

A Comparative Study of Physical Versus Online Classrooms: Co-Creation in Industry-Academia Collaborative Education

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ABSTRACT

As COVID-19 impacted international higher education, collaborative online international learning (COIL) spread globally. Nevertheless, evaluations of the effect of online education have been scant. This study aimed to investigate changes in students' entrepreneurial competencies and cross-cultural knowledge, skills, and abilities before and after a course, as well as differences between physical classroom and COIL approaches. The courses investigated were collaborative educational projects jointly run by four Canadian universities and one Japanese university with international partner companies and organizations. Participants attended a global career course at the University of Toronto in person in 2020 or virtually in 2021. The questionnaire survey consisted of five main themes: knowledge, problem-solving skills, communication skills, cross-cultural understanding and teamwork skills, and confidence and motivation. The surveys were administered before and after the course, and the results revealed statistically significant differences in all themes before and after the courses in 2020 and 2021. Students performed well in all five themes in both the physical-classroom and COIL approaches. Personal development through self-reflection and collaborative learning with peers, instructors, companies, and organizations fostered co-creation and created social value. Considering the budget for and accessibility of the courses, students' learning outcomes in COIL positively affected global career education.

Keywords: Entrepreneurship Education; Collaborative Learning; Collaborative Online International Learning (COIL); Co-creation.

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1. INTRODUCTION

The demand for entrepreneurship in international businesses is increasing worldwide. Today, universities face the challenge of providing academic opportunities for collaborative learning through technology. The COVID-19 pandemic has impacted international higher education, especially regarding the mobility of students and faculty,

and teaching, learning, and experimental research have shifted to a dependence on technology (Obadire *et al.*, 2020). Globally, distance learning via virtual classrooms and collaborative online international learning (COIL) has accelerated. Faculty and students have faced the challenge of adjusting to online teaching and learning, and faculty members must ensure the quality of education, including meaningful engagement with and between students and the provision of interactive activities (Mishra *et al.*, 2020; Neuwirth *et al.*, 2020).

Universities provide both offline and online international business courses with companies, organizations, or other universities to inculcate entrepreneurial thinking and enhance opportunities for students' global careers. The effectiveness of these courses is of interest to researchers, even though some acknowledge difficulties in evaluating students' responses to various teaching styles (Henry *et al.*, 2005b). Entrepreneurship education has become widespread among higher education institutions since the rise in demand for business creation and expansion in the international market (Kuratko, 2005). Mwasalwiba (2010, p. 23) categorizes the entrepreneurship education framework as 1) definitions; 2) specific learning objectives; 3) type of program, target groups, course contents, and outreach projects; 4) teaching methods; and 5) evaluations and impact assessment methods and the results from specific objectives. Entrepreneurship education is designed to develop an individual's abilities in the value-creation process (European Commission, 2008). Value creation occurs when people support each other in meaningful, engaging, and satisfactory ways (Baumeister *et al.*, 2013). Glăveanu (2010) demonstrated that collaborative learning in entrepreneurship education moved the emphasis from "I" to "we." Hence, entrepreneurship programs often include team-based projects (Man and Farquharson, 2015). These team-based projects require business knowledge and skills such as marketing, finance, and management, and they entail collaboration with team members.

Collaborative learning differs from traditional one-way knowledge transfer (Harasim, 1990), as students interact in small groups or project-based teams. Improving students' involvement, problem-solving, and communication skills is a major advantage of collaborative learning (Yazici, 2005). Vygotsky (1978, p. 86) suggested that development through problem-solving is required under expert guidance or in collaboration with more capable classmates in a zone of proximal development (ZPD). Harland (2003) mentioned that ZPD enhanced teaching and learning in a collaborative problem-solving course in his action research. Students learn that an environment of equality, student autonomy, and trust turn mistakes into opportunities for a more critical approach to learning. De León (2012) explained the strong relationship between Vygotsky's zone of proximal development and Bruner's scaffolding. Bruner (1986) conceptualized Vygotsky's theoretical framework and proposed scaffolding as a method for guiding students to make students self-sufficient.

Students today are expected “to (a) know how to learn, (b) access changing information, (c) apply what is learned, and (d) address complex real-world problems in order to be successful” (Larkin, 2002, pp. 1–2). Learning in groups allows students to grow with the help of their classmates’ strengths (Waters-Hasler and Napier, 2002) while testing their own abilities in a safe, educational environment. Successful teamwork in higher education courses involves collaboration (Riebe *et al.*, 2010; Scott-Ladd and Chan, 2008; Yazici, 2005). However, teams might not be successful if individual student performance is low or if a group has many free riders (Brooks and Ammons, 2003; Siciliano, 2001).

