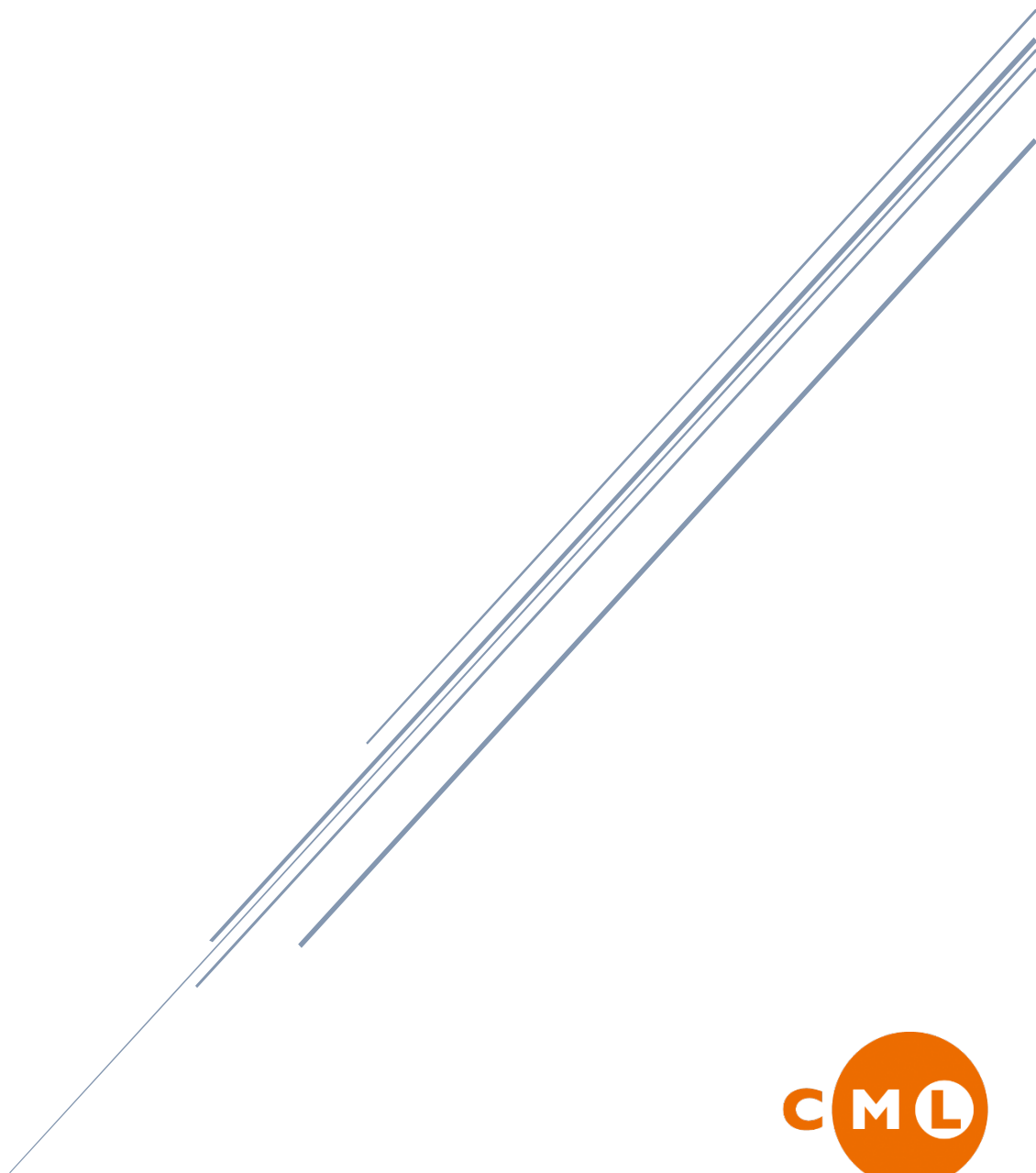


2021年度公立はこだて未来大学 メタ学習センター活動報告

Future University Hakodate Center for Meta-Learning
Report 2021 - 2022



メタ学習センター
Center for Meta-Learning

Think reflectively. Act collaboratively. Design the future.

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1. メタ学習センターについて
Basic Information of the Center for Meta-Learning

1-1. 設置目的/Aims of CML

※平成 20 年公立大学法人公立はこだて未来大学規程第 30 号「メタ学習センター規程」より

* Regulations of the Center for Meta-Learning at Future University Hakodate/Act No.30 of 2008

「目的(第 2 条)」/Aims of CML is to advance (Article 2)

センターは、情報技術分野の専門教育の基礎として、大学における学習方法の教育を主たる目的とし、特に総合的なコミュニケーションの能力および幅広い教養と多角的な視点から物事を判断する能力の養成を中心として、将来にわたり持続的に発展していく社会に資する人材を輩出するための活動を実施する。

Future University's strategic education and learning within the professional and academic disciplines of Information Technology. Through educational programs, CML will foster students' communication ability and thinking through a wide range of Liberal Arts subjects offering multilateral points of view. Our goal is to develop human resources who will continually contribute to developing society in the future.

「業務(第 3 条)」/Initial Roles of CML (Article 3)

(1) リベラル・アーツ教育のカリキュラム開発および実施の企画

Supervising curriculum of Liberal Arts and Communication and feedback to Faculty who teach the class

(2) 新入生の導入教育の企画

Planning introductory education

(3) FD(教育・研究・運営に関する人材育成および組織改革)の企画

Planning faculty development

(4) 教育研究、学習研究に関わること

Matters relating to research of teaching and learning

(5) 大学の教育活動を中心とした建学理念の教員や職員との共有化に関わること

Matters relating to sharing FUN educational philosophy with faculty and staff

(6) その他、未来大学における教育、学習活動に関わること

Miscellaneous matters relating to activities of teaching and learning at FUN

1-2. 沿革 /History

2007 年 CML 準備委員会発足/Preparatory committee for organizing CML started

2008 年 CML 設置(センター長 美馬のゆり教授)/CML started (Chair of CML Prof. Noyuri Mima)

2011 年 CML 専任教員の雇用開始/Employment of full-time faculty for CML started

2012 年度～2013 年度 センター長 片桐恭弘教授/Chair of CML Prof. Yasuhiro Katagiri

2014 年度～2015 年度 センター長 マイケル・ヴァランス教授/Chair of CML Prof. Michael Vallance

2016 年度～2017 年度 センター長 平田圭二教授/Chair of CML Prof. Keiji Hirata

2018 年度～センター長 富永敦子教授/Chair of CML Prof. Atsuko Tominaga

1-3. 2021 年度委員会メンバー/2021 Committee Members

所属(コース) Department (Course)	氏名 Name
センター長 Chair of CML 2018-21	富永 敦子教授 Atsuko Tominaga (Professor)
メタ学習センター Center for Meta-Learning	リヴァーズ ダミアン教授 Damian Rivers (Professor)
	宮本 エジソン 正教授 Edson T. Miyamoto (Professor)
	スミス アダム准教授 Adam Smith (Associate professor)
	中村 美智子准教授 Michiko Nakamura (Associate professor)
	辻 義人准教授 Yoshihito Tsuji (Associate professor)
コミュニケーショングループ Communication group	ヴァランス マイケル教授 Michael Vallance (Professor)
	ジョンソン アンドリュー准教授 Andrew Johnson (Associate professor)
	ルースベン・スチュアート ピーター准教授 Peter Ruthven-Stuart (Associate professor)
情報システムコース Information Systems	伊藤 恵准教授 Kei Ito (Associate professor)
複雑系コース Complex Systems	三上 貞芳教授 Sadayoshi Mikami (Professor)
	鈴木 昭二教授 Shoji Suzuki (Professor)
	田中 吉太郎准教授 Yoshitaro Tanaka (Associate professor)
CML 委員会庶務 CML Committee Admin	事務局教務課 Department of Education Affairs
CML コーディネーター CML Coordinator	渡邊 紀子 Noriko Watanabe

2. 2021 年度 CML 活動報告
CML Activity Report on AY2021

2-1. Foundation for Meta-Learning

2-1-1. Meta-Learning Lab

1. Program description

The Meta Learning Lab (hereafter, “the MLL”) is a learning support system outside of core courses that aims to raise the basic academic skills of the university’s students and to improve their knowledge and behavior regarding study habits and learning strategies. In AY2021, the MLL had 15 peer tutors (6 out of 15 are newly hired), including both undergraduate and graduate students, who supported independent learning in basic subjects centered on the core courses taken in the first and second years.

MLL has been certified as a Public Assistance Administrator of “International Tutor Training Program Certification Level 1” running by CRLA since 2015 for guarantee the quality of tutoring and to encourage self-development of tutors. MLL certifies Level 1 of CRLA/ITTPC to tutors who meet the requirements.

