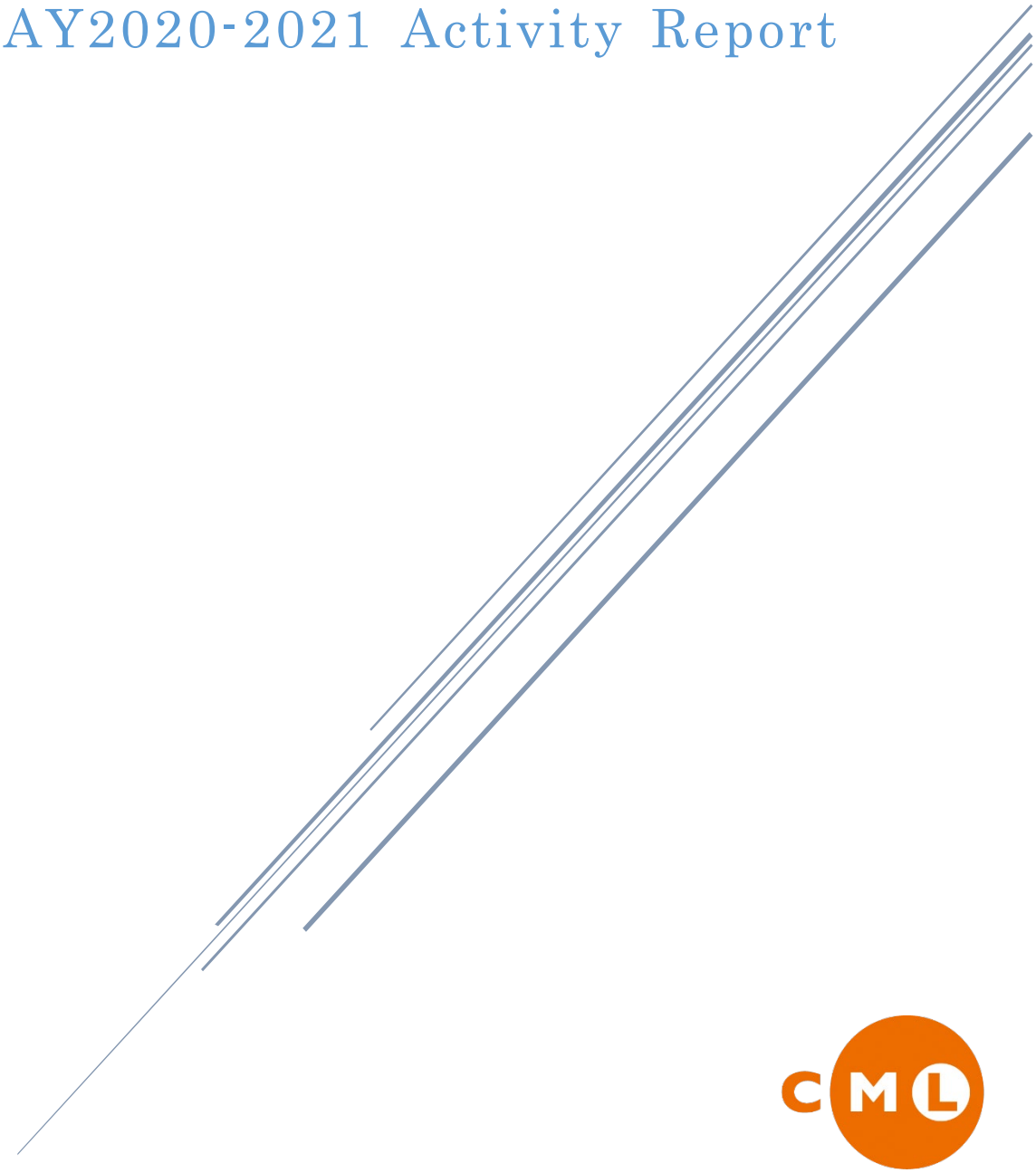
Future University Hakodate
Center for Meta-Learning
AY2020-2021 Activity Report



CML

メタ学習センター
Center for Meta-Learning

Think reflectively. Act collaboratively. Design the future.

Contents

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AY2020-2021 CML Activity Report

1. Foundation for Meta-Learning

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 academic year 2020, the MLL had 14 peer tutors, 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.

11 tutors were certified as Level1 of CRLA/ITTPC in past years. In academic year 2020, a tutor was certified.

2. Overview of AY2020 activity and Outcomes

(1) Implementation period and number of consultation sessions

In academic year 2020, there were 162 consultation sessions. Looking at the rate of usage by discipline, programming students took the highest proportion, 55% (89 sessions), followed by math students at 30% (48 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	18 May 2020- 28 July 2020	50 sessions/week	110	14 (M2: 1, M1: 0, B4: 7, B3: 4, B2: 2)
Second semester	5 October 2020- 21 January 2021	55 sessions/week	52	12 (M2: 1, M1: 0, B4: 5, B3: 4, B2: 2)