Entrepreneurship education in collaborative learning may also include a practical component. Purbasari *et al.* (2020) and Yasuoka *et al.* (2018) indicated that collaboration between universities and companies or organizations is important. Industries and academia cooperate in various aspects of practical training. Due to globalization and technological progress, international collaboration has expanded worldwide.

1.1 Collaborative online international learning (COIL)

Knight (2003) stated that international education includes transnational, borderless, and cross-border education in the 21st century. The term collaborative online international learning (COIL) was coined in 2006 to describe broader university engagement. The COIL projects were a collaboration among universities with different educational mandates, course designs, teaching styles, assessments, academic calendars, and time zones. COIL allows students to study abroad without the necessity of significant financial or time investments while helping students prepare for their global careers (Rubin, 2017).

Benbunan-Fich, Hiltz, and Harasim (2010) developed a dynamic model for online interactive learning theory (Figure 1) and demonstrated that the input factors of technology, students, instructors, and courses (Barron and Kenny, 1986) influence individual and collaborative learning. The learning experience quality relates to three learning stages: idea generation, idea organization, and intellectual convergence, which include group engagements based on shared thoughts. The output is measured through accessibility, faculty satisfaction, student learning and satisfaction, and cost-effectiveness (Benbunan-Fich, Hiltz, and Harasim, 2010). Subsequently, for the development of COIL, universities should technologically and educationally support professors and students with administrative and faculty training (Rubin, 2017).

The State University of the New York introduced COIL in 2010. According to data of 650 students at this COIL institute, the average class size was 16, and the most used language to facilitate collaboration was English. Classes lasted a semester or part of a semester. Email, Facebook, and Blackboard were used as asynchronous tools, whereas Skype, Facebook, Google Chat, or Hangout were used as synchronous tools. Such approach

allows instructors and students from diverse backgrounds to communicate and collaborate remotely. COIL supports cross-cultural communication and students' academic and personal engagement with a global network of classmates. Additionally, it can include a wide range of subjects, such as human societies, media arts and cultures, language and literature, and international studies (Guth, 2013).

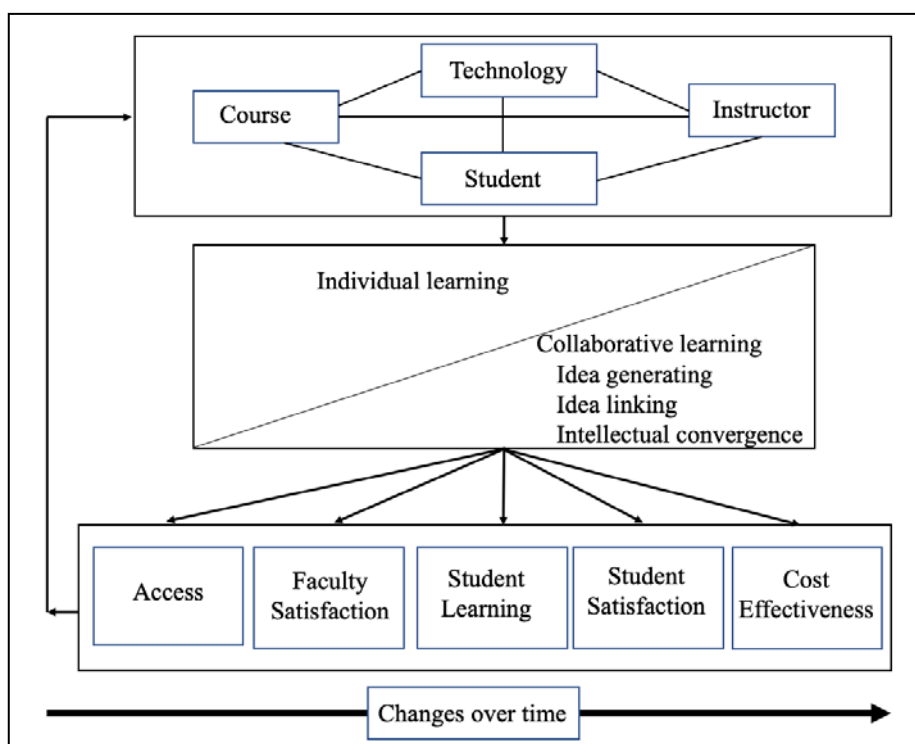


Figure 1. Dynamic model for online interactive learning theory.

Source: Benbunan-Fich, Hiltz, and Harasim (2010, p. 34).

