussion

EAL Student Academic Performance

The academic backgrounds of the students attending the EAL tutorial sessions are relevant to the project outcomes. The sample size is small ($n = 10$) with seven students (70%) recruited from the target microeconomics class and three students (30%) coming on their own from two other microeconomics course sections. It is worth noting that the sample has a balanced gender distribution with 50% of male and 50% of female students. Their chosen fields of study are 60% in mathematics, 20% in computer science, and 20% in accounting and financial management. These are competitive programs of study which demand high levels of academic achievement. We see that the EAL volunteer participants are bright, highly motivated, and hard working. They are not weak students with low marks.

The descriptive statistics in Table 3 shows that the ten EAL students have a high average of 85% for their final economics course mark, which ranges from 74% to 91%, standard deviation 7%, and median 88% (that is, half above 88% and half below 88%). We do not have data for the economics classes to statistically compare the performance of these ten EAL students with the remaining students in their economics classes. With this caveat in mind, it is worth noting that the 85% average (of this particular group of EAL students) is well above the general 72% average that we know is standard in most introductory economics classes. This is not surprising since these EAL students typically must maintain a high mark average in order to stay in their programs.

Along the same line, again with the same caveat about data limitation that prevent more formal statistical inference, we note that for this particular group of ten EAL students, the non-recruit group had a higher average than the recruit group (89% vs. 82%). In this non-recruit group were the three students who showed up to the EAL tutorials uninvited even though they did not belong to our target class for the EAL project. This may demonstrate that students who went out of their way to participate in the tutorials might have greater motivation overall. Unfortunately, the same self-selection process meant that less motivated international students who may have needed the extra support provided by our CBI project did not volunteer to participate in the project as we had hoped.

Table 3
Economics Marks, Class Attendance, and EAL Tutorial Attendance

	n	M	SD	Min	Max	Mdn
Economics Course Marks						
Recruit	7	82%	8%	74%	91%	84%
Non-recruit	3	89%	2%	87%	91%	90%
Total	10	85%	7%	74%	91%	88%
Economics Class Attendance						
Recruit	7	59%	36%	11%	100%	71%
Non-recruit	3	n/a	n/a	n/a	n/a	n/a
Total	10	n/a	n/a	n/a	n/a	n/a
EAL Tutorial Attendance						
Recruit	7	87%	15%	56%	100%	89%
Non-recruit	3	78%	11%	67%	89%	78%
Total	10	84%	14%	56%	100%	89%

This self-selection pattern, if confirmed by statistical analysis in future work, underlines the importance of the need for institutional involvement in the project. For example, in the long run, it might help if university units such as the Student Success Office or the International Student Office could encourage students in need of language support to take advantage of the EAL tutorials.

We kept attendance records at all EAL tutorials during the term. For the seven students in the recruit group, we also have their economic class attendance records maintained by the course instructor who was a member of the project. We have no economic class attendance records for the three students in the non-recruit group as course instructors normally do not keep attendance records in big classes such as introductory economics.

Table 3 reveals the attendance records of the seven students in the recruit group for both the EAL tutorials and their economics class. It is interesting to note that these seven students have an average attendance rate of 87% in the EAL tutorials (standard deviation 15% and median 89%). It is even more interesting to note that the same seven students have a much lower attendance rate of only 59% average in their economic classes (standard deviation 36% and median 71%). We were pleased to see that the attendance in the optional EAL tutorials was much higher than in the economics classes in which these students had registered. The 28% difference (87% - 59%) in attendance might suggest that they perceived value in the tutorials to help them improve their language proficiency. Also there could be a link between this pattern of choice in class attendance and the International Student Language Survey (p. 10, line 216) which reveals that 80% of the respondents perceive the importance of discipline-specific vocabulary in academic performance. This could be a line of future research to explore the link between student perception of their language development and patterns of classroom activities without the data limitations that we have in this project.