(2) User satisfaction levels

Questionnaires were not completed for two consultations, but responses from the remaining 160 sessions were collated (Table 2). The total of "Strongly agree" and "Agree" were 94% in "4. The issue I sought to address through this consultation was resolved through tutoring.", however the other questions were more than 97%. 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.	138 (86%)	22 (14%)	0 (0%)	0 (0%)
2. The tutor was approachable and easy to talk to.	137 (86%)	22 (14%)	1 (1%)	0 (0%)
3. The tutor's explanations were easy to understand and useful to me.	129 (81%)	30 (19%)	1 (1%)	0 (0%)
4. The issue I sought to address through this consultation was resolved through tutoring.	113 (71%)	39 (24%)	7 (4%)	1 (1%)
5. I received tips and advice related to independent study.	134 (84%)	26 (16%)	0 (0%)	0 (0%)
6.Through tutoring, I found out about resources and teaching materials that I will be able to use on my own.	117 (73%)	40 (25%)	2 (%)	0 (0%)
7. Overall, I was able to obtain the learning support that I required.	134 (84%)	26 (16%)	0 (0%)	0 (0%)

(3) Online tutoring

Due to the impact of the novel coronavirus, the first day of classes was delayed by a month in academic year 2020. All classes in the first semester and most of all in the second semester were conducted online. Accordingly, our tutoring form needed to change to synchronous online tutoring using Zoom. Online tutoring was conducted by appointment only and "Walk-in" tutoring that we conducted without appointment usually was aborted online due to the difficulty of handling online.

In addition, a request from Student Affairs Committee of FUN to strengthen supporting freshman in sudden beginning of the first semester classes online without the entrance ceremony and face-to-face orientation because of the cancellation, two MLL tutors were placed in each class of first-year students and hold the additional post of online teaching assistant (online TA). The main work was to give them feedback on weekly report that first-year students submit to their class site in manaba and to make response to their questions and worries. This duty was terminated in the first semester of academic year 2020.

(4) Implementation of peer tutor-led training

3 hours training was held online using Zoom for all 13 tutors before beginning of academic year 2020 (April 9). The purpose of this training was to support online tutoring which is a first experiment for tutors and TA works. Instructed tutors in training with a material crated by professor Atsuko Tominaga a supervisor of the MLL. In training, tutors learned knowledge and skills, e.g., what is distance learning, what is that advantage/disadvantage, and how to feedback online in practical manner. Tutor trainings to learn required knowledge and skills for tutoring held online using Zoom every Mondays' lunch time as usual. Due to the impact of entrance limitation for students, fall intensive training spending a half day on weekend was difficult to conduct during the semester. On that account, it held online in the end of academic year 2020 (March 27). We decided that the aforementioned online TA workshop was to be in place of spring intensive training.

Academic year 2020 continuing from last year, there were 3 peer tutor-led training workshops that the peer tutors themselves sought strategies to resolve challenges that emerged during actual tutoring. On June 8 (Mon.) which is approximately one month later from beginning operation of the MLL, a leader and sub leaders of tutors shared online tutoring tips such as helpful tools, how to conduct tutoring using advantage of online, advise and important points. In the second semester (on December 7 and 14), a training with a theme "Open & Closed Questions" to aim to improve question skills was heled by a leader, sub leader and volunteers of tutors. Likewise, fall intensive training held in the end of academic year, a leader and sub leaders of 2020 cooperated with 2019's to choose that topic and conduct the training from creating the material.

(5) Conducted online tutoring for international students

Once a week in the second semester, conducted 18 sessions on skype and Zoom for international students coming from Sri Lanka from academic year 2021. The purpose of this online tutoring was to reduce anxiety before studying abroad through understanding FUN, so that sessions were conducted by the same 2 tutors (a fourth-year student and a third-year student) every time.

Staff: Michiko Nakamura, Atsuko Tominaga, Noriko Watanabe

2. Preparatory Education

2-1. Preparatory Education in English

1. Program description

The Pre-enrolment English program is provided for students who have successfully taken the Comprehensive Entrance Exam or the School Recommendation Entrance Exam. Its primary aim is to help students maintain their English language skills in the four or five months between the exams and the start of the university.

2. Overview of AY2020 activity

The 2021 iteration of the program, which used the Moodle learning management system, ran from the end of December 2020 to the beginning of April 2021. The program consists of a mixture of communicative and individual study activities. The main components were:

- A self-introduction discussion forum
- A series of ten topic-based sections, each containing
    - a discussion forum about the topic,
    - a single-question survey, and
    - a weekly text and quiz. The texts were about topics relating to goal setting and learning, the university's facilities, and life in Hakodate.
- Access to the English Foundations course, where students could improve their basic English grammar and vocabulary

In mid-January, the students also had the opportunity to discuss college life with current Future University Hakodate students in a discussion forum.

3. Outcomes

Of the 99 pre-enrollment students, 88 (89%) accessed the online course at least once, but only 13 students (13%) accessed it weekly between early January and the end of March.

After enrollment, students were asked to complete an online questionnaire in order to understand their experience with and opinions of the program. There were 43 respondents. The 43 students consisted of 13 Comprehensive Entrance Exam and 30 School Recommendation Entrance Exam. Fifteen (28%) had experience with online classes and 28 (52%) had no experience. Regarding English proficiency, 1 (2%) was “good,” 8 (15%) “somewhat good,” 15 (28%) “undecided,” 8 (15%) “somewhat poor,” and 11 (20%) “poor”. The most time spent on pre-entrance education was between 1 and 3 hours per week for 29 (56%) of the respondents.