1.2 The effects of collaborative learning

Nabi *et al.* (2017) demonstrated the improvement of knowledge and skills in the entrepreneurial abilities of students in higher education. Inada (2018a) examined the effects of entrepreneurial competency (knowledge, skills, and attitudes) in entrepreneurship education with diversified students. The results revealed statistically significant differences in skills and attitudes before and after the entrepreneurship program. However, there was no significant difference in knowledge gained. Inada (2019a, 2020a, 2022) also demonstrated an improvement in students' career development after the entrepreneurship course.

COIL enables student-to-student interactions that affect positive learning outcomes (McInnerney and Roberts, 2009). Some researchers used courses with students from the US and Ghana (Appiah-Kubi and Annan, 2020) and the US, Lithuania, and Russia

(Kayumova and Sadykova, 2016) to emphasize the significant effectiveness of COIL courses compared to non-COIL courses. COIL teams performed significantly better on project work than the non-COIL teams. Collaboration brings together diverse ideas from different perspectives, even though students must work around cultural and language barriers and time zone differences (Appiah-Kubi and Annan, 2020). Kayumova and Sadykova (2016) also demonstrated that students learn about their peers' diverse cultural and educational backgrounds, communication styles, learning strategies, and interactions in a successful learning experience.

Furthermore, Ramírez (2020) demonstrated that in a COIL project for students from Mexico and the US, half of the US-based students stated that the project positively affected their peers, whereas the Mexico-based students reported that the project was a negative experience due to schedule conflicts, unfamiliar topics, and their expectations of traditional teacher-based learning instead of facilitator interactions. Similarly, Zhou *et al.* (2008) found that US students expected instructors as facilitators who respect students' autonomy, whereas Chinese students expected instructors as authority figures in a classroom. Gray *et al.* (2021) emphasized the importance of pedagogy, technology, and cross-cultural training. Additionally, COIL should include carefully planned content, activities, online communication tools, and project deadlines. Although synchrony is difficult due to time differences, it is beneficial for students to better engage with peers and professors.

1.3 Collaborative learning in entrepreneurship education in Japan

After the US and Europe, Asia leads in entrepreneurship education and research (Mwasalwiba, 2010). A survey¹ by the Ministry of Education, Culture, Sports, Science and Technology (MEXT; 2021) demonstrated that approximately 27% of 598 Japanese private and public universities offer entrepreneurship courses. Most of these courses focus on training in management strategy, marketing, idea generation, managing growth, organization, design thinking, and business plan creation. The teaching method comprises mainly lectures, and only 7% of all entrepreneurship programs have practical courses. MEXT highlighted a lack of curricula, faculty members, supporters, and budgets for entrepreneurship education. Furthermore, MEXT has encouraged research on the effects of entrepreneurship education, which will help in data accumulation on successful cases in

¹ From January to March 2021, MEXT sent the survey to 1,007 private and public universities, including junior colleges. A total of 598 institutions responded, with a response rate of 59.4%. See: https://www.mext.go.jp/content/20210728-mxt_sanchi01-000017123_1.pdf

Japan. The Ministry of Economy, Trade and Industry (2018)² mentioned the qualities that industries expect from university student graduates, such as communication and problem-solving skills, autonomy, vitality, teamwork, cooperation, and the ability to discover opportunities.

Inada (2019a) examined the effects of entrepreneurial competency (knowledge, skills, and attitudes) in entrepreneurship education in Japan. The results revealed statistically significant differences in students' knowledge, skills, and attitudes before and after the entrepreneurship program. The program also developed entrepreneurial thinking to contribute to society and future careers. Inada (2018b, 2020b) demonstrated that the students were involved, cared for and trusted each other, and communicated well in successfully managing teams with diverse members. However, the reception of the sessions, entrepreneurial aspirations, and course objectives differed by nationality.

Moreover, Inada (2021, 2022) suggested the importance of collaborative learning and program design in higher education in Japan, and Helms (2003) pointed out that the Japanese prefer "fit in" and work in groups without a lack of "thinking big" and creativity. Nevertheless, Sorenson (2000) suggested that Japanese society is gradually changing its mind about entrepreneurship. In light of this issue, the Japanese government is introducing educational reform in an attempt to cultivate creativity, personal initiative, and entrepreneurial spirit to change the traditional educational system (Muta, 2000). It also encourages entrepreneurship to foster students as global citizens.

Although many researchers have recognized the importance of assessing the effects of entrepreneurship education (Gibb, 1987; Henry *et al.*, 2005a; Pittaway and Cope, 2007), research on this topic is scant (Cox *et al.*, 2002; European Commission, 2012). Kakouris (2018) proposed utilizing an ability, support, knowledge, and opportunity-based framework to measure entrepreneurial conceptualizations for different courses or to determine pre-post course outcomes. Lejk and Wyvill (2001) insisted on the need for an in-depth understanding of how entrepreneurship education contributes to students' entrepreneurial behaviors and inspires students to pursue careers in entrepreneurship. Villar-Onrubia and Rajpal (2016) and Ramírez (2020) stated that empirical data on learning outcomes in online courses are still under development. Additionally, it is important to understand how COVID-19 has impacted higher education and whether online education has the same impact on students' learning for the sake of educating global citizens. Subsequently, clarity is needed on the effects of non-COIL and COIL entrepreneurial education.