The EAL tutorials differ from the economics class in several aspects. While the former is offered as a small free tutorial of language instruction specifically customized to the content of the economics class, the latter is a large registration-based class offering discipline-specific instruction in economics only. The students in the EAL tutorials seemed to be a homogeneous group of dedicated students with a serious interest in doing well in both language and economics content learning. This contrasts with the economics class which had a heterogeneous mix of

students with vast differences in academic preparedness, motivation, and linguistic backgrounds. Since the focus of this project is mainly on the EAL tutorials, we do not have data on the bigger economics class to make comparisons between the two. Further research to investigate the link between these two intertwined class structures would be a worthwhile effort in terms of both language and discipline-specific instruction.

As a side note, we casually observe from Table 3 that the three students in the non-recruit group had a lower EAL tutorial attendance rate of 78% compared to the seven students in the recruit group who had a higher attendance rate of 87%. Given the current data limitations (n = 3 for non-recruit, n = 7 for recruit), this pattern of attendance by the non-recruit group can be further explored when more data becomes available. One reason for the lower tutorial attendance by the non-recruit group could be that the tutorial materials were customized to the economic class of the recruit group, and hence, might not have been immediately related to the economic class of the non-recruit group. The main focus of the EAL project was on the recruit group from the design stage to the end. The uninvited non-recruit group was welcome and treated equally, but was not part of the original design of the project.

EAL Student Language Assessments

Table 4 presents assessment results for vocabulary and reading skills for nine EAL students (excluding the sole native speaker). Pre-tests were given before the beginning of the first EAL session and post-tests were given at the end of the last EAL session.

Table 4
Language Test Scores

	n	M	SD	Min	Max	Mdn
Vocabulary Tests						
Pre-vocabulary	9	55%	13%	28%	76%	56%
Post-vocabulary	9	68%	15%	44%	88%	68%
Reading Tests						
Pre-reading	9	69%	12%	47%	87%	73%
Post-reading	9	57%	16%	40%	93%	53%

For this particular group of nine EAL students, we note that their performance improved between the two vocabulary tests: the average score went up 13% from 55% to 68% while the minimum and maximum scores also moved up considerably (from 28% to 44% for the minimum and from 76% to 88% for the maximum). While recognizing that these results are not statistically reliable, due to the small sample size, the improved marks could suggest that the EAL tutorials seem to be an effective method to help international students develop their vocabulary skills. This hypothesis was later corroborated by students who clearly expressed their perceptions that the vocabulary instruction was useful in their exit interviews.

On the other hand, the reading results were less clear: while the average score went down by 12% (69% to 57%) and the minimum score fell 7% (47% to 40%), the maximum score went up 6% (87% to 93%). Therefore, the top performers did well but the rest of the tutorial participants did not. There are some possible explanations for the decrease in the average score: despite our efforts to develop tests of comparable difficulty, the post reading test may have been too difficult compared to the pre reading test. This was also confirmed by students in the exit

interviews who perceived that the post reading seemed more difficult than the pre reading test. In addition, due to time constraints, (EAL tutorials were only 1.5 hours/week), students did not have as much of a chance to practice reading skill strategies as vocabulary.

EAL Student Language and Content Learning

In this section, we attempt an exploratory study of the possible link between language proficiency and content learning. Given the data limitation of our small sample ($n = 9$), we are cautious that the findings must be handled with extreme care. Although we are aware of de Winter's (2013) analysis of using Student t-test with extremely small sample sizes (defined as $n \leq 5$), we still prefer, if possible, to be on the conservative side with the dictum "more is better" on data collection.