Twelve tutors were certified as Level1 of CRLA/ITTPC in past years. In AY2021, 3 tutors were certified.

2. Overview of AY2021 activity and Outcomes

(1) Implementation period and number of consultation sessions

In AY2021, there were 117 consultation sessions. Looking at the rate of usage by discipline, programming students took the highest proportion, 69% (81 sessions), followed by math students at 18% (21 sessions).

Table 1 Number of consultation sessions per academic term and number of peer tutors

	Implementation period	No. of possible sessions per week	Total no. of sessions	Number of peer tutors
First semester	13 April 2021-27 July 2021	33 sessions/week	117	14 (M2: 0, M1: 5, B4: 4, B3: 4, B2: 1)
Second semester	4 October 2021-21 January 2022	39 sessions/week	10	13 (M2:0, M1:3, B4:2, B3:5, B2:2, B1:1)

(2) User satisfaction levels

Questionnaires were not completed for one consultation, but responses from the remaining 116 sessions were collated (Table 2). The total ratio of “Strongly agree” and “Agree” was more than 95% at all question items. This indicates a high level of user satisfaction.

Table 2 Result of compilation of users’ questionnaire responses

	Strongly agree	Agree	Disagree	Strongly disagree
1. The tutor listened to what I said and understood my problems.	101 (87%)	15 (13%)	0 (0%)	0 (0%)
2. The tutor was approachable and easy to talk to.	107 (92%)	9 (8%)	0 (0%)	0 (0%)
3. The tutor’s explanations were easy to understand and useful to me.	93 (80%)	20 (17%)	3 (3%)	0 (0%)
4. The issue I sought to address through this consultation was resolved through tutoring.	80 (69%)	31 (27%)	4 (3%)	1 (1%)
5. I received tips and advice related to independent study.	90 (78%)	25 (22%)	1 (1%)	0 (0%)
6. Through tutoring, I found out about resources and teaching materials that I will be able to use on my own.	74 (64%)	36 (31%)	6 (5%)	0 (0%)
7. Overall, I was able to obtain the learning support that I required.	95 (82%)	19 (16%)	2 (2%)	0 (0%)

(3) Implementation of Online tutoring

Due to the COVID-19 situation, many classes in the first semester of 2021 were conducted online, as in the previous year. For that reason, our tutoring corresponding to the university's timetable continued to conduct online using Zoom. Online tutoring was conducted by appointment only and "Walk-in" tutoring sessions without appointment were not conducted at the beginning of first semester due to the difficulty of handling them online.

We opened consultation space for study (*Senpai Supporter*) which is face-to-face and no appointment at study hall of Media Library as per instructions of our vice-president in April 2021 to strengthen supporting freshman under COVID-19 situation. Thereby, we had two learning support systems. One of them is online tutoring with appointment by MLL and another one is face-to-face *Senpai Supporter* without appointment at Media Library. As mentioned above, the number of tutoring at MLL (first semester is 107, second semester is 10, the total is 117) decreased from the previous year and it is difficult to specify the reason. However, there is a possibility that new learning support system affects the result. From the point of view of the number of users, there were 59 this year, not a significant decrease from 63 in the previous year, which is thought to be due to fewer students using the service multiple times. Furthermore, in this academic year there were 7 tutors are newly-hired out of 15 tutors. The tutor newly-hired is not able to commit tutoring during induction course, the tutoring time decreases as a matter of necessity (even 50 sessions at the first semester in the previous academic year, only 33 sessions at the first semester in this academic year). As the result of this, the problem might be occurred that when the user would like to reserve the session, there were no available sessions. Then other study consultation services needed to be introduced.

As the trial to increase the number of users, from 1st November (as the second half), we started the new service named "Walk-in Tutoring" which is available without appointment. Tutors were at all slots and always available (90 minutes sessions) for study consultation services. However, the number of the tutoring didn't increase after "Walk-in Tutoring" services started. It seems that students may keep using "Senpai Supporter" service by their senior students in the second semester. The first-year students who are majority of users for support service may prefer the face-to-face support service than online through Zoom. They may feel comfortable when they see that other students take the support service. It may be important that the real situation support service to urge the students to use our service more. All in all, it is very important to learn and understand the point of view of a student in order to think what is the "study support" should be.

(4) Implementation of tutor-led training

The tutor-led training, which was started in AY2020, was also implemented in AY2021. The purpose of the tutor-led training is that tutors understand more about the contents of training and learn more teaching skills and methods by teaching at various situations. Due to COVID-19 pandemic, there were less exchange opportunities among tutors, so to let tutors to plan and prepare the training program together is important for enhancing solidarity consciousness. Furthermore, it is good experience for middle leveled tutors to teach newly-hired tutors to contribute raise the awareness of being a leader and to grow up mentally. The tutor-led training in this academic year, the faculty didn't give the topic of the training, and let new and old tutor leaders think the year training program draft, and some topics were totally decided by tutors. Then two training programs for the first semester and three training programs for the second semester, (total 5) CRLA topic were done by tutors. There are still some things we have to settle such as optimizing the time of preparation and discussion. Based on the goals of training made by CRLA, tutors learned the skills to design the two parts "To understand the theoretical concept and the application of tutoring." Especially, the quality of activity to reflect the concepts learned to tutoring skills are improved. As the result of this, the qualities of deliverables and discussions at the training improved, tutors learned the point of view of Meta for tutoring and the skill of verbalizing. Through the preparation, newly-hired tutors learned remarkably.

Staff: Michiko Nakamura, Atsuko Tominaga, Noriko Watanabe

2-2. Preparatory Education

Preparatory Education for Students Selected through the Comprehensive and Recommendation Exams

2-2-1. Preparatory Education in English

1. Program description

The Preparatory English Programme (PEP) is a voluntary course, which in 2021 was designed to facilitate a successful transition from school to university with emphasis on highlighting the function/position/value of the English within an information systems university. The content of the course familiarizes incoming students with university-level expectations and provides them with context appropriate skills and strategies in readiness for a productive university learning experience. The successful transition from school to university is known to impact academic achievement and course completion, although many students are often unprepared for the demands and responsibilities of university-level academic study. As a conceptual framework for the current PEP course, the Student Integration Model (SIM) outlines how students must negotiate three transitional stages when entering university: separation (a disassociation with membership of past communities); transition (the adoption of new patterns of behavior); and incorporation (a renewed sense of connectedness). This model was used to design and structure the PEP course content and authentic learning materials. The new learning materials created appeal to student interests, curiosity, and communicative English abilities while also showcasing the university as a site of innovative teaching pedagogy through the implementation of virtual reality assisted materials that further inspire an interest in the use of technology. With emphasis on promoting meta-learning skills and self-regulation strategies with applicability across multiple domains of study, the PEP course engages students through English as a practical tool for connecting to international research, academia, and interpersonal communication.

2. Overview and Syllabus

The course commenced on 12/21/2021 and concluded on 03/21/2022. All course materials and learning contents were communicated to students through the HOPE learning management system. New content was given to students on a weekly basis and students were required to review the materials before contributing toward several online tasks. The tasks given included the sharing of opinion, commenting upon research data, reading research publications, searching through the university website for information, making a time management plan, identifying dominant personality traits and how they relate to learning, understanding the position of English within an international society, asking questions to faculty, documenting instances of personal responsibility, recording spoken reflections, and creating a mini-research report. The course syllabus is shown in Table 1.

Table 1: Course syllabus

Unit	Start Date	Week	Focus
	12/21/2021	Week 0	はじめに
Unit 1	01/03/2022	Week 1	なぜ英語なの？
	01/10/2022	Week 2	未来大における英語
	01/17/2022	Week 3	学術分野における言語活動としての英語
Unit 2	01/24/2022	Week 4	成功への鍵は「勤勉・誠実性」
	01/31/2022	Week 5	自己調整力と学業成績
	02/07/2022	Week 6	学びへの方略的アプローチ
Unit 3	02/14/2022	Week 7	プランニングと時間の管理
	02/21/2022	Week 8	質問すること・情報を求めること
	02/28/2022	Week 9	自律性と自己責任
Unit 4	03/07/2022	Week 10	データ分析と解釈 ミニレポート
	03/14/2022	Week 11	データ分析と解釈 ミニレポート

3. Outcomes

(1) Participation

A total of 103 students were registered at the beginning of the course on 12/21/2021. Eight students did not access the course at any point throughout the duration, 14 students failed to access the course after 02/05/2022, 81 students participated on the course until 03/14/2022, and 57 students submitted a final analyzing and interpreting data mini report. Students viewed the course a total of 47,507 individual times across the duration and made 8,711 active posts. The three faculty members responsible for the course viewed the course a total of

4,470 individual times across the duration and made 4,510 active posts. Students therefore made a written or spoken contribution to the course 1/5.453 visits while the three faculty members made a written or spoken contribution to the course 1/0.991 visits across the duration. The participation data for students is shown in Figure 1 (note: During the week commencing 03/06/2022 the HOPE server was offline which explains the lack of participation during that week).