² For a report on strengthening human resources in Japanese industry by the Ministry of Economy, Trade and Industry, see https://www.meti.go.jp/report/whitepaper/data/pdf/20180319001_1.pdf.

1.4 Research purpose and hypotheses

From the research gaps identified above, this study investigates the changes in students' entrepreneurial competencies and cross-cultural knowledge, skills, and abilities before and after global career courses. We also examined the differences between the physical classroom (non-COIL) and COIL approaches. The study was based on three hypotheses:

Hypothesis 1. The global career course in 2020 using the physical classroom approach will improve students' entrepreneurial competencies and cross-cultural knowledge, skills, and abilities.

Hypothesis 2. The global career course in 2021 using the COIL approach will improve students' entrepreneurial competencies and cross-cultural knowledge, skills, and abilities.

Hypothesis 3. The COIL approach does not create differences in students' entrepreneurial competencies and cross-cultural knowledge, skills, and abilities compared to the classroom (non-COIL) approach.

2. METHODS

The research was designed as a case study involving students in a global career course who had experienced the physical and COIL versions of the course. The course aims to enable students to identify and discuss global problems from various perspectives and create business plans to address these problems. The purpose is to support students in becoming global citizens and leaders who can contribute to growth and sustainability in a world with cross-cultural understanding and communication skills. The course is a collaborative educational project jointly run by Canadian (King's University College at Western University, Mount Allison University, Queen's University, University of Toronto) and Japanese universities (Kwansei Gakuin University [KGU]) and international partner companies and organizations. The partner companies and organizations include Air Canada, the Asia Pacific Foundation of Canada, Ernest & Young, Kubota Canada, Manulife, the Japan Foundation Toronto, Toyota Canada, Uniqlo Canada, Venture for Canada in 2020, and Ernest & Young, Ricoh, and Toyota Canada in 2021. The partner entities provided assignments that they wanted to tackle concerning issues that arose within their organizations. In 2020, the assignments were related to Japanese and Canadian market research, comparative climate policies, value at work, digital marketing, brand awareness, customer interest, mobility leaders, concept development for life and based on values, and training programs; in 2021, they were related to diversity and inclusion, new programs, and virtual mentoring and coaching in a post-COVID-19 world. Additionally, KGU and the Canadian universities marked the 110th anniversary of their historical relationship and the 10th anniversary of the collaborative cross-cultural exchange program in 2020.

Both the 2020 and 2021 courses were divided into two parts: an online individual lecture series and a collaborative series. In the first part, students gained basic knowledge of the business framework via online lectures. The course introduced contemporary business frameworks and topics, and it provided students with opportunities to analyze and find practical solutions for specific business issues, which were provided by representatives from the companies and organizations in collaboration with people from divergent backgrounds using online platforms. In the second part, the students spent a week with their peers, met representatives, asked questions, and received feedback. After a final presentation, the students received feedback aimed at helping them develop solutions. All discussions were conducted in English.

The main difference between the 2020 and 2021 courses was the number of students and the content of the courses. Students were divided into groups of five or six members in 2020 and groups of seven to eight members in 2021. The online individual lecture portion of the 2020 course included a variety of topics, including human resource management, governance, marketing, business culture, and entrepreneurship, which several professors taught. The 2021 course entailed assignments created by companies and organizations and focused on business design and creating a business plan, which was implemented during the collaborative portion of the course. There were 27 sessions in 2020 and 24 in 2021; the sessions lasted from November to February. In 2020, students from KGU in Japan and three Canadian universities visited the University of Toronto. Students lived with their peers and worked with partner companies and organizations. In 2021, all students attended the intensive online synchronous and asynchronous seminar sessions, worked on a group project with students from other participating universities, and presented their final group findings to the representatives of companies and organizations via Zoom. In the collaborative portion, the classes were synchronous, so the Japanese university students and instructors had early morning courses, and the Canadian students had evening courses.

1.5 Sample

Forty-six students participated in the course in 2020 and 45 in 2021. Consent was obtained from all participants before the course, and all participants took the survey before and after the course. Six students were excluded because of a missing value in 2021. The total number of survey participants was 46 students (23 students from Canadian universities and 23 from KGU) in 2020 and 39 students (18 students from Canadian universities and 21 from KGU) in 2021. Female participants comprised 70% and 72% of the 2020 and 2021 samples, respectively. Approximately 35% and 20% of all students belonged to business-related streams (commerce, economics, and management) in 2020 and 2021, respectively.