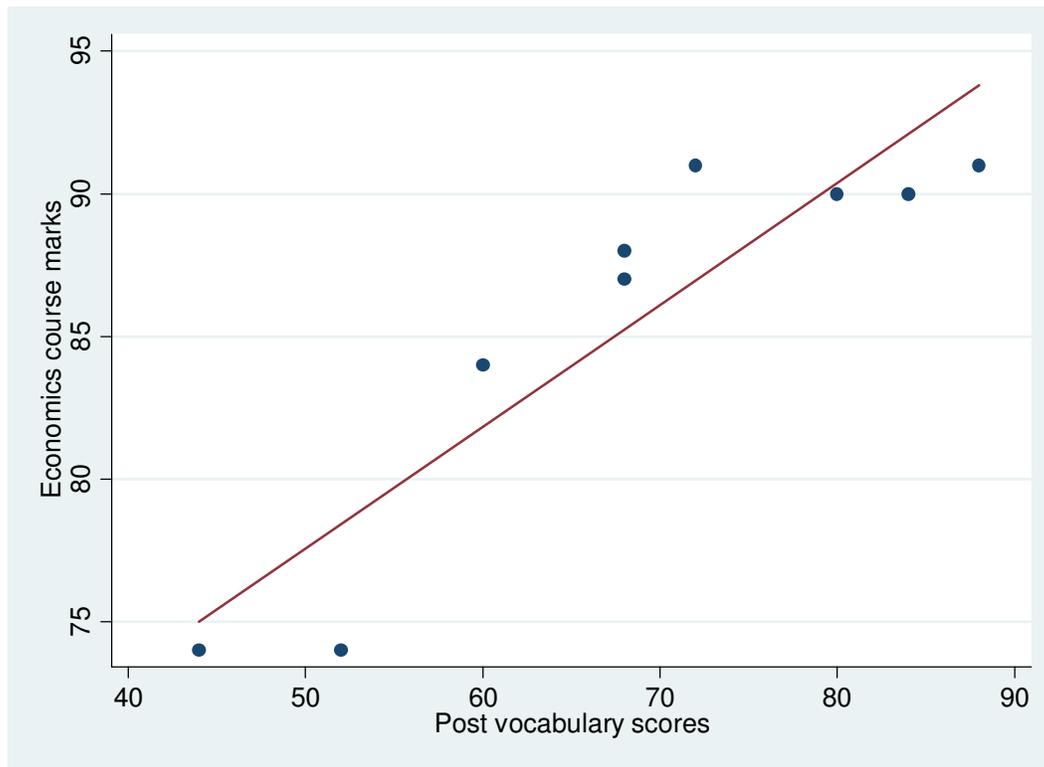
Our intention is to see if there could be preliminary findings from the data that shed some light on the interrelationship between language proficiency and content learning, especially given that student comments in exit interviews provide insights into their perceptions of the usefulness of this model. In doing this exercise, we are more interested in qualitative directions and insights.

Table 5
Language Test Scores and Economics Course Marks

Independent Variables	Dependent Variables	
	Econ Course Marks (n = 9)	Econ Final Exam Marks (n = 6)
Post-vocabulary test scores	0.8754	0.7450
Standard errors	(0.1331)	(0.1104)
Student's t values	[6.58]	[6.75]
Post-reading test scores	0.4262	0.5927
Standard errors	(0.1574)	(0.1479)
Student's t values	[2.71]	[4.01]
R ²	0.9913	0.9968

The first half of Table 5 (first column) presents regression results for two language test scores (post-vocabulary and post-reading) on the economics course marks as a proxy for learning outcomes. The regression coefficients show that, everything else remaining constant, an increase of one percent mark in the post-*vocabulary* test score adds nearly one percent (0.87%) to the economics course mark. On the other hand, an increase of one percent mark in the post-*reading* test score adds less than half a percent (0.43%). In other words, the effect of the post-vocabulary scores is more than twice ($87/43 = 2.02$) as strong as that of the post-reading scores.

Figure 1
Scatter Diagram of Post Vocabulary Scores and Economics Course Marks (n = 9)



Due to our small sample size, we are careful about making claims about the numerical value of the results; however, it is hard to miss the importance of vocabulary and reading proficiency in providing content-based language instruction to international students. This evidence from our EAL tutorial pilot project is further supported by the results from our preliminary language survey of international economics students which indicated that 80% of international students recognized their need for increased vocabulary range.

The regression line has a high goodness of fit ($R^2 = 0.9913$) as the sample consists of students having similar backgrounds, majors, marks, and more importantly, a strong motivation to improve their language skills to further their academic performance. This can be seen in the scatter diagram of Figure 1 with the points lying along both sides of the regression line.