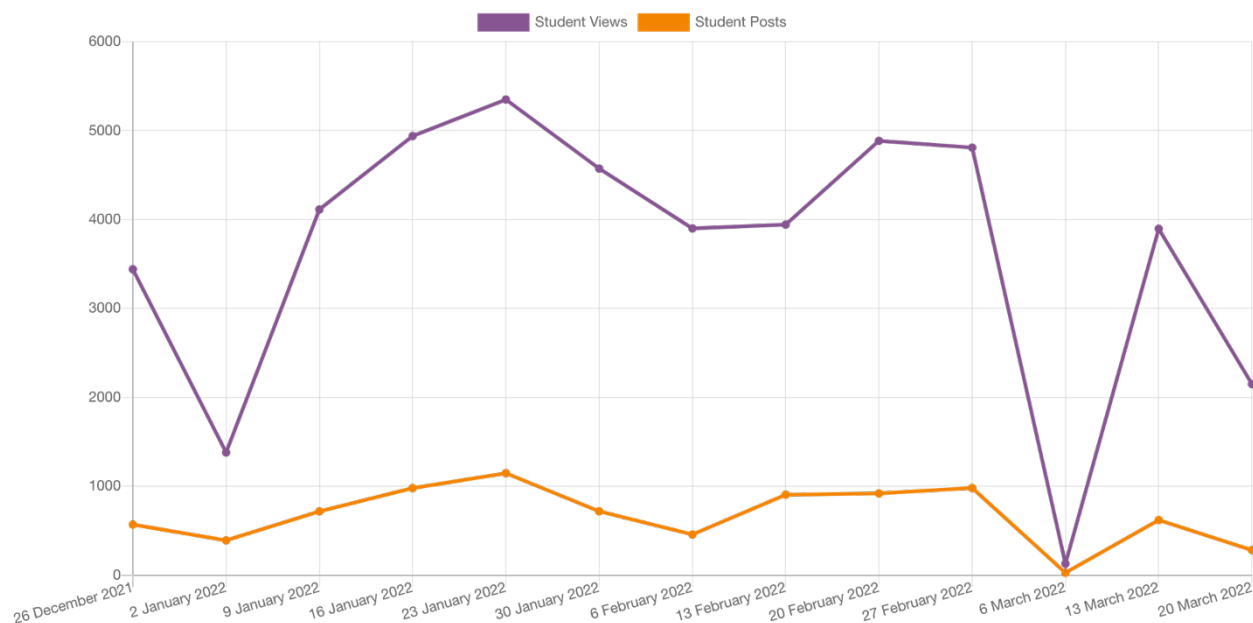


Figure 1: Student participation

(2) Student Reflection

After the course concluded, students were invited to complete a short survey online. The survey items presented to students are listed below:

1. この導入教育コースの内容は、知的好奇心を刺激するものであった。
2. このコースを通して、大学での学びにおいて重要なことを学ぶことができた。
3. このコースの内容は、大学での学びに対する関心を高めるものであった。
4. このコースの内容を理解し、習得することができた。
5. 教材はよく工夫されたもので、その説明もわかりやすかった。
6. 教授方法は、受講生がコースの学習目標を達成するために適切であった。
7. 受講生はコース内でディスカッションなどに積極的に参加するよう促された。
8. 受講生は自分の意見や知識を共有することを求められた。
9. 受講生による質問が奨励され、質問に対して適切な回答を得られた。
10. 教員は様々な理論や概念・研究結果など、学術的情報にもとづいて説明した。
11. 教員は適宜自分の考え方以外の見解も伝えていた。
12. 受講生の意見や共有内容に対して、教員からの適切なフィードバックがあった。
13. 課題で提示された読み物や学習教材は有益なものであった。

Responses to the above items were assessed on a six-point scale:

- [1] まったくあてはまらない
- [2] あてはまらない
- [3] どちらかと言えばあてはまらない
- [4] どちらかと言えばあてはまる
- [5] あてはまる
- [6] とてもよくあてはまる

A total of 38 students completed the survey and the descriptive outcomes are shown in Figure 2.

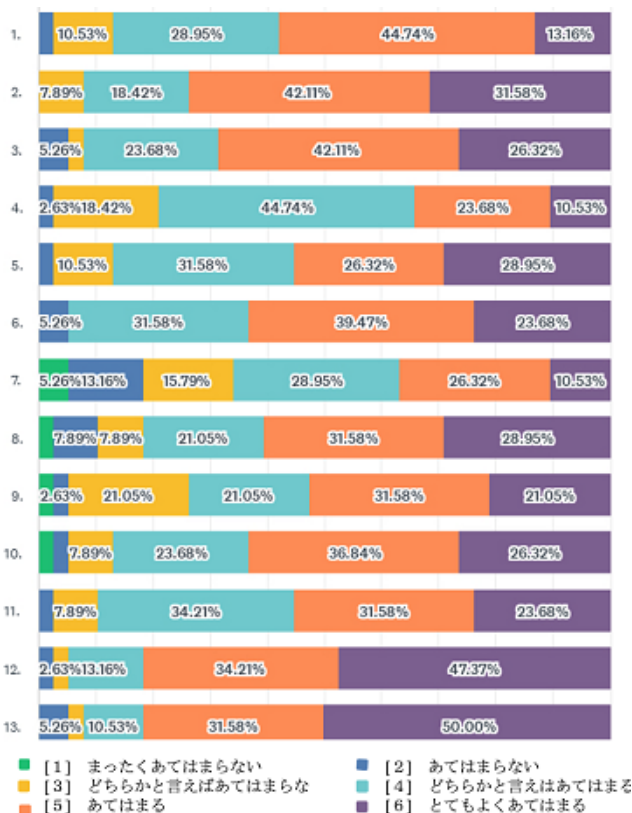


Figure 2: Survey responses (n=38)

(3) Conclusion

Informed by the principles of the Student Integration Model (SIM) the 2021-2022 Preparatory English Programme (PEP) was created to appeal to student interests, curiosity, and communicative English abilities while also showcasing the university as a site of innovative teaching pedagogy through the implementation of virtual reality assisted materials that further inspire an interest in the use of technology. With emphasis on promoting meta-learning skills and self-regulation strategies with applicability across multiple domains of study, the PEP course engaged students through English as a practical tool for connecting to international research, academia, and interpersonal communication. The data gathered relating to student participation (Figure 1) and post-course reflection (Figure 2) provides information which will be used to inform future course iterations with specific attention given to areas for improvement.

Staff: Damian Rivers, Michael Vallance, Michiko Nakamura

2-2-2. Preparatory Education in Math

1. Program description

One of the fundamental abilities demanded of students enrolling in this university is a basic competence in mathematics. Students are expected to understand high-school mathematics such as Mathematics III, (differentiation/integration), which is directly related to the mathematics studied at university. There is a tendency for students enrolling via **the Comprehensive or the Recommendation exams** (*early exams*, hereon) to have a lower level of competence in mathematics when compared to students enrolling via the General entrance exams. Although some students who enroll via the General First exam, do not sufficiently understand the content of Mathematics III; among those selected via the early exams, there are students without sufficient understanding of the even more basic content of Mathematics II and Mathematics B, as well as Mathematics III. This tendency is especially pronounced for students enrolling through the **Comprehensive** exam. To address this concern, the university provides pre-enrollment education for those selected via **the early exams**, with the following purposes:

- To re-emphasize the importance of high-school mathematics, solidify the basics, and revise Mathematics II, B, and III.
- Returning to a stance toward studying in which elements that are not understood are not simply ignored, and that understood content is written in the correct language.
- Steeling oneself through engagement with university mathematics and getting into the habit of studying continuously and independently.

2. Overview of AY2021 activity

(1) The distribution schedule and aims of the assignments

a. Assignment 1

- Schedule: Instructions were sent out around December 20th, 2021. The deadline was January 14th, and feedback was returned together with the instructions for Assignment 2.
- Content: Review of high-school mathematics (Mathematics II, Mathematics B)
- The online distribution of lecture videos and materials for the special course in Mathematics II and B: For students who have not acquired the basics of Mathematics II and B, and for those who find it difficult to study on their own, recorded lecture videos and materials for the special lectures in Mathematics II and B were uploaded to the learning management system HOPE.
- Aims: To review content that will be particularly needed immediately after enrollment from among the basic content of high-school mathematics (complex numbers and equations, trigonometric functions, exponential and logarithmic functions, differentiation, integration, and sequences). In doing so, areas where understanding is ambiguous or insufficient will be identified prior to enrollment, solidifying the fundamentals.

b. Assignment 2

- Schedule: Instructions were sent out on January 31st; the deadline was February 28th, and feedback was returned with the instructions for Assignment 3.
- Content: Review of high-school mathematics (Mathematics II, Mathematics B, and Mathematics III)
- The online distribution of lecture videos and materials for the special lectures in Mathematics III: For students who have not acquired the basics of Mathematics III, and for those who find it difficult to study on their own, recorded lecture videos and materials for the special lectures in Mathematics III were made available on HOPE.
- Aims: To engage with content of high-school mathematics (Mathematics III) centered on calculations (limits, sequences, differentiation, integration) highly linked to Analysis I and Analysis II, which are compulsory courses in the first academic year. In doing so, students who have not covered this coursework in high school will become accustomed to the content of Mathematics III, which will assist them in understanding Analysis I and II.