The remaining students were from law and politics, humanities, international studies, human welfare studies, and policy studies disciplines. All students submitted the application form and a short essay as part of their applications. The students from KGU required a certain level of English language proficiency, for example, IELTS 5.5. Each student was also interviewed by an instructor and had to participate in a group discussion. Participants had English language proficiency levels ranging from upper-intermediate to native speakers.

1.6 Processing methods

To measure the impact of entrepreneurship education, Jack and Anderson (1998) suggested comparing differences in pre- and post-course measurements. In this study, participant responses to the survey questionnaire were used as the pre- and post-course measures. The questionnaire was based on five elements of entrepreneurial competencies and cross-cultural management. There were 28 items related to the five main categories. The five main themes were knowledge, problem-solving skills, communication skills, cross-cultural understanding and teamwork skills, and confidence and motivation, as arranged by the Japan Student Service Organization. The participants used a five-point Likert scale to indicate the extent to which they agreed or disagreed. The response values ranged from 1 (strongly disagree) to 5 (strongly agree), whereas 3 (neither disagree nor agree) indicated indecision. After the course, the students commented on the five elements in the survey. An instructor explained the purpose of the survey in the first and last sessions and explained that participation was voluntary, personal information would be kept confidential, and participants' responses would not affect their grades. In both 2020 and 2021, pre- and post-course data were collected in November and February respectively (before and after the global career course); SPSS (version 27) was used for data analysis.

1.7 Cronbach's alpha

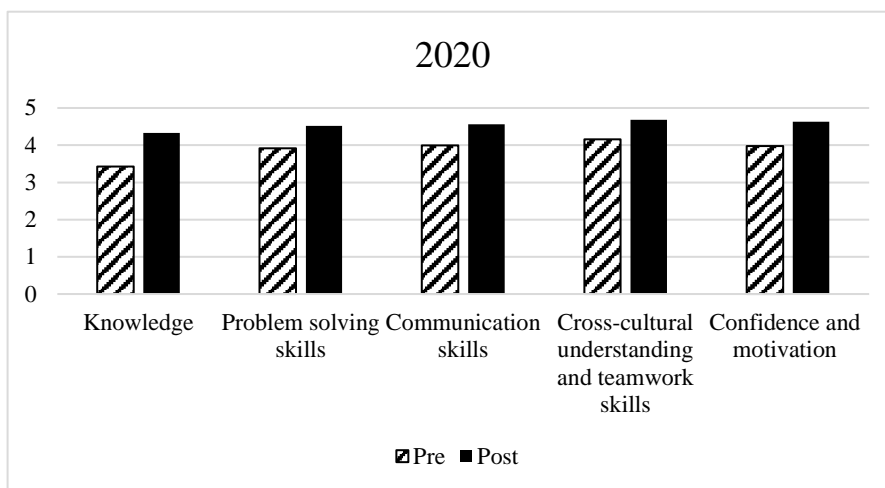
Table 1 illustrates Cronbach's alpha for knowledge (8 items), problems solving skills (4 items), communication skills (5 items), cross-cultural understanding and teamwork skills (6 items), and confidence and motivation (5 items) before and after the global career seminar courses in 2020 and 2021. For the confidence factor, Murase *et al.* (2007) prefer 0.8 or more as a measure for practical use, but in social sciences and individual survey data, 0.7 or more is considered good internal consistency. In this study, Cronbach's alpha ranged from 0.7 to 1.0 and was acceptable.

Table 1: Cronbach’s alpha for knowledge, problem-solving skills, communication skills, cross-cultural understanding and teamwork skills, and confidence and motivation

	2020		2021	
	Pre	Post	Pre	Post
Knowledge	0.7	0.9	0.7	0.8
Problem-solving skills	0.8	0.8	0.8	0.8
Communication skills	0.9	0.9	0.8	0.9
Cross-cultural understanding and teamwork skills	0.9	0.8	0.9	0.9
Confidence and motivation	0.9	0.8	0.9	1.0

3. RESULTS

To test the hypotheses related to the effect of entrepreneurial competencies and cross-cultural management, t-tests were used to compare the mean values of the measures of the five themes before and after the global career course. Additionally, non-COIL courses and COIL courses were compared. The statistical tests of pre-post results indicated that the global career course positively affected students’ knowledge, problem-solving skills, communication skills, cross-cultural understanding and teamwork skills, and confidence and motivation in 2020 and 2021 (Figure 2).