For the sake of completeness, we included the usual statistics (standard errors, t values) in Table 6 but refrained from performing statistical inference and hypothesis testing. We believe that given our small sample size, it is more important and sensible to focus on the qualitative direction and insight, rather than attempt procedures that could produce misleading results.

The second half of Table 5 (last column) presents regression results for the same two language test scores (post-vocabulary and post-reading) but on the final exam marks (instead of overall course marks). This alternative formulation was intended to capture differences in short term effect (final exams) and longer term effect (entire course duration). Since we did not have final exam marks for the three non-recruit students who were not in our target class, we had to reduce the sample to the six EAL students of the recruit group ($n = 6$). Qualitatively speaking, the regression results were, however, not very much different from those of the overall economics course marks (first half of Table 5).

In conclusion, the results suggested, in a preliminary way, that discipline-specific language instruction such as our EAL tutorials could have positive impacts on both economics final exam marks and overall course marks.

EAL Student Exit Interviews

The exit interviews provided additional qualitative information which confirmed some of the results discussed above. The interview format was casual and non-intrusive to keep students engaged and yet comfortable with open-ended questions such as, “Can you tell us which tutorial activities were the most helpful?”

The students perceived that vocabulary activities were the most useful for them. A typical exit interview comment on the effectiveness of vocabulary instruction was, “Most helpful class activities are vocabulary work,” (participant 1). Interestingly, participant 3 articulated the central role vocabulary knowledge plays in supporting the use of other reading and listening strategies. She stated

I have learned a lot in my own country. My Chinese teacher taught a lot about these strategies and said that it does not work and it does depend on your vocabulary. If your vocabulary is good, all the strategies work, but if you do not know the vocabulary, they don't work.

The dominant position of vocabulary knowledge was restated by participant 7. He spoke of how understanding vocabulary was essential to applying strategies to correctly answer multiple choice questions. “Vocabulary is the key to use the strategies. Because if you do not understand the question, the strategies do not work.” Thus several students reiterated the essential role of vocabulary knowledge to understanding subject matter content. Participant 4 also made the connection between culture and vocabulary learning explicit; in her exit interview, she referred to a class activity in which the Canadian municipal election system was related to microeconomics. This was largely a class on vocabulary learning (e.g. election, riding, partisan, etc.). She said, “This is the only class I can learn all the cultural differences in Canada.” These comments indicate that students clearly perceived the importance of strong vocabulary knowledge both to economics content and cultural understanding.

Student comments on the impact of explicit reading strategy instruction (e.g. predicting reading content and structure, skimming for main points, scanning for specific details, writing margin notes to summarize key points) indicated that students felt the instruction had reduced their reading times. This comment, from participant 6, indicates the student found the time required to complete the weekly readings was reduced over the course of the term.

I don't know exactly but improve my English skills definitely increase my economics skills Because at the beginning two pages of economics book would take me like an hour to read. Now, probably it is like half an hour.

For students who are always pressed for time, the reduction in time required to complete class readings is significant. And it is important to note that improved vocabulary knowledge also contributes to reducing reading times as students refer less frequently to dictionaries (either paper or online). Student's comments in their exit interviews indicated that they appreciated both

vocabulary and reading strategy instruction. All the participants expressed that they would recommend the tutorials to other students.

Conclusion

This paper reports student perceptions of the effectiveness of a pilot project that incorporated discipline-specific language instruction into the traditional method of course delivery in introductory economics. Without forgetting the data limitations and pilot nature of the EAL tutorial project, we hope that there are still some useful lessons to be learned from this innovative line of research as follows:

Students perceive that discipline-specific language instruction such as our ‘EAL for Economics’ tutorials can lead to the dual outcomes of increased content and language mastery. Students consider vocabulary development to be one of the most helpful activities of our EAL tutorials. Reading skills are also important but require more time and commitment to develop.

Our EAL tutorials attracted highly motivated students looking for even more academic achievement. Busy student schedules made it hard for more students to participate. Any policy to encourage more student participation (especially by the weaker students) must be formally initiated at the university level rather than by interested individual instructors.