The students were asked to rate the difficulty, quantity, and usefulness of each of the Discussion forum, text and quiz, and English Foundations on a 5-point scale. The means and standard deviations are shown in Table 1.

Table 1. Means and standard deviations of difficulty, quantity, and usefulness

	difficulty	quantity	usefulness
Discussion forum	2.96 (0.87)	3.11 (0.41)	4.11 (0.82)
Text and quiz	2.57 (0.73)	2.89 (0.41)	4.07 (0.88)
English Foundations	2.86 (0.79)	3.29 (0.59)	3.82 (1.04)

The questionnaire included two open-ended sections in which participants were asked to describe program improvements (Table 2) and positive aspects of the program (Table 3).

Table 2. Program improvements

Category	Main description
Content (11)	・ I thought it would have been fun to have a few more replies in the discussion forum to get the conversation going. ・ I felt the amount of quizzes in English Study was too much. ・ Foundations was a little much. ・ I thought it would be fun to play English games with other students via zoom. ・ How about actually interacting with people via zoom, discord, etc. so that you can connect with more people? ・ I would have liked to have had a simple assignment. ・ I would like to do vocabulary, listening, and grammar questions with TOIEC, etc. in mind. ・ I wish I could have reviewed vocabulary and listening. ・ There were some parts of the text that I did not understand the basis for the answers to the questions, so I would like you to show them in the explanations, etc.
Instructions and explanations (6)	・ It would be easier to learn if it was explained a little more. ・ I didn't quite understand what I was supposed to do, and I thought maybe this is what I should do. I think it would be better if it were easier to understand. ・ Printouts on how to use the system are difficult to understand.
Technical suggestions (4)	・ I would like to receive notifications of comments sent by others on my Discussion Form postings. ・ It was troublesome to jump to English Study (Foundation?). It would be very helpful if you could post a link. ・ It was very difficult to drag and drop, so please make it possible to use the keyboard.

Table 3. Positive aspects of the program

Category	Main description
English (19)	・ Even after passing the exam, I was able to maintain and improve my English skills thanks to regular exposure to English. ・ I was exposed to English every week ・ I am glad that I could tackle learning English, which I tend to avoid” ・ I was able to practice writing, which is not easy to do by myself.
Discussion forums (13)	・ Thanks to the discussion forum, I met my future classmates ・ The discussion forum helped me improve my English writing skills.
Weekly text topics (6)	・ I am glad that I could learn about Future University through the homework
Course structure / format (5)	・ The fact that it could be done online or by paper submission ・ Being able to communicate with other students in advance.
Study in general (6)	・ It was good to be able to study during a period when I would not have done so voluntarily ・ I have developed some study habits

Staff: Adam Smith, Andy Johnson, Peter Ruthven-Stuart

2-2. Preparatory Education in Math

Preparatory Education for those Selected through both General Selection and Recommendation-based Selection

1. Program description

One of the fundamental abilities demanded of students enrolling in this university is a basic competency in mathematics. Enrollees are expected to understand high-school mathematics such as Mathematics III, (differentiation/integration), which is directly related to the mathematics studied at university. However, even if you enroll via the first semester entrance exam, there are many students who do not sufficiently understand the content of Mathematics III. Moreover, among those selected via **general selection** or **recommendation-based selection,** there are students without sufficient understanding of the even more basic content of Mathematics II and Mathematics B, as well as Mathematics III. There is a tendency for students enrolling via **general selection** or **recommendation-based selection** to have a lower level of competency in mathematics when compared to students enrolling via general entrance exams. This tendency is especially pronounced for students enrolling through the **general selection** method. For this purpose, we are carrying out a course of pre-enrollment education for those selected via **general selection** or **recommendation-based selection,** with the following purposes:

- To re-acknowledge 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 left that way, and that understood content is written in the correct language.
- Steeling oneself through engagement with university mathematics and getting into the habit or studying continuously and independently.

2. Overview of AY2020 activity

(1) The distribution schedule and aims of the assignments

① The 1st Assignment

- Schedule: It will be sent out around December 21st; the deadline is January 15th, and it will be returned when assignment 2 is distributed.
- Content: Revision 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 course in Mathematics II and B will be uploaded to Moodle.
- Aims: To revise the content (complex numbers and equations, trigonometric functions, exponential and logarithmic functions, differentiation, integration, and sequences) that will be particularly needed immediately after enrollment from among the basic content of high-school mathematics (Mathematics II and Mathematics B). In doing so, areas where understanding is ambiguous or insufficient will be identified prior to enrollment, solidifying the fundamentals.

② The 2nd Assignment

- Schedule: It will be sent out on February 1st; the deadline is February 26th, and it will be returned when assignment 3 is sent out.
- Content: The revision of high-school mathematics (Mathematics II, Mathematics B, and Mathematics III)
- The online distribution of lecture videos and materials for the special course 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 course in Mathematics III will be uploaded to Moodle.
- Aims : Among the content of high-school mathematics (Mathematics III), content centered on calculations (limits, sequences, differentiation, integration) that is highly linked to the classes Analysis I and Analysis II, which will be taken in the first academic year, will be engaged with. 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.