- c. Assignment 3
 - Schedule: Instructions were sent out on March 14th. There was no required submission. Answers were distributed after enrollment in early April.
 - Content: Preparation for Analysis 1
 - Aim: By studying university-level materials in advance, students should understand how the content of high-school mathematics is deeply linked to university mathematics and realize how important it is to solidify the basics of high-school mathematics. Another aim is enabling students to steel themselves by engaging with the university-level mathematics and getting into the habit of studying continuously and independently, so that they will not fall behind in math classes after enrollment.

(2) Leveraging HOPE in interactive dialogues, feedback, and the construction of an environment for taking special classes in Mathematics II, B, and III.

We built an environment for pre-enrollment education using HOPE.

- a. Distributing comments (explanations of each question, advice, the rate of correct answers) from faculty members according to the status of the assignment
- b. Setting up a forum for dialogue between students, and also between faculty members and students
- c. Carrying out a “Questionnaire regarding Pre-enrollment Education” targeted at students
- d. Accumulation of detailed data on the responses to each question
- e. Distributing lecture videos and materials for the special courses for Mathematics IIB and Mathematics III.

3. Outcomes

The schedule for the three assignments was similar to that of the previous academic year. Out of the 103 students who enrolled for AY2022 through the **early exams**, 99 submitted Assignment 1, and 96 submitted Assignment 2. Six students in Assignment 1 and seven students in Assignment 2 scored less than 60 % correct (see Figure 1), suggesting that more assistance should be provided once they enter the university.

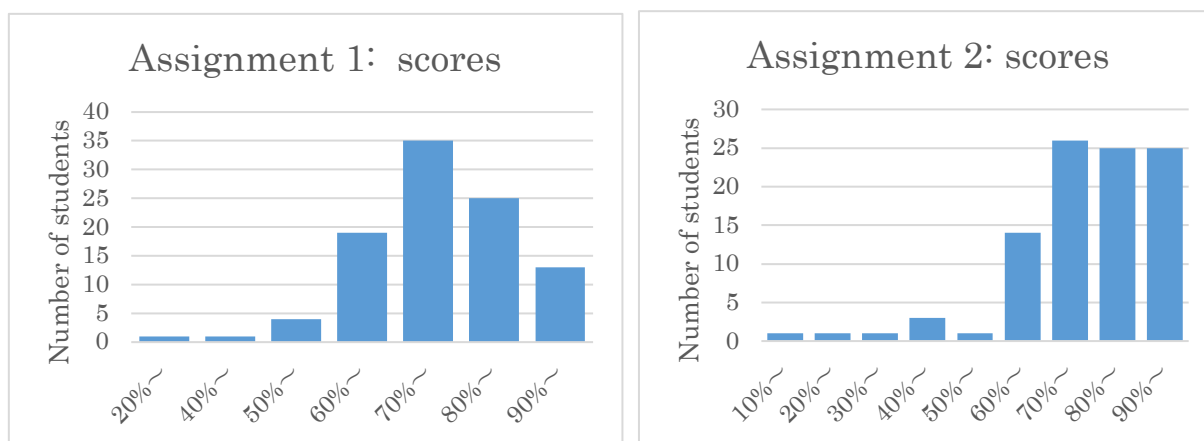


Figure 1. Distribution of scores (in percentage correct) for Assignments 1 and 2

This year, assignments were made available online on HOPE and were also mailed in paper format to promote the revision of assignments and to make it more convenient to do so. The HOPE online system allowed the creation of an environment in which feedback is received from faculty members, and interactive dialogue is engaged between faculty members and students, and between groups of students. But there was no spontaneous leveraging of this interactive dialogue. Consideration of the use of the dialogue function is required.

According to a survey answered by 85 students who gave consent to have their anonymized responses made public, 32% were accepted to the university through the Comprehensive exam and the remaining 68% through the Recommendation exam. The percentage of students who took high-school math courses was as follows: 100% for Math 1, 98% for Math A, 99% for Math II, 94% for Math B, and 71% for Math 3. Ratings for high-school math aptitude on a 5-point scale (1: extremely inept; 5: extremely skillful) had a mean of 3.33 (SE 0.10). Ratings for whether they had a good understanding of high school math for their college studies on a 5-point scale (1: not at all; 5: very much so) had a mean of 2.96 (SE 0.10). Seventeen students provided comments suggesting that the materials provided helped them to prepare, review, notice their own weaknesses (eight students); three students stated their intention to do more reviews on their own; and there were two requests for more materials (which will be provided once they arrive on campus).

In summary, materials and lecture videos recorded for the special lectures for Mathematics II and B, and Mathematics III were uploaded to HOPE. The aim was to provide learning support to those students who have not grasped the basics of Mathematics II, Mathematics B, and Mathematics III as well as those who find independent learning difficult. Answers to the individual questions of each assignment are being analyzed, and ways of using the results in the future are being considered.

Staff: Yoshitaro Tanaka, Yoshihito Tsuji, Edson T. Miyamoto

2-3. Supplementary Education

2-3-1. Supplementary Math Lectures (Math II B, Math III)

1. Program description

In the past several years, supplementary math lectures have been made available to students taking Analysis I and Analysis II, which are compulsory subjects for 1st year students. The exercise-style lectures cover high-school level topics from Mathematics III and Mathematics IIB (Math III and Math IIB, hereafter).

2. Overview of AY2021 activity

The AY2021 supplementary math lectures were conducted in the same online format as the AY2020 course. On-demand distribution of course material content was conducted using the video distribution service "YouTube". Some of the courses were delivered in a real-time format, and the recorded material of these courses was also delivered in an on-demand format. Participants used the Learning Management System (LMS: manaba) to watch the course materials, and to receive and submit study materials. This year, two courses were set up on the LMS: Math IIB and Supplementary (free participation).

Location: The lectures were conducted online, so that participants did not have to come to campus.

Period: For each course (Math IIB and Supplementary), handouts and videos were made available eight times in the first semester, and seven times in the second semester.

(1) Math IIB

The University offers a required mathematics course Analysis for first-year students. In this course, some students are required to take this course based on the instructions of the Analysis instructors. A total of 39 students took this course in the first semester and 26 students took it in the second semester in AY2021. The instructor for this course was Mr. Kazuyuki Konno, a former math teacher at Hakodate High School.

(2) Supplementary

A supplementary course (free participation) was offered to all first-year students to promote the understanding required for the study of mathematics in university. This course offered the following three courses about Math IIB and Math III. Students were free to choose the course they needed according to their own level of understanding.

- i) Math III Course-A: This course dealt with units that were particularly related to subject "analysis". This course uses materials that were utilized as online learning materials until the previous year.
- ii) Math III Course-B: This course was newly established this year. The content of this course is related to "analysis", but it is a unit that has not been adequately covered in the past.
- iii) Math IIB course (supplementary): This course covered more advanced content related to Math IIB.

The "Supplementary course (free participation)" was open to all participants. Therefore, the study results were not examined in relation to the study results, only the participation rate was calculated.

Enrollment Procedures

- The contents and progression of each course was discussed between the lecturers in charge of each course and the university staff. The lecturers and the staff in charge of this university consulted with each other regarding the content and progression of each course.
- The first-year students were informed about supplementary courses. It was also informed to the students that participation in the supplementary course (free participation) may be taken into consideration when grading their grades, depending on the class in which the analysis course is offered.
- For the Math IIB course, lecture videos and course materials were distributed. Students watched the lecture videos, worked on the distributed assignments, and submitted a file of the answers they had entered and photographed. Afterwards, the correct answers were published on the LMS, and the students referred to the correct answers and submitted a file with the graded and corrected answer sheets. Therefore, when attending Math IIB course, students were required to submit the assignment files twice: once for the answer sheets and once for the graded and corrected answer sheets.
- In the supplementary course (free participation), lecture videos and course materials were distributed. In this course, only the submission of assignments was checked. Students were later provided with the correct answers, graded, and reviewed.
- Attendance at the Math IIB course was mandatory for each of the Analysis I and II classes. Therefore, we encouraged those who had not submitted the required materials to do so. In addition, we shared information on the status of submission of assignments with the teachers in charge of Analysis I and II.