Given the continued growth in international students in Canada, we recommend that more research be done in this area as we have only scratched the surface. However, it is important to keep in mind that this line of research is an expensive one in terms both time and resources. For example, while our project spanned two years, it took more than a year to clear research ethics review, conduct the preliminary language survey, develop our planning strategy, and prepare content-based tutorial materials and language tests. In particular, the EAL instructor has to have sufficient knowledge of both English and discipline-specific skills. That suggests that additional instructor training or co-teaching may be required, the availability of which are dependent on university resources.

This line of research is relevant to SoTL as it calls our attention to a growing segment of non-Anglophone international students in the traditional classroom framework. While SoTL research on the native Anglophone student group is still worth pursuing, it is important to recognize two new developments: (a) the global economic environment has changed which has given rise to the increasing enrolment of international students everywhere, and (b) the teaching and learning environment has also changed in the wake of the influx of international students. These changes in the economy and the classroom will eventually be catalysts for changes in SoTL.

References

- Belkhdja, C. & Esses, V. (2013). Knowledge synthesis: Improving the assessment of international students’ contribution to Canadian society. Pathways to Prosperity Partnership. Retrieved from <http://p2pcanada.ca/library/knowledge-synthesis-improving-the-assessment-of-international-students-contribution-to-canadian-society/>
- Chang, A. (2007). The impact of vocabulary preparation on L2 listening comprehension, confidence and strategy use. *System*, 35, 534-550.
<http://dx.doi.org/10.1016/j.system.2007.03.001>.

- Cobb, T. (2008). Commentary: Response to McQuillan and Krashen. *Language Learning & Technology*, 12, 109-114.
- Crandall, J., & Kaufman, D. (Eds.). (2002). *Content-based instruction in higher education settings*. Alexandria, VA: Teachers of English to Speakers of Other Languages (TESOL).
- de Winter, J. C. F. (2013). Using the Student's t-test with extremely small sample size. *Practical Assessment, Research & Evaluation*, 18(10). Available online <http://pareonline.net/getvn.asp?v=18&n=10>
- Deen, J., & Hacquebord, H. (2002). Content-based language teaching. In M. Bax (Ed.), *Reflections on language and language learning in honour of Arthur van Essen* (pp. 221-236). Philadelphia: John Benjamins Publishing Company. <http://dx.doi.org/10.1075/z.109.23dee>
- Engber, C. (1995). The relationship of lexical proficiency to the quality of ESL compositions. *Journal of Second Language Writing*, 4, 139-155. [http://dx.doi.org/10.1016/1060-3743\(95\)90004-7](http://dx.doi.org/10.1016/1060-3743(95)90004-7)
- Ferris, D. (1994). Lexical and syntactic features of ESL writing by students at different levels of L2 proficiency. *TESOL Quarterly*, 28, 414-420. <http://dx.doi.org/10.2307/3587446>
- Flesch, R. (1948). A new readability yardstick. *Journal of Applied Psychology*, 32, 221-233. <http://dx.doi.org/10.1037/h0057532>
- Grabe, W., & Stoller, F. L. (1997). Content-based instruction: research foundations. In M.A. Snow, & D.M. Brinton (Eds.), *The content-based classroom: perspectives on integrating language and content* (pp. 5-21). New York: Longman.
- International Optometric Bridging Program (IOBP). (2015). International optometric bridging program. Waterloo, Ontario: University of Waterloo. Retrieved from <http://www.optometry.uwaterloo.ca/international-optometric-bridging-program>
- James, M. A. (2006). Transfer of learning from a university content-based EAP course. *TESOL Quarterly* 40 (4), 783-806. <http://dx.doi.org/10.2307/40264308>
- Jappinen, A. K. (2005). Thinking and content learning of mathematics and science as cognitional development in content and language integrated learning (CLIL): Teaching through a foreign language in Finland. *Language and Education*, 19 (2), 148-169. <http://dx.doi.org/10.1080/09500780508668671>
- Joe, A. (1998). What effect do text-based tasks promoting generation have on incidental vocabulary acquisition? *Applied Linguistics*, 19, 357-377. <http://dx.doi.org/10.1093/applin/19.3.357>
- Kincaid, J. P., Fishburne, R. P., Rogers, R. L., & Chissom, B. S. (1975). *Derivation of new readability formulas (automated readability index, fog count, and Flesch reading ease formula) for Navy enlisted personnel*. Research branch report 8-75. Chief of Naval Technical Training: Naval Air Station Memphis.
- Marsh, D. (Ed.). (2002). *CLIL/EMILE – The European dimension: actions, trends and foresight potential*. Retrieved from http://ec.europa.eu/education/policies/lang/doc/david_marsh-report.pdf
- McMullen, K., & Elias, A. (2011). A changing portrait of international students in Canadian universities. Statistics Canada. Retrieved from <http://www.statcan.gc.ca/pub/81-004-x/2010006/article/11405-eng.htm>
- Official Languages and Bilingualism Institute (OLBI). (2015). Immersion courses. Ottawa, Ontario: University of Ottawa. Retrieved from <http://olbi.uottawa.ca/programs/register-credit-course/immersion-credit-courses>