③ The 3rd Assignment

- Schedule: It will be sent out on March 15th ※There is no submission. Answers will be distributed after enrollment (in early April).
- Content: Preparation for Analysis 1
- Aim: By taking university lectures before others, students will 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 through engaging with the mathematics learned in university and getting into the habit or studying continuously and independently so that they will not fall behind in math classes after enrollment.

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

We will continue to build an environment for pre-enrollment education using Moodle.

① Distributing comments (explanations of each question, advice, the rate of correct answers) from faculty members according to the status of the assignment
② Setting up a forum for dialogue between students, and also between faculty members and students
③ Carrying out a "Questionnaire regarding Pre-enrollment Education" targeted at students
④ Accumulation of detailed data on the responses to each question
⑤ Distributing lecture videos and materials for the special courses for Mathematics II B and Mathematics III.

3. Outcomes

The schedule for the 3 assignments is almost exactly the same as in the last academic year. In total, 97 of the 99 prospective students expected to enroll in the current academic year from the **general selection** or **recommendation-based selection** streams took this course, with 95 submissions of the 1st assignment and 93 submissions of the 2nd assignment received.

The learning environment that leverages ICT is continuing to create an environment in which feedback is received from faculty members, and interactive dialogue is engaged in between faculty members and students and between groups of students. This year, at the same time as making assignments available online on Moodle, they were also distributed in paper format to promote the revision of assignments and to make it more convenient to do so. There was no spontaneous leveraging of the interactive dialogue function between faculty members and students and between groups of students. Consideration of the use of the dialogue function is required. Having conducted a questionnaire-based survey surrounding pre-enrollment education, useful knowledge was obtained for the future implementation of pre-enrollment education, such as the difficulty level of tasks as well as the opinions of students about their expectations of the content to be learned. However, the response rate was low (57.7%: Responses were received from 56 out of 97 people) with an expectation that the response rate will improve in the future.

As a new endeavor for the 2020 academic year, materials and lecture videos recorded for the special courses for Mathematics II and B, and also Mathematics III were uploaded to Moodle. The aim was to provide generous 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. While the number of views of the video was not particularly high, it can be assumed that we were able to provide learning support to at least a sub-set of students. While detailed data on the responses to each question are still being compiled, the challenge remains of how to analyze and leverage this data going forward.

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

3. Supplementary Education

3-1. Supplementary Lecture for Math (Math ⅡB, Math Ⅲ)

1. Program description

In the past several years, supplementary mathematics 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 AY2020 activity

For the AY2020, the supplementary lectures were conducted online, replacing the in-person format of previous years.

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

Period: For each course (Math III and Math IIB), handouts and videos were made available eight times in the first semester from May to July, and seven times in the second semester from October to November. For Math II, an additional feedback video was distributed at the end of the semester.

(1) Math III supplementary lectures

Target: open to all interested students attending Analysis I & II
Number of participants: 176 in the first semester and 132 in the second semester
Lecturer: Mr. Takayuki Suzuki (teacher at Hakodate High School) was the instructor for both semesters.

(2) Math IIB supplementary lecture

Target: All students in Analysis I & II who were deemed to require remedial lectures based on assessments conducted at the beginning of each semester.
Number of participants: 55 in the first semester and 41 in the second semester.
Lecturer: Mr. Kazuyuki Konno (former teacher at Hakodate Ryohoku High School) was the lecturer for both semesters.

< Activity status >

- We consulted with the faculty in charge and adjusted the content to make it consistent with that of Analysis I & II.
- Students of Analysis I and II were informed that their participation in the supplementary lectures for Math III may be reflected in their grades.
- For each lecture of Math III, students submitted answers to assignments and later checked their submissions with reference to answer keys provided.
- For each lecture of Math IIB, students submitted their answers to assignments, and later their self-scored answers based on answer keys provided.
- Assignment submissions were tabulated and made available to the lecturers of the courses and the faculty in charge of Analysis I & II.

3. Outcomes

In order to verify the effectiveness of the lectures, we examined the attendance of both courses (Math III and Math IIB) and their relation to students' performance in Analysis I & II. Data from 252 students were analyzed. The implementation of the lectures and the verification of their effectiveness received financial support from a Special Research Grant (F3).

(1) Number of students

In the first semester, 55 students were instructed to take the Math IIB lectures. Of these, 47 took the final exam, while the remaining eight did not complete the requirements for Analysis I. In the second semester, 41 students were instructed to take the Math IIB lectures. Of these, 28 took the final exam, while 13 students did not complete Analysis II.

As for the Math III course, 176 students took the course in the first semester and 132 students in the second semester.

(2) Verification of the effectiveness of the lectures

In the AY2020, both the Math IIB and Math III lectures were conducted in an online format. We compared their effectiveness to the in-person learning format used until the AY2019 for the students who took the final exam each year.

We analyzed the effectiveness of the Math IIB lectures. As a result, there was no interaction between academic year (2018, 2019, 2020) and whether the students were required to attend the lectures or not (Figure 1). In other words, the learning effect of the online format in 2020 was comparable to that of the in-person format of previous years. Also note that, overall, students who were required to attend had lower attainment than those who were not required to attend (first and second semester: p's$<.01$), suggesting that the requirement to attend had targeted the appropriate students.