3. Outcomes

(1) The effect of supplementary course (Math IIB)

The format of this Math IIB course has been changed from a face-to-face format (2018-2019) to an online format (2020-2021). This section discusses the difference in learning effects due to the difference in course format. As an indicator of effectiveness, we focused on the grade point average of each Analysis class in each year. The values converted into deviation values of academic achievement were used in the analysis.

A three-factor analysis of variance was conducted including the factors format (face-to-face or on-line), semester (first or second), and subject (whether students were required to attend the Math IIB course or not). No main effects were found in the semester factor and the subject factor (*n.s.*). In addition, an interaction was found between the semester factor and subject factor ($p < .01$). A simple main effect test showed that the course participants performed lower in the second semester than in the first semester ($p < .01$) (*Fig. 1*).

The results of this analysis show similar trends before and after the change in training format from face-to-face to online. In both face-to-face and online formats, the results showed that the grades in the Analysis course decreased in the second semester compared to the first semester. It is possible that the students who took the Math IIB course had more difficulty keeping up with the progress of the course in the second semester than in the first semester. It is considered necessary to expand learning support for Math IIB students, especially in the second semester.

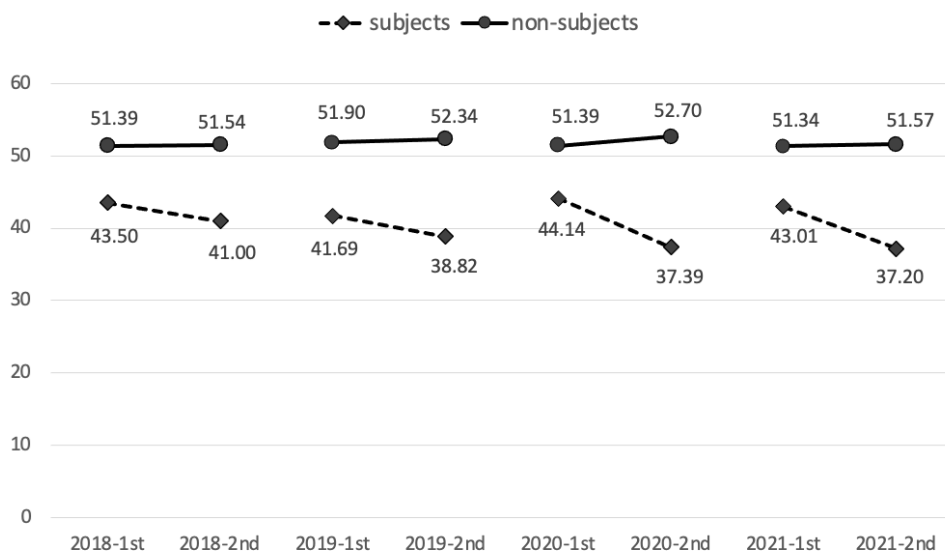


Figure 1. Academic deviation of Math IIB course participants in face-to-face (2018-2019) and online (2020-2021) formats.

In addition, a survey was administered to the participants of the supplementary Math IIB course (10 items, 5-point scale) (1st semester N=41, 2nd semester N=21, including responses from voluntary students in 2nd year and above). The results showed that, for both semesters, the students gave high marks to the course. The results of the free responses also showed that in many cases, the students took advantage of the features of online learning, repeatedly listening to the content until they understood it, and utilizing the primary stop and replay feature of the learning content.

An interesting perspective is that students who are not required to take the Math IIB course may voluntarily watch and deepen their understanding of the learning content. Only some students are required to take the Math IIB course, while others are not required to listen to it. Nevertheless, a review of LMS access indicated that nearly half of the students repeatedly audited the learning content. This result suggests that incorporating an online course format may have provided more learners with the opportunity to relearn the content. Further study will be needed to focus on the access status of the course participants.

(2) The effect of the supplementary course (free participation)

In AY2021, the following three courses were offered as supplementary courses (free participation). Learners took the necessary courses according to their own level of understanding. The total number of students registered was 243. For each course, the percentage of students who submitted the weekly assignment at least once is shown.

•Math III course-A	33.7%
•Math III course-B	29.6%
•Math II course (supplementary)	28.4%

As shown in Figure 2, few students submitted assignments regularly. However, access to the LMS indicate that the materials were probably useful as close to 90% of the students accessed the content at least once and as many as 1,719 times (see the 2021 Professional Development report for details).

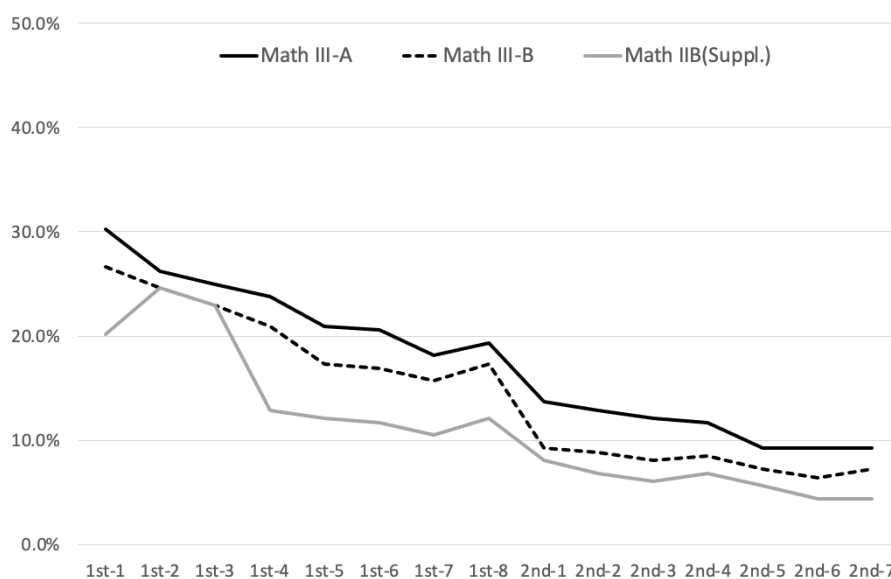


Figure 2. Trends in participation in each course of supplementary course (free participate)

In this report, we compare the effectiveness of supplementary math lectures in a face-to-face format (2018-2019) and an online format (2020-2021). The results of the analysis showed that there were no significant differences in the learning effectiveness of the course formats (face-to-face and online). However, the results indicated that the participants of the Math IIB course were able to deepen their understanding of the course in an iterative manner, taking advantage of the features of the online format. As an issue for future study, it is possible that the online format of the course may have given more students the opportunity to relearn the subject than the face-to-face format. It is considered necessary to conduct ongoing research on the effectiveness of special mathematics courses based on a variety of perspectives in the future.

Addendum

A report on the contents of this report will be presented at an education-related conference scheduled to be held in 2022.

Staff: Yoshihito Tsuji, Yoshitaro Tanaka, Edson T. Miyamoto

2-3-2. Connections Café

1. Program description

The aims of Connections Café are to:

1. create a positive environment where students are able to speak in English without fear of making mistakes,
2. help students see the value of learning English as a communication tool, and
3. offer students new perspectives of the world.

Connections Café offers students opportunities to practice speaking and listening to English in small-group sessions. These sessions are led by an English speaker and held 3 or 4 times most days during the semester (up to 17 times per week). Each session lasts 40 minutes.

2. Overview of AY2021 activity

Table 1 gives an overview of the 2021 activities.

Table 1. Overview of Connections Café small-group sessions

	Spring 2021	Autumn 2021
Open	Weeks 2-15	Weeks 1-15
Course Page	https://vle.c.fun.ac.jp/moodle/course/view.php?id=616	https://vle.c.fun.ac.jp/moodle/course/view.php?id=620
Style	Zoom	Zoom
# of small-group sessions	17x / week	17x / week
# of seats per session	4	4

As in 2020, activities were limited to small-group sessions with a reduced maximum capacity of 4 (from 8) and held on Zoom. The following summarizes what was done to prepare for online sessions:

- an online registration system for students was used
- a Connections Café Zoom account (through the Systems Committee) was made
- special facilitator documentation for how to manage online small-group sessions was created
- the annual facilitator orientation was held
- information for students about how to join small-group sessions (J/E) was updated

Orientation for first-year students was once again shortened resulting in only a few minutes allocated to introducing Connections Café to students. All students were emailed information (J/E) about how to join Connections Café ahead of its opening. This information was also shared on the VEP 1 and VEP 3 course announcement forums.

Each semester, a Connections Café course page was created in FUN Moodle for students that contained information and attendance records.

3. Outcomes

Table 2 shows attendance data (seats filled) for AY2021. As in 2020, attendance was greatly affected by the Covid-19 pandemic. A total of 265 small-group session seats were filled in the spring semester and 165 in the autumn semester. While attendance did increase in the spring semester compared with the AY2020, it was still considerably lower than in AY2019 when attendance in the spring and autumn was 1504 and 1006, respectively.