- Parkin, M., & Bade, R. (2010). *Macroeconomics: Canada in the global environment* (7th Ed.). Toronto: Addison-Wesley.
- Parsons, G., & McMullen, K. (2009). Education Matters: Insights on Education, Learning and Training in Canada – Trends in University Graduation, 1992 to 2007. Statistics Canada. Retrieved from <http://www.statcan.gc.ca/pub/81-004-x/2009005/article/11050-eng.htm>
- Ready, D., & Wesche, M. (1992). “An evaluation of the University of Ottawa’s sheltered program: Language teaching strategies that work.” In R.J. Courchène, J. Gliden, J. St-John and C. Thérien (Eds.) *Comprehension-based second language teaching /L’enseignement des langues secondes axé sur la compréhension* (pp. 389-405). Second Language Institute, University of Ottawa.
- Snow, M. A. (1993). Discipline-based foreign language teaching: Implications from ESL/EFL. In M. Krueger & F. Ryan (Eds.), *Language and content: Discipline- and content-based approaches to language study*. Lexington, MA: D.C. Heath.
- Snow, M. A., & Brinton, D. M. (1988). Content-based language instruction: Investigating the effectiveness of the adjunct model. *TESOL Quarterly*, 22, 553-575.
<http://dx.doi.org/10.2307/3587256>
- Spack, R. (1997). The acquisition of academic literacy in a second language: A longitudinal case study. *Written Communication*, 14, 3-62.
- Statistics Canada (2008). University enrolment. (2008, February 7). *The Daily*. Retrieved from <http://www.statcan.gc.ca/daily-quotidien/080207/dq080207a-eng.htm>
- Statistics Canada (2013). Education indicators in Canada: An international perspective, 2013. Retrieved from <http://www.statcan.gc.ca/daily-quotidien/140107/dq140107b-eng.pdf>
- Stohler, U. (2006). The acquisition of knowledge in bilingual learning: An empirical study on the role of language in content learning. In C. Dalton-Puffer & T. Nikula (Eds.), *Current research on CLIL. A special issue of VIEWZ – Vienna English Working Papers*, 15(3). Retrieved from http://www.univie.ac.at/Anglistik/views15_3_clil_special.pdf
- Vogel, G. M. (2013). Language & cultural challenges facing business faculty in the ever-expanding global classroom. *Journal of Instructional Pedagogies*, 11, 1-32. Retrieved from <http://www.aabri.com/manuscripts/131491.pdf>
- Taillefer, G. (2009). EMILE a la canadienne: The french immersion program of the University of Ottawa. *Les Apres-Midi De LAIRDIL*, 15, 41-53. Retrieved from <http://search.proquest.com.proxy.lib.uwaterloo.ca/docview/85705449?accountid=14906>
- Wilkins, D. (1972). *Linguistics in language teaching*. London, England: Arnold.