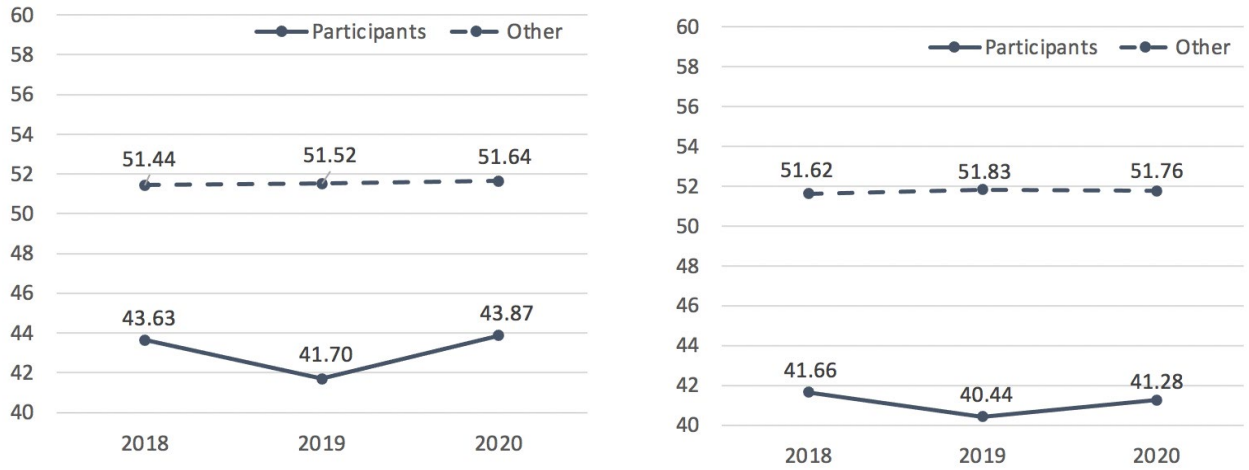


Figure 1. Effectiveness (academic deviation) of Math IIB in the first (left) and second (right) semesters per academic year

For the Math III lectures, there was a trend for an interaction between academic year and whether students attended the lectures or not (first semester; $p<.05$, second semester; $p=.09$), as the performance of the students who took the course in AY2020 was relatively higher than in previous years (p's$>.05$; see Figure 2). The reason for this may be

that even advanced students were willing to review high-school level concepts when the course was offered online (in AY2020) than when it was offered in-person (as in previous years). There was also a main effect of lecture-attendance (first semester: $p<.05$, second semester: $p<.01$).

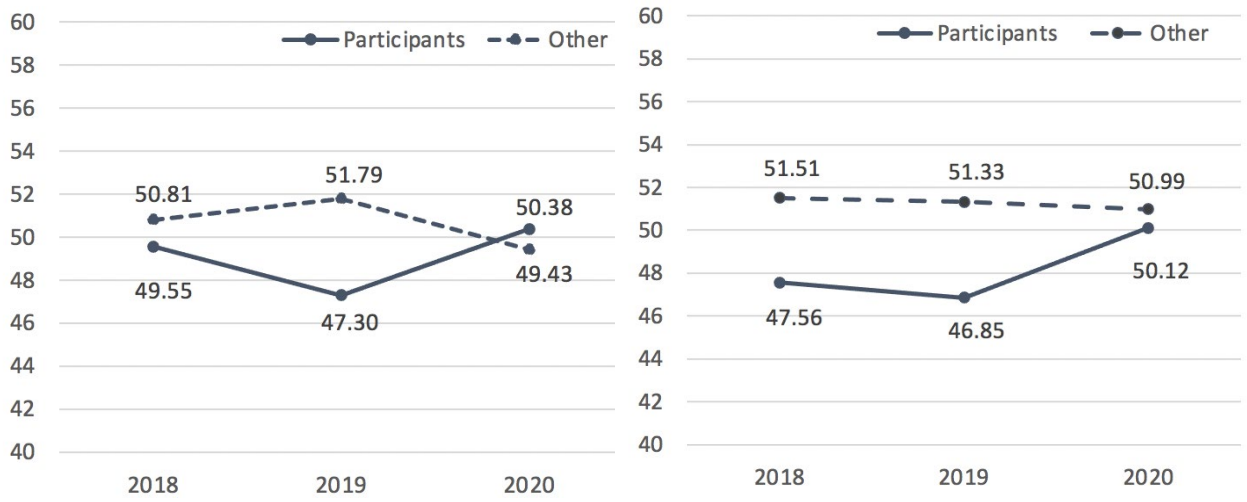


Figure 2. Effectiveness (academic deviation) of Math III in the first (left) and second (right) semesters per academic year

(3) Future considerations

One of the issues with the online format of the supplementary lectures was that more students abandoned Analysis I & II compared to previous years. This is an issue that needs to be addressed in the future.

Addendum: Details on the methodology and the results of the implementation are described in the Special Research (F3) report.