Table 2. 2021 Attendance data

	Spring		Autumn	
	2021	% change from 2020	2021	% change from 2020
Small-Group Sessions Attendance	265	121%	165	2%
# Students	42	180%	24	-4%
Avg. # Students per Small-Group Session	1.1	13%	0.7	6%
Max # Sessions Attended by a Student	37	12%	22	-46%
# Students Attending 5+ Total Sessions	23	156%	14	0%
# Students Attending 15+ Total Sessions	2	0%	2	100%
# Students Attending 25+ Total Sessions	1	0%	0	-

Future Plans

- An important goal for AY2022 will be to increase attendance at Connections Café. Recommencing face-to-face sessions is believed to be a necessary step and approval from FUN's Covid-19 committee to do this was sought and received. Precautions such as maintaining the maximum number of students per session at 4 (as opposed to the pre-Covid maximum of 8) and providing hand sanitizer will be taken.
- Continuation of support for international students including a welcome event on April 28.
- While facilitators are given guidance on how to approach sessions, they have agency on how to lead the discussions. A random sampling of sessions will be observed during the spring semester to better understand the activities that take place.
- Surveys will be distributed after most sessions to get student feedback.
- A re-examination of the Connections Café objectives will be conducted.
- More support for speaking skills will be provided, specifically conversational strategies.

Staff: Andrew Johnson, Peter Ruthven-Stuart

2-3-3. Study space in Response to the Coronavirus Pandemic

1. Program description

The COVID-19 pandemic made it difficult for students to build mutually beneficial relationships among themselves in an online classroom-focused environment that weakens connections between individuals. As a result, there are now an increasing number of students who are taking leave of absence or dropping out of school without consulting someone about the difficulties they may be encountering in life or academia. Therefore, a study space was established for the following objectives:

- To provide a place to habituate studying on campus.
- To provide a place where students can easily consult with "senpai" regarding minor questions and/or challenges related to their university life and/or studies.

2. Overview of AY2021 activity

The media library and room 594 were converted into study spaces. For the study space situated within the media library, "senpai-supporters" (a paid position) were recruited to provide learning support. Fifteen students (i.e., five 2nd-year students, three 3rd-year students, five 4th-year students, and two 1st-year master's students) were hired during the 1st semester from 30 applicants. They were hired based on the number of subjects that they could effectively handle as well as their reasons for applying. For the 2nd semester, 10 students (i.e., four 2nd-year students, one 3rd-year student, four 4th-year students, and one 1st-year master's student) who wished to continue as supporters were rehired out of the 15.

The activity period of the 1st semester was from April 13 to August 3 (i.e., the end of the final exam period). For the 2nd semester, the activity period was from November 1 to December 3, and then again from January 5 to January 21. This 2nd semester activity period was set in accordance with the exam and assignment submission period for compulsory subjects for 1st-year students.

In both the 1st and 2nd semester, two senpai-supporters were on duty over the 3rd, 4th, and 5th periods each weekday. Study support was primarily provided to 1st-year students; this was offered face-to-face, did not require a reservation, and had no time limit. After each session, the senpai-supporter recorded the content of the learning support they provided to students in a Google spreadsheet. The faculty member then checked the entered data and commented accordingly. Regular weekly meetings were also held, where senpai-supporters could share and discuss the contents of the support provided based on the recorded information, with the faculty member.

3. Outcomes

(1) Number of consultations

There was a total of 218 consultations in the 1st semester and 34 in the 2nd semester. The most common consultation types during the 1st semester were related to programming (136), with there being about the same number of consultations in both programming (10) and mathematics (12) in the 2nd semester (Table 1, 2)

Although there were a few consultations regarding class registration methods and university facilities recorded at the beginning of April, consultations thereafter primarily related to class content and assignments. According to the work record table, most of the consultations were resolved by having senpai-supporters problem-solving together with the consultees, or by the senpai-supporters providing explanations using textbooks. The reason for the decrease in the number of consultations in the 2nd semester, when compared to the 1st semester, is presumed to be the result of an increase in face-to-face classes in the 2nd semester, which allowed students to

befriend whom they could consult directly.

The number of consultations at the Meta Learning Lab, which had been providing online learning support, were 107 in the 1st semester and 10 in the 2nd semester. A possible reason for why the senpai-supporters received more consultations than the Meta Learning Lab is likely that the support provided was face-to-face. Therefore, it is presumed that the consultee students felt more comfortable with and that it was easier for them to use a face-to-face format as opposed to an online format wherein they could not physically see the supporter.

Table 1: Number of consultations per week

1 st semester				2 nd semester									
Week	(n)	Week	(n)	Week	(n)	Week	(n)	Week	(n)				
4/14-4/15	6	5/3-5/7	5	6/7-6/11	23	7/5-7/9	17	11/1-11/5	3	1/5-1/7	1		
4/19-4/23	5	5/10-5/14	11	6/14-6/18	34	7/12-7/16	11	11/8-11/12	11	1/10-1/14	4		
4/26-4/30	11	5/17-5/21	16	6/21-6/25	15	7/19-7/23	9	11/15-11/19	5	1/17-1/21	0		
		5/24-5/28	18	6/28-7/2	11	7/26-7/30	7	11/22-11/26	4				
		5/31-6/4	19			8/2-8/3	0	11/29-12/3	6				
Total	22		69		83		44		29		5		
							Semester total	218				Semester total	34

Table 2 Number of cases by type of consultation

	1st	2nd		1st	2nd
Programming	136	10	VEP	5	0
Mathematics	43	12	Word/Excel/PowerPoint	4	0
Overview of Information Equipment	7	-	manaba/HOPE	2	0
Science and technology literacy	6	-	Computer Operation	5	1
Communication	2	0	Course Selection	0	4
Introductory Data Science	-	7	Other	8	0
			Total	218	34

“-“ indicates subjects that were not offered that semester.

(2) User survey results

A voluntary questionnaire was administered to students who received support from the senpai-supporters. Although the number of respondents was small (i.e., only a total of 10), the survey revealed positive comments like, "I'm glad that I used the service because my issues wouldn't have been solved if I hadn't consulted the senpai-supporters," "I received advice that was very easy to understand. I was very happy, and it helped that they [the senpai-supporters] showed me what I should fix and what I could improve on, besides what I had asked about," and "I was given advice so that I could resolve the issue by myself as far as possible." There were no negative comments.

(3) Issues

The following issues were identified from the work record table, regular meetings, and survey results gained from senpai-supporters:

- Some consultation slots were busy while others were not, depending on the period and day of the week. As such, although the staffing was altered in the middle of the semester to accommodate these differences, it was difficult to assume appropriate and necessary staffing in advance.

- Although small in number, there were some students who were difficult for the senpai-supporters to handle (e.g., students who had little understanding of the basics, or those who exhibited little to no effort to solve problems on their own and were, thus, highly dependent on the senpai-supporters).
- There were many students who came in for a consultation on the day before or on the day of an assignment deadline. In such cases, these students were not able to study in a planned manner.

Staff: Atsuko Tominaga, Noriko Watanabe, Sachiko Awaya (Media Library)

2-4. Professional Development Activity

1. Program description

The focus of the PD•Hokkaido FD/SD•CCH group (the PD group hereon) in AY2021 was on basic first-year undergraduate education, and on communication and math instruction, in particular. The goals were to help faculty reflect on their practices based on previous literature, to compare the effectiveness of online supplementary lectures to past in-person iterations, and to determine the relation between entrance-exam scores and performance in first year courses at the university.

2. Overview of AY2021 activity

- Communication 1 and 2
 - The PD group organized and provided support to a reading group that met online ten times during the year to discuss literature relevant to the Communication 1 and 2 courses, and ways of evaluating the effectiveness of these courses taking into consideration the changes introduced in AY2021.
- Supplementary math lectures
 - The PD group provided support to the Introductory Education group to evaluate the effectiveness of online supplementary math lectures in comparison to the in-person lectures of previous years. Results for 2020 were presented at the Hokkaido District FDS Forum 2021¹ held online in September 2021.
 - The supplementary math lessons were taught by instructors with extensive experience teaching in person at high schools in the Hakodate area. Various format alternatives were discussed with the primary goal of facilitating the instructors' transition from in person to online lectures.
- Data collection and analysis
 - With the university Ethics Committee's approval, spreadsheets were obtained from the university office containing data for the most recent academic years (2018 to 2021).
 - Analyses were conducted to determine the relation between entrance exam scores and performance in first-year compulsory courses in math and communication at the university.