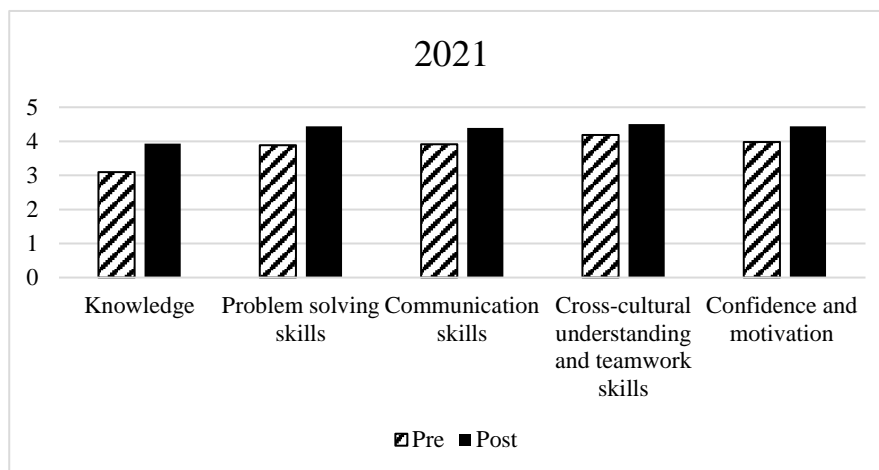


Figure 2. The impact of knowledge, problem-solving skills, communication skills, cross-cultural understanding and teamwork skills, and confidence and motivation before and after the global career courses

The statistical results for 2020 and 2021 are presented in Table 2. The differences between the pre- and post-results in 2020 included knowledge ($t(45) = -9.38, p < .01$), problem-solving skills ($t(45) = -6.63, p < .01$), communication skills ($t(45) = -6.08, p < .01$), cross-cultural understanding and teamwork skills ($t(45) = -5.32, p < .01$), and confidence and motivation ($t(45) = -6.41, p < .01$).

The differences between the pre- and post-results in 2021 included knowledge ($t(38) = -7.59, p < .01$), problem-solving skills ($t(38) = -4.98, p < .01$), communication skills ($t(38) = -4.65, p < .01$), cross-cultural understanding and teamwork skills ($t(38) = -3.49, p < .01$), and confidence and motivation ($t(38) = -4.79, p < .01$). There seemed to be a significant positive impact on knowledge, problem-solving skills, communication skills, cross-cultural understanding and teamwork skills, and confidence and motivation between pre- and post-course ratings in 2020 and 2021.

The effect size represents an index of the effects of experimental manipulation or the strength of association between variables (Field and Hole, 2003, p. 152). According to Shiba and Haebara (1990), the effect size is an independent indicator of measurement differences. Therefore, it is important to mention effect sizes in addition to t-tests, as they merely detect the presence or absence of statistically significant differences in group averages. The effect sizes range from 0 to 1. Mizumoto and Takeuchi (2008) mention that 0.1 is considered a small effect, 0.3 a medium effect, and 0.5 a large effect. The American Psychological Association (2010, p. 34) suggested reporting effect sizes regardless of the mean test significance, and the effect sizes for the five themes were above 0.5 in 2020 and 2021.

Table 2: Pre- and post-course mean scores in 2020 and 2021

	2020						2021					
	Pre		Post		Pre-Post		Pre		Post		Pre-Post	
	M	SD	M	SD	C	ES	M	SD	M	SD	C	ES
K	3.43	0.57	4.33	0.55	-0.90*	0.8	3.10	0.64	3.93	0.62	-0.83*	0.8
P	3.92	0.61	4.52	0.55	-0.60*	0.7	3.89	0.68	4.44	0.58	-0.55*	0.6
C	3.99	0.70	4.56	0.56	-0.57*	0.7	3.91	0.65	4.39	0.69	-0.48*	0.6
CT	4.16	0.71	4.68	0.39	-0.52*	0.6	4.19	0.64	4.51	0.66	-0.32*	0.5
CM	3.98	0.70	4.63	0.42	-0.65*	0.7	3.98	0.76	4.44	0.78	-0.46*	0.6

Notes: * $p < .01$ M: Mean, SD: Standard Deviation, C: Changes, ES: Effect size.

K: Knowledge, P: Problem-solving skills, C: Communication skills, CT: Cross-cultural understanding and Teamwork skills, CM: Confidence and Motivation.