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

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 a fluent 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 AY2020 activity

Table 1 gives an overview of the 2020 activities. Due to the Covid-19 situation, the opening was delayed until May 25, and activities were limited to small-group sessions held on Zoom. The following summarizes what was done to prepare for online sessions:

- a new online registration system for students was created
- a Connections Café Zoom account (through the Systems Committee) was made
- special facilitator documentation for how to manage online small-group sessions was created
- two training sessions for facilitators were held
- information for students about how to join small-group sessions (J/E) was updated
- the session student capacity was reduced from 8 to 4

Due to the shortened Orientation week, it was only possible to give first-year students a brief introduction to Connections Café. All students were emailed information (J/E) about how to join Connections Café ahead of its opening on May 25. This information was also shared on the VEP 1 and VEP 3 course forums.

Connections Cafe information and student attendance records were provided on each semester's course page. In early June, one facilitator had to resign for health reasons. As a result, sessions were held only three or four days per week for the remainder of the spring semester.

Table 1. Overview of Connections Café Activities

	Spring 2020	Autumn 2020
Open	Weeks 6-15	Weeks 1-15
Course Page	https://vle.c.fun.ac.jp/moodle/course/view.php?id=595	https://vle.c.fun.ac.jp/moodle/course/view.php?id=604
Style	Zoom	Zoom
# of small-group sessions	11-17x / week	12x / week
# of seats per session	4	4

3. Outcomes

As Table 2 shows, Connections Café attendance was adversely affected by the Covid-19 pandemic. A total of 282 small-group session seats were filled in 2020, compared with 2,510 in 2019. The reduced attendance could be attributed to:

- the reduced appeal of Zoom sessions compared with face-to-face sessions,
- students' increased workload due to the switch to online courses, and
- significantly reduced time to inform students about Connections Cafe during first-year Orientation

In previous years, the majority of small-group session attendance was by first-year students. Only four first-year students attended in the spring of 2020 compared with 110 in 2019. In total, only 15 students attended in the spring. While still low compared to previous years, attendance improved in the autumn semester. In total, 25 students attended, 14 of whom attended five or more sessions.

Future Plan

- Connections Café will remain online as long as the Covid-19 situation continues.
- A priority for AY2021 will be for more effective communication about Connection Café during first-year Orientation.
- In AY2021, a student will be hired to help create scaffolding material for students and develop other improvements for Connections Café.
-

Table 2. 2020 Attendance data

	Spring		Autumn	
	2020	% change from 2019	2020	% change from 2019
Small-Group Sessions Attendance	120	-92%	162	-84%
# Students	15	-87%	25	55%
Avg. # Students per Small-Group Session	1.0	-84%	0.9	-77%
Max # Sessions Attended by a Student	33	-79%	41	-68%
# Students Attending 5+ Total Sessions	9	-88%	14	-62%
# Students Attending 15+ Total Sessions	2	-89%	1	-94%
# Students Attending 25+ Total Sessions	1	-91%	1	-92%

Staff: Andrew Johnson, Adam Smith

4. Professional Development Activity

1. Introduction

Good university instructors are crucial for a high-quality education. In addition, university academics are required to not only continually improve the education of their students but are consequently expected to likewise be disciplined in the development of their own professional skills and knowledge, commonly referred to as professional development (PD, EU Commission, 2017). Therefore, the professional development activities undertaken aimed to provide positive role models of collaborative educational research for professional development and to share research advice and statistical analysis support to other faculty members interested in educational research.

2. Methods and Outcomes

The PD Group undertook a total of four educational research projects. A brief overview of each project and the related PD activities are described below.

(1) Professional Development Project 1

Overview

Informed by the fact that all FUN students are currently working online from a distance an educational research project focused on "Self-Regulated Learning as Predictor of Distance Learning Achievement" was begun. The research project measured the self-regulation of FUN students relative to task definition, goal setting, strategic planning, environmental structuring, time management, help seeking, comprehension monitoring, motivation control, effort regulation and strategy regulation. These variables were used to explain variance in academic achievement with the goal of improving teaching materials and practices within an online distance learning context.

Relevant PD Activities

1) A summative research report was written and presented to CML.
   https://drive.google.com/file/d/1ONCQD0k5OhVXAApj2JpJbQ1LX2Kf7SRT/view?usp=sharing
2) The data from the project was analyzed and a full article has been drafted for submission to a journal.
3) Information (title of research and abstract below) about the final research project was also shared on Faculty Mail on November 4th [faculty-ml 12066].

Title *Online Self-Regulated Learning and Achievement in the Era of COVID-19: A Structural Equation Modelling Mediation Approach*

Abstract *The novel coronavirus (COVID-19) pandemic has extended its impact across the globe. With a sample of 276 student participants, this article reports from a Japanese university which shifted all regular face-to-face lectures online at short notice. Self-regulated learning is drawn from in order to test a primary thesis that online self-regulated learning effects achievement. It was hypothesized that metacognitive skills provide the foundation for online self-regulated learning but are not able to exert a direct effect on achievement in that such skills must be mediated through applied action. Three structural models indicated limited achievement effect sizes between 11.1% and 12.6%. The models are discussed in relation to online learning and pedagogies relevant to distance education in the era of COVID-19.*

No feedback or comment was received from faculty or management.