3. Outcomes

Participation in the general meeting of the Hokkaido District FDS Forum 2021 was helpful as members of the group were able to compare the efforts at this university with those at other regional institutions. For example, while staff of this university presented detailed analyses of the effects of online delivery on a narrow set of courses, staff from the Otaru University of Commerce presented a broad overview of the effects of online delivery on the grade averages at their institution (Nishide, 2021).² The two analyses were complementary and provided different types of evidence for the same conclusion, namely that online formats can be as effective as in-person lessons, at least in the short term, which was the timeframe covered by the presentations. To emulate the work conducted at Otaru but in more detail, data were gathered during the second semester to analyze students' performance in the past four years (2018-2021). The results of these and other analyses are being compiled into three reports.

The first report is about the Communication 1 and 2 courses. Scores from a standardized test (TOEIC Bridge)

¹ The Hokkaido District FD • SD Forum 2021: <https://ctl.high.hokudai.ac.jp/20210903fdsforum/>

² In Japanese: 西出, 崇. (2021). 授業のオンライン化による成績への影響とその要因. (Literal translation: *The Impact and Factors Affecting Grades in Online Classes*). The Hokkaido District FD•SD Forum 2021. <https://ctl.high.hokudai.ac.jp/20210903fdsforum>

were analyzed for first-year students from 2006 to 2020. Results indicated that scores increased by 0.75 points per year ($F(1,3362)=117.4, p<.001$). Recent students' scores corresponded to a CEFR A2 level, which was the level of the two textbooks adopted for 2021 (one for listening and speaking for the first semester, and one for reading and writing for the second semester). The suitability of the textbooks was confirmed by a placement test according to which 56% of Communication 1 students were at the A2 level (13% were below, and 31% were above the A2 level). Moreover, 73% (122 out of a total of 168) of students indicated in a survey at the end of the second semester that the textbook was "just right" (for 13% the textbook was easy, and for 14% it was difficult). Reading and writing skills improved during the second semester according to the scores in a test conducted at the beginning (M 62%, SE 1.2) and the end of the semester (M 72%, SE 1.1; two-tailed paired-samples t-test: $t(147)=7.29, p<.001$). Further analyses dividing the students according to their English skills suggest that improvement was observed in all quartiles but especially in the writing skills of students at the lowest quartile. A similar pre- post-test comparison is being planned for each semester of 2022. Moreover, smaller classes will be used in 2022 to increase instructor-student contact time.

The second report is about the supplementary math courses. One course was compulsory for a subset of the first-year students, and the online format adopted in the last two years was as effective as the in-person format of previous years (see the section on Supplementary Math Lectures in this report). However, for the optional math course, only a few students submitted at least one of the weekly assignments. The percentage was low in the first semester (91 out of 280, 32.50%), and in the second semester (45 out of 309 students, 14.56%). But it is conceivable that some students chose to watch the videos without submitting the assignments, which were not compulsory. The system did not keep detailed records of when students accessed each page; but it did provide information about the total number of accesses to the course and the date of the last access for each student. This information was used as rough estimates of the extent to which the optional course was accessed. Results were as follows. Thirty-two students (10.36%) never accessed the course. The remaining 276 students (89.32%) accessed it at least once, and as many as 1,719 times (mean 167.39, SE 16.18, excluding one student whose 54,099 accesses seemed excessive and was eliminated as an outlier); and 59.22% of these 276 students made their last access in the second semester. These results indicate that many students accessed the online materials repeatedly even though they were not required to do so. This points to the flexible uses of online materials, as they can be accessed repeatedly at any time, and students can use them according to their individual needs, rather than being constrained by a one-size-fits-all type of regimen. But this also raises challenges to measure the effectiveness of such flexible uses of resources. Even when detailed logs are available, it is not always clear whether students were attending to the material or left it open while doing something else. This will need to be considered in the future especially as hybrid courses with various degrees of online access may add complexity to the factors to be evaluated.

The third report summarizes results suggesting that entrance exam scores are good predictors of performance in first-year courses at the university, in line with previous literature. Moreover, in the last four years there was a persistent weakness in math for a subgroup of students. Therefore, the results are being used to re-organize pre-enrolment education for the 2023 entrants shifting emphasis towards math. This report was submitted to the entrance exam committee at the university, but will not be made available more widely because of the sensitive nature of the data described.

The first two reports as well as materials related to PD/FD workshops held in AY2021 will be made available in an online folder so that the university community can easily access this information whenever needed.

Staff: Edson T. Miyamoto, Yoshihito Tsuji, Adam Smith

2-5. Self-Evaluation for Learning Achievement

1. Program description

Future University Hakodate launched its “Self-evaluation for learning achievement” surveys from the latter half of academic year (AY) 2019. This system was adopted at the behest of the National Institution for Academic Degrees and Quality Enhancement of Higher Education in its University Institution Certification Evaluation report for AY 2018. With the self-evaluation, students can evaluate their progress toward achieving the learning goals presented in the University’s Diploma Policy and Curriculum Policy. The purpose of the self-evaluation is to assist students in setting goals and creating plans for full achievement. By making continuous and successive plans from their first year through to graduation, students can get a sense of their own growth and continue their learning based on concrete goals.

There are seven assessment survey items, listed below, which were created on the basis of the Diploma Policy. Detailed explanations, based on the Curriculum Policy, are provided for each item. Students are to read the detailed items and then respond using the provided seven-point scale, which ranges from “**1. Not achieved at all**” to “**7. Well achieved.**” Then, considering the results of their responses, each student may respond freely, writing about their goals and plans for the current academic term.

1. Superior professional ability regarding Systems Information Science (Common to all courses)
Superior professional ability regarding Systems Information Science (Courses Expertise): for over second-year students
Superior professional ability regarding Systems Information Science (Graduation Study): for only fourth-year students
2. Inquisitiveness and Imagination to support healthy research attitudes
3. Expressiveness to support collaborative creativity and teamwork
4. Meta-learning ability to foster autonomous and continuous learning
5. Humane professionalism

Survey responses are collected from all students twice a year, at the beginning of each school term that a student is registered. Students take an additional survey just before they graduate to enable reflection on their learning achievements during their university years.

2. Overview of AY2021 activity

During AY 2021, the “Self-evaluation for learning achievement” survey was performed using “HOPE”. Furthermore, a “Self-evaluation for learning achievement” survey was made for graduates regarding the time of their graduation.

Last year, the "Self-evaluation for learning achievement transition graph" was sent only to graduates. This year, the system was improved, and individual transition graphs (see Figure 1 for an example) were returned to each student each semester.

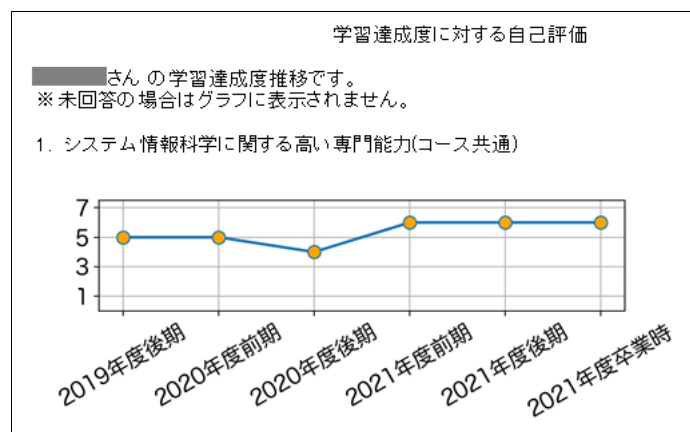


Figure 1. Part of “Self-evaluation for learning achievement transition graph”

3. Outcomes

Number of respondents were as follows. In the first semester, there were 387 respondents (177 first-year students, 77 second-year students, 101 third-year students, and 32 fourth-year students). In the second semester, there were 184 respondents (83 first-year students, 54 second-year students, 31 third-year students, and 16 fourth-year students).

Moreover, 206 students responded the final survey just before they graduated. This was an increase compared to 2019 (180 respondents) and 2020 (144 respondents). Analyses of the responses revealed similar trends to those for AY2020.

Staff: Atsuko Tominaga, Sadayoshi Mikami, Shoji Suzuki, Kei Ito

2-6. Special Research

2-6-1. The Development of a Writing Tutorial Program Using AHP Analysis (E5)

1. Purpose

The purpose of this research is to develop a writing tutorial program to efficiently train the vocabulary and logical thinking skills necessary for writing in Japanese. This research is scheduled to be conducted over a four-year period, and the following activities were carried out in AY2020, the first year of the project.

- 1) Created a vocabulary learning hierarchy diagram as a prototype.
- 2) Created the questions for "Be able to select the meaning of the word," the lowest level on the learning hierarchy diagram (hereinafter *Meaning questions*).
- 3) University students answered the questions, and their validity was verified using an S-P chart.

The following three objectives were set for this year, the second year of the research.

- 1) Create the questions for "Be able to select an appropriate word for the context" within the learning hierarchy diagram (hereinafter *Context questions*).
- 2) Have university students answer the questions and verify the validity of answers using an S-P chart.
- 3) Compare the results of the Context questions and the Meaning questions.