4. DISCUSSION

This study examined the impact of a course on students' entrepreneurial competencies and cross-cultural knowledge, skills, and abilities in international collaborative learning. The course involved four Canadian universities, one Japanese university, and host companies and organizations. The statistical tests of pre-post results indicated that the global career course positively affected students' knowledge, problem-solving skills, communication skills, cross-cultural understanding and teamwork skills, and confidence and motivation in 2020 and 2021. Furthermore, all main themes had a significantly positive difference in the pre-post course and had a large effect size above 0.5 in 2020 and 2021. Therefore, Hypotheses 1 and 2 are supported, which is largely consistent with previous research (Nabi *et al.*, 2017; Inada, 2018a, 2018b, 2019b, 2019c; Riebe *et al.*, 2010; Scott-Ladd and Chan, 2008; Yazici, 2005; McInnerney and Roberts, 2009; Appiah-Kubi and Annan, 2020; Kayumova and Sadykova, 2016).

Knowledge in 2020 and 2021 had the highest positive differences, including the effect size. The global career course is unique because it includes the participation of companies and organizations and incorporates suggestions from their representatives. Furthermore, most students were not majoring in business yet were able to bridge the knowledge gap. Students' comments in the knowledge section included "Leadership, entrepreneurship, in-depth knowledge of digital marketing, human resource skills," "I learned more about industry practices, corporate social responsibility, and international business," and "It was a great chance to think about how university students can contribute to companies and society." In terms of problem-solving skills, students from Canada and Japanese

universities discussed ideas and improved them with peers' feedback. They said, "Active communication was utilized to solve problems and work effectively," and "I could persuade classmates with data and sources." Most students had positive voices, and some could improve their business planning skills.

To improve communication skills, students from Canadian universities assisted Japanese students who were non-native speakers, helped them communicate effectively, and ensured that everyone was on the same page in the project. The Canadian students commented: "I challenged myself to practice better communication skills and rephrase sentences" and "I create a comfortable environment for Japanese to speak their opinions." Japanese students also made efforts to communicate with students from Canadian universities. For example, one student from a Japanese university mentioned, "To respond to Canadians' efforts, I tried my best to convey my thoughts in English."

For cross-cultural understanding and teamwork skills, students from the Canadian universities noticed Japanese students' shy personalities, learned active listening, and found common things. Students from a Canadian university stated, "I learned that it is very important to listen"; "I understand that Japanese people are respectful, and so they are often too shy to speak up"; "Working together, we realized that we have very similar interests and ideas. Even though we may not have the same culture, our styles of critical thinking were very alike"; and "I can now properly adjust to new environments and face unforeseen challenges, such as working online across many time zones."

The Japanese students also listened carefully, proactively insisted on their opinions, and learned trust. Students mentioned the importance of eating together after discussions in 2020 and managing time differences in 2021, especially as it seemed to take more time to establish camaraderie in 2021. In 2021, some Japanese students commented, "With limited time and in different time zones, we learned how to organize divided tasks. I finished my part at a certain time and passed it on to my Canadian peers and back and forth. I realized the importance of trust in completing a project"; and "It is important to provide an honest opinion." These statements demonstrate that team-building activities might be more necessary for COIL courses than non-COIL courses.

In terms of confidence and motivation, many Canadian team members highlighted the improvement in public speaking and its role in confidence-building in 2020 and their online presentation skills in 2021. Comments from the students included, "This class really pushed me to be a better public speaker and present with confidence"; and "The positive comments from the professor boosted my confidence and self-worth for future group projects and presentations as well." Some Japanese students overcame difficulties in English and gained confidence for their global careers through collaborative learning. They mentioned, "I was worried about discussions in English, but I was confident enough to overcome the project's

difficulties with the Canadian students' support"; "I realized that it was more important to share content and the willingness to participate in the project"; "The project can serve as a possible global career in the future"; and "I am in the job-hunting process, and during the course, I became confident to being working at the company because I gained knowledge of business and culture and representatives praised our business plan."

Furthermore, the COIL approach did not present any differences in students' trajectories compared to the classroom (non-COIL) approach, supporting Hypothesis 3. More flipped teaching was used in the COIL approach, and students received a solid grounding in SWOT analyses and proposing a business plan in the individual learning sessions. They researched the companies, analyzed them, and proposed business plans. Before the collaborative session began, all the students had ideas about the tasks given by the host companies or organizations. With preparation, the student expanded their knowledge and gained broader perspectives through collaboration.

Similar to Yazici's (2005) student involvement, problem-solving, and communication skills in collaborative learning; Vygotsky's (1978) zone of proximal development; and Bruner's (1986) scaffolding, in this study, the students received guidance and assistance from lecturers (via their lectures), representatives of companies and organizations, and other students in this study. Peer feedback, lectures, and partner companies or organizations' supervision or mentoring helped the students develop cultural and social business perspectives. This demonstrates that both individual and collaborative learning is important. Overall, the professors in charge of the courses and the host companies and organizations also praised the students' proposals.