(2) Professional Development Project 2

Overview

As FUN shifted to online delivery in 2020, and due to the sudden widespread usage of learning management systems, a project was undertaken to examine the role of personality traits and online academic self-efficacy in acceptance, actual use and achievement in Moodle on a socially distanced asynchronous university course at FUN. With a sample of 149 students the study adopted SEM path-analysis model testing procedures and showed that agreeableness and conscientious have positive direct effects on online academic self-efficacy in addition to positive indirect effects on the acceptance of Moodle. Moreover agreeableness and conscientious had an indirect effect on course achievement while none of the five-factor model personality traits had an influence on actual Moodle use. An improved respecified model further affirmed the importance of agreeableness and conscientious and their role in online academic self-efficacy, the acceptance and actual use of Moodle and course achievement outcomes. Fourteen percent of the observed variance in course achievement was explainable through the respecified model. A published paper discussed the implications to be drawn from the data in relation to the current educational landscape from the perspective of the educator.

Relevant PD Activities

1) Information (title and abstract below) about the final research project was shared on Info Mail on March 3rd [info-ml 07535]. The message was written in Japanese only.

Title *The role of personality traits and online academic self-efficacy in acceptance, actual use and achievement in Moodle*

Abstract *Informed by the educational conditions shaped by the novel coronavirus pandemic and an increased reliance upon online learning solutions and technologies, this project examines the role of personality traits and online academic self-efficacy in acceptance, actual use and achievement in Moodle on a socially distanced asynchronous university course at FUN. With a sample of 149 students the study adopts SEM path-analysis model testing procedures and shows that agreeableness and conscientious have positive direct effects on online academic self-efficacy in addition to positive indirect effects on the acceptance of Moodle. Moreover agreeableness and conscientious had an indirect effect on course achievement while none of the five-factor model personality traits had an influence on actual Moodle use. An improved respecified model further affirmed the importance of agreeableness and conscientious and their role in online academic self-efficacy, the acceptance and actual use of Moodle and course achievement outcomes. Fourteen percent of the observed variance in course achievement was explainable through the respecified model. The discussion highlights the implications to be drawn from the data in relation to the current educational landscape from the perspective of the educator.*

2) The published research is available in the Education and Information Technologies at: https://doi.org/10.1007/s10639-021-10478-3

No feedback or comment was received from faculty or management.

(3) Professional Development Project 3

Overview

With the current shift toward online learning solutions being witnessed around the world in response to the novel coronavirus (COVID-19), it is important for technology-using educators to understand how students process the demands of online learning and how they conceive of themselves within distant spaces and digital communities. The metacognition knowledge, that being “the relatively stable information human thinkers have about their own cognitive processes and those of others” (Wenden, 1998, p. 516), which learners develop about themselves as learners is inherently complex and draws from a multitude of cognitive and situational-affective dynamics such as individual differences, personality traits and intelligence, the awareness and application of adaptive learning thoughts and actions, the perceived value of the learning process, the perceived locus of control and causality between effort input and reward output, persistence applied over time, the development of practical skills and knowledge and an ability to self-monitor and adjust to setbacks. A new initiative entitled "Metacognitive Knowledge and the Self as Online Learner: A Virtual Reality Assisted Analysis of Academic Self-Concept Belief Rationalizations" was therefore started. Such research is timely in that uncovering the beliefs which learners develop within distance learning situations serves to provide crucial information for educators as a platform for positive pedagogical intervention and future course design improvements. Data has been collected from 210 students and will be used to inform online teaching pedagogies that create an inclusive, supportive and achievement focused environment in AY2021.

Relevant PD Activities

1) Information (title and abstract below) about the final research project was shared on Info Mail on March 19th [info-ml 07574]. The message was written in Japanese only.

Title *Metacognitive Knowledge and the Self as Socially Distanced Online Learner: A Virtual Reality Assisted Analysis of Academic Self-Concept*

Abstract *With online learning solutions responding to the novel coronavirus pandemic, it is important for educational technologists and other practitioners to understand how learners are experiencing the demands of socially distanced online learning and how they conceive of themselves within distant spaces and digital communities. Research into the metacognitions of learners provides a non-technocratic focal point through which such information can be extracted. Framing learner self-beliefs as a form of metacognitive knowledge, the current article presents a virtual-reality-assisted thematic analysis into the self-appraisals of 210 socially distanced online learners at a Japanese university. The study focuses on the discursive rationalizations expressed in service of the academic self-concept. Four themes were identified in the data: formal assessment, affect and emotion, self-regulation, and transformative awareness. Such research provides educators with a platform for pedagogical intervention and course design considerations relative to the challenges of the online learning experience.*

2) The published research is available in the Journal of Educational Technology Systems at: https://doi.org/10.1177/0047239521999779

No feedback or comment was received from faculty or management.