2. Method

(1) Creating test questions

Forty Context questions were created, which are located at the top level of the learning hierarchy diagram. The words used in the questions were the same as those in the Meaning questions. In addition, the question text was based on Japanese language dictionaries and the White Paper on Information and Communications in Japan.

(2) Conducting tests

Tests were conducted on university students to verify the validity of the questions. Data was collected using the Fastask internet survey system from JustSystems Corporation. Answer options 1 through 5 were displayed in a random order for each respondent, while choices 6 and 7 were fixed (Figure 1). We surveyed 182 of the university students who answered the Meaning questions in AY2020.

Choose the most suitable word for the parentheses in the following sentence.

Q01. It is important to assess whether the assigned problems are () or not, since they may have been assigned incorrectly.

1. appropriate 2. perfect
3. advantageous 4. effective
5. ideal
6. none of the above choices apply.
7. I don't know

Figure 1. An Example of the Context questions

3. Results

(1) Subject of analysis

Of the 134 respondents, 127 were included in the analysis because 7 respondents did not complete the questionnaire and so were not included in the analysis. The 127 respondents comprised 60 men and 67 women, with an average age of 20.89 years ($SD=1.42$).

(2) Number of correct answers

Table 1 shows the number of correct answers for the Meaning questions and the Context questions.

Table 1 Number of Correct Answers

	Meaning questions	Context questions
Average number of correct answers	18.04/40 (45.1%)	23.26/40 (58.1%)
Number of correct answers <i>SD</i>	7.51	10.16
Highest score	37	39
Lowest score	0	2

(3) Verifying the validity of questions using an S-P chart

As in the previous year, we created an S-P chart of the Context questions by replacing correct answers with 1, incorrect answers with 0, and "I don't know" with no response (B). The variance threshold was 0.343, and the positions of the S and P curves classified the questionnaire as test type (I) according to Sato's [1] classification system. Test type (I) is often found in standardized achievement and proficiency tests.

The Context questions were verified in accordance with Sato's [1] evaluation criteria. Of the 40 questions, 35 were rated good, 1 was rated mostly good, 3 needed further investigation, and 1 was rated poor. In the Meaning questions asked last year, 26 of the 40 questions were rated good, 10 needed further investigation, and 4 were poor.

(4) Comparison of the Meaning questions and the Context questions

We compared the percentage of correct answers from the 127 participants who answered both the Meaning questions and the Context questions, with the five questions determined to be poor by the S-P table—four of the Meaning questions and one of the Context questions—excluded from evaluation. We then compared the percentage of correct answers for the remaining questions. The average percentage of correct answers was 44.51% ($SD=0.21$) for the Meaning questions and 58.45% ($SD=0.26$) for the Context questions. A t-test returned a standard of 5% ($t(126)=7.87, p=.00$), indicating that results were significant. The correlation coefficient between the percentage of correct answers for both questions was 0.65.

4. Discussion

Questions in the lower tiers of the learning hierarchy diagram are prerequisites for questions in the upper tiers, so that students learn from the lower tier to the upper tier [2][3]. In the vocabulary learning hierarchy diagram created last year, the lower tier was "be able to select the meaning of the word" and the upper tier was "be able to select an appropriate word for the context" because we thought that students should first understand the meaning of individual words and then be able to select words that fit certain contexts.

However, average test scores were higher for upper tier ("select an appropriate word for the context") questions than for lower tier ("select the meaning of the word") questions, and this indicates that students can select an appropriate word from the context even if they do not know the correct meaning of said word.

Addendum: This document was created on the basis of the Future University Hakodate AY2021 Special Research E5 Report.

[1] Takahiro Satoh (1985) Introduction to student-problem (S-P) score tables. Meijitoshō Shuppan

[2] Masahiro Fukuda (1992) On the hierarchical sequence of social studies contents: A study on R. M. Gagne's learning hierarchies. Bulletin of the Faculty of Education, Nagasaki University: Curriculum and Teaching 1992, No. 18, 1-14

[3] Katsuaki Suzuki (2002) The design of teaching materials. Kitaoji Shobo Publishing

Staff: Atsuko Tominaga, Kei Ito

付録
Appendices

公立はこだて未来大学メタ学習センター規程

(平成20年公立大学法人公立はこだて未来大学規程第30号)

(趣旨)

第1条 この規程は、公立はこだて未来大学学則（平成20年公立大学法人公立はこだて未来大学規程第1号）第7条第2項の規定に基づき、公立はこだて未来大学メタ学習センター（以下「センター」という。）について必要な事項を定めるものとする。

(目的)

第2条 センターは、情報技術分野の専門教育の基礎として、大学における学習方法の教育を主たる目的とし、特に、総合的なコミュニケーションの能力および幅広い教養と多角的な視点から物事を判断する能力の養成を中心として、将来にわたり持続的に発展していく社会に資する人材を輩出するための活動を実施する。

(業務)

第3条 センターは、次に掲げる業務を行う。

- (1) 専門教育を受け入れる素地をつくる基礎教育のカリキュラム開発および実施の企画に関すること。
- (2) 新入生の導入教育の企画に関すること。
- (3) ファカルティ・ディベロプメント（教育・研究・運営に関する人材育成および組織改革）の企画に関すること。
- (4) 教育研究および学習研究に関すること。
- (5) 大学の教育活動を中心とした建学理念の共有化に関すること。
- (6) その他公立はこだて未来大学における教育および学習活動に関すること。

(事務職員)

第4条 センターに事務職員を置く。

- 2 事務職員については、公立大学法人公立はこだて未来大学の事務組織に関する規程（平成20年公立大学法人公立はこだて未来大学規程第23号）の定めるところによる。

(審議)

第5条 センターの運営方針に関する事項について審議するため、メタ学習センター運営委員会（以下「委員会」という。）を置く。

2 委員会に関し必要な事項については、別に定める。

(補則)

第6条 この規程によるもののほか、必要な事項は、メタ学習センター長が別に定める。

附 則

この規程は、平成20年4月1日から施行する。

附 則（平成22年3月15日規程第28号）

この規程は、平成22年4月1日から施行する。

公立はこだて未来大学メタ学習センター運営委員会規程
(平成20年公立大学法人公立はこだて未来大学規程第31号)

(趣旨)

第1条 この規程は、公立はこだて未来大学メタ学習センター規程（平成20年公立大学法人公立はこだて未来大学規程30号）第5条第2項の規定に基づき、公立はこだて未来大学メタ学習センター運営委員会（以下「委員会」という。）について必要な事項を定めるものとする。

(所掌事項)

第2条 委員会は、次に掲げる事項を審議する。

- (1) 公立はこだて未来大学メタ学習センター（以下「センター」という。）の運営方針に関すること。
- (2) センターが実施する事業の企画、立案等に関すること。
- (3) その他センターの運営に関すること。

(組織)

第3条 委員会は、次に掲げる者を委員として組織する。

- (1) メタ学習センター長
- (2) 公立はこだて未来大学の専任の教授，准教授，講師および助教のうちから学長が指名する者

(委員の任期)

第4条 委員の任期は、2年とし、再任を妨げない。ただし、欠員により新たに委員となった者の任期は、前任者の残任期間とする。

(委員長)

第5条 委員会に委員長を置き、メタ学習センター長をもってこれに充てる。

(会議)

第6条 委員長は、委員会の会議を招集し、その議長となる。

- 2 委員長に事故があるときは、あらかじめ委員長が指名した委員がその職務を代理する。

3 委員会の会議は、委員の過半数の出席がなければ開くことができない。

4 委員会の会議の議事は、出席委員の過半数によって決定し、可否同数のときは、議長の決するところによる。

(委員以外の者の出席)

第7条 委員会が必要と認める場合は、委員会の会議に委員以外の者の出席を求め、その意見を聴くことができる。

(庶務)

第8条 委員会の庶務は、事務局教務課において処理する。

(補則)

第9条 この規程に定めるもののほか、必要な事項は、委員長が別に定める。

附 則

この規程は、平成20年4月1日から施行する。

附 則 (平成22年4月1日規程第61号)

この規程は、平成22年4月1日から施行する。



メタ学習センター
Center for Meta-Learning

CML ロゴマーク: 二重の円は、「Learning) Meta-Learning」の関係を表現。顔あるいはカップの見立ては、人が集まる場をイメージしたもの。
Meaning of CML logo: Double circles represent the relation of “Learning) Meta-Learning”. Shape of a face or a cup is the images of an open plaza.

作成: 公立ほこだて未来大学メタ学習センター
お問い合わせ: cml-coordinator@fun.ac.jp (CML コーディネーター)
Created by Future University Hakodate Center for Meta-Learning
Contact: cml-coordinator@fun.ac.jp

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