Also, students were encouraged to be part of the classroom Facebook group and introduced themselves and shared their interests before starting the collaborative session. As suggested by Appiah-Kubi and Annan (2020), who considered cultural and language barriers and how to work around different time zones, some students solved such difficulties using technology. Even though students are separated by the time difference between Canada and Japan, synchronous sessions feel similar to the physical classroom. Such interactive and ice-breaker activities might help to build camaraderie between classmates and team members during collaborative learning in a safer environment. If all collaboration sessions are asynchronous, the results might not be positive.

Entrepreneurship education could include a practical component for facilitating work in actual business markets. As Yasuoka *et al.* (2018) mentioned, industry-academia collaborative education in practical training is important for students' academic and practical development. The courses in this study proved to be significantly positive; they also presented some challenges for the future. After tackling social issues in these fields, students are not afraid to express their opinions and share their business ideas. They utilize

entrepreneurial thinking to solve problems. Co-creation with students, faculty, learning assistants, and companies or organizations is significant in the entrepreneurial and cross-cultural management and practical learning experience in global career courses (Figure 3). In these courses, students are made aware of the values of diversity, leadership, trust, cooperation, active listening, failure, and self-improvement. Personal development through self-reflection and feedback from team members leads to higher co-creation with collaborators. Students voluntarily challenge themselves through co-creation with universities, companies, and organizations in collaborative learning. Along with these stakeholders, students' individual and team progress creates value in society. The preparation of courses with four Canadian universities and host companies and organizations requires a well-structured course design based on ample discussions. However, students could benefit from the courses for improving entrepreneurial and cross-cultural management competencies and expanding their opportunities for future careers in global business. As their horizons expand, they can become global citizens and strive for a better society.

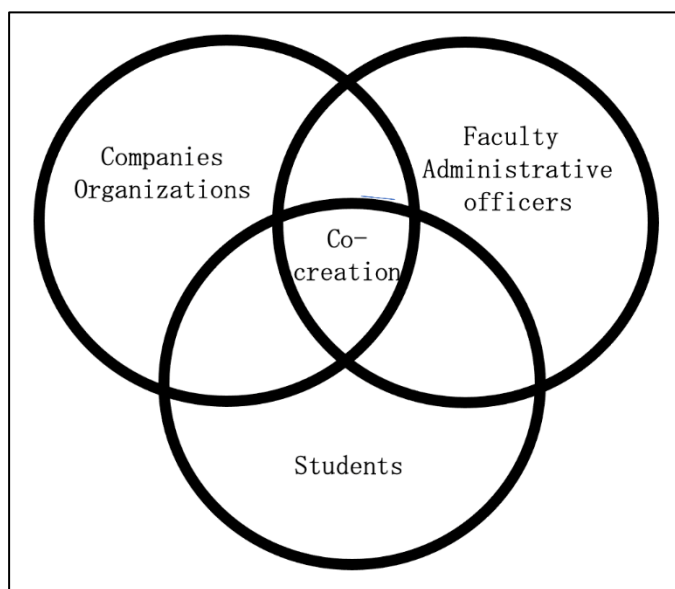


Figure 3. Diagram of co-creation

The main limitation of this study is its lack of generalizability because of the limited sample size. Therefore, researchers are encouraged to analyze students' entrepreneurial competencies in larger and more representative samples in different settings. Furthermore, qualitative and longitudinal research on the effectiveness of global career courses should be considered in future studies.

5. CONCLUSION

This study explored the impact of entrepreneurial and cross-management competencies in a sample of students from four Canadian universities and one Japanese university with partner companies and organizations. Pre-post data analysis demonstrates the students' development in knowledge, problem-solving skills; communication skills; cross-cultural understanding, teamwork skills, confidence, and motivation in the physical classroom in 2020 and COIL in 2021 in a global career course using pre-post data. The effect size indicated a positive change in the five main themes. Students' knowledge, especially regarding industry and international business; idea generation and problem-solving; and confidence to undertake challenging projects, improved considerably. Even with the bottlenecks of language and cultural barriers, academic differences in 2020 and 2021, and time differences in 2021, the students paid attention to these differences and scaffolded each other to create a relationship of trust gradually. The findings demonstrate that COIL has a significantly positive impact on academic and practical development. However, it needs to be developed in a friendly atmosphere that includes feedback from peers, instructors, and representatives of host companies and organizations to avoid the problems of the lack of face-to-face approaches on online platforms. In terms of practical implications, effective program design and mixed methods in the on-demand individual learning sessions in the first part and collaborative learning in the second part enhance individual and team performances. Furthermore, industry-academia collaborations and practical learning foster co-creation and enhance students' academic and career development to make them global citizens.

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