(4) Professional Development Project 4

Overview

The PD Group have begun writing a collaborative research article concerning PD experiences at FUN. University teaching is considered a high-skill, knowledge-based occupation where the expectation is to deliver authoritative content and supervise the continued improvement of students. Effective professional development "is connected to questions of content and pedagogy that educators are asking—or should be asking—about the consequences of their instructional practices on real students as well as in general questions about effective teaching practice" (Elmore, 2002, p.7). The materials used in the current study stem from documented discourse between faculty assigned to promote professional development and a collective of native-speaker English teachers. The challenge is recognised by Hiver et al. (2019) who writes that "not all L2 teachers are deliberately thoughtful about their practice or desire to be, and reflection does not guarantee action" (p. 2). Vignettes of recorded interactions are provided to develop an understanding of the subtle resistance of faculty to engage in professional development and discourse to improve academic knowledge and broaden awareness of professional standards. The vignettes have been categorized relative to Ashforth and Lee's (1990) defensive behaviors: (1) avoid action (overconforming, passing the buck, playing dumb, depersonalizing, smoothing and stretching, stalling); (2) avoid blame (buffing, playing safe, justifying, scapegoating, misrepresenting, escalating commitment); (3) avoid change (resisting change, protecting turf). The evidence gathered will be used to further support our calls for positive professional change within FUN toward greater standards of practice, expectation and outcome.

3. Conclusions and Observations

Despite the documented efforts there exists widespread reluctance to engage in professional development initiatives which reflect an aspirational and achievement-orientated mindset. Attempts at initiating professional discussions concerning documented workplace issues have been ignored by our immediate colleagues and management, with the exception of CML Director Tominaga who has been supportive of our efforts. As a consequence, those faculty committed to promoting a more professionally-focused workplace culture are given the impression that they are working alone in isolation rather than contributing together toward the fulfilment of a shared institutional mission. Without institutional directives aimed at identifying and maintaining standards of practice, expectation and outcome, and without proactive support and communication from management, individual faculty may be demotivated and demoralized. It is for these reasons, informed by direct documented experience, that the current members of the PD initiative have decided not to continue. In short, resistance to change and a lack of support, communication and direction have rendered our effort futile beyond what has been achieved in isolation.

Staff: Damian Rivers, Michael Vallance, Michiko Nakamura

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 made twice per year, during each school term a student is registered for a course. Graduates take an additional survey at graduation to enable reflection on their learning achievements during their university years.

2. Overview of AY2020 activity

During AY 2020, the "Self-evaluation for learning achievement" survey was performed using "manaba". Respondents were as follows: in the first half of the AY, 472 persons (225 first-year students, 77 second-year students, 113 third-year students, and 57 fourth-year students); in the second (latter) half of the AY, 329 students (165 first-year students, 56 second-year students, 67 third-year students, and 41 fourth-year students). Further, from January 1 through February 13, 2021, a "Self-evaluation for learning achievement" survey was made of graduates regarding the time of their graduation. For this, there were 162 respondents.

To obtain feedback from individual students regarding trends in their learning-achievement levels during periods that overlap AYs, under the guidance of assistant professor Kei Ito, a system for automatic generation of a "learning-achievement level self-evaluation graph" was developed for students belonging to the Kei Ito research lab. Figure 1 shows one example of output results from this system. This system was used to create a "learning-achievement level self-evaluation graph" for each graduate, and this feedback was provided to these individuals.

3. Outcomes

Table 1 shows the mean values for each question item for each AY. Values in parentheses are mean values for AY 2019. Unpaired t-tests were performed for the second half (latter term) of AY 2019 and the second half of AY 2020. Significance (5% level) was shown for second-year students for "3. Expressiveness to support collaborative creativity and teamwork" ($t(109) = 2.49$, $p < .05$), with second-half AY 2020 lower than second-half AY 2019. No other values showed significance. The difference is thought to be related to the fact that most classes were performed online due to the coronavirus epidemic, resulting in fewer opportunities for co-creative face-to-face groupwork.

Table 1a. Aggregate results

	1. Superior professional ability (Common to all courses)			1. Superior professional ability (Courses Expertise)			1. Superior professional ability (Graduation Study)		
	First half	Second half	At graduation	First half	Second half	At graduation	First half	Second half	At graduation
1st-year students	1.56	4.11 (4.06)	—	—	—	—	—	—	—
2nd-year students	4.19	4.36 (4.30)	—	3.42	4.05 (4.15)	—	—	—	—
3rd-year students	4.49	4.90 (5.01)	—	4.56	4.91 (4.80)	—	—	—	—
4th-year students	5.32	5.34 (5.48)	5.64 (5.46)	5.14	5.39 (5.48)	5.42 (5.37)	4.89	5.44 (5.04)	5.43 (5.46)

Table 1b. Aggregate results

	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		
	First half	Second half	At graduation	First half	Second half	At graduation	First half	Second half	At graduation	First half	Second half	At graduation
1st-year students	1.62	3.61 (3.67)	—	1.66	3.76 (3.73)	—	1.99	4.14 (4.21)	—	2.03	4.07 (4.06)	—
2nd-year students	3.82	3.84 (4.03)	—	3.86	3.80 (4.45)	—	4.38	4.57 (4.37)	—	4.22	4.52 (4.52)	—
3rd-year students	4.19	4.55 (4.51)	—	4.35	4.78 (4.90)	—	4.49	4.94 (4.89)	—	4.61	4.96 (4.87)	—
4th-year students	4.88	4.85 (4.88)	5.39 (5.15)	5.14	5.05 (5.06)	5.56 (5.33)	4.93	5.02 (5.06)	5.42 (5.31)	5.12	5.12 (5.24)	5.48 (5.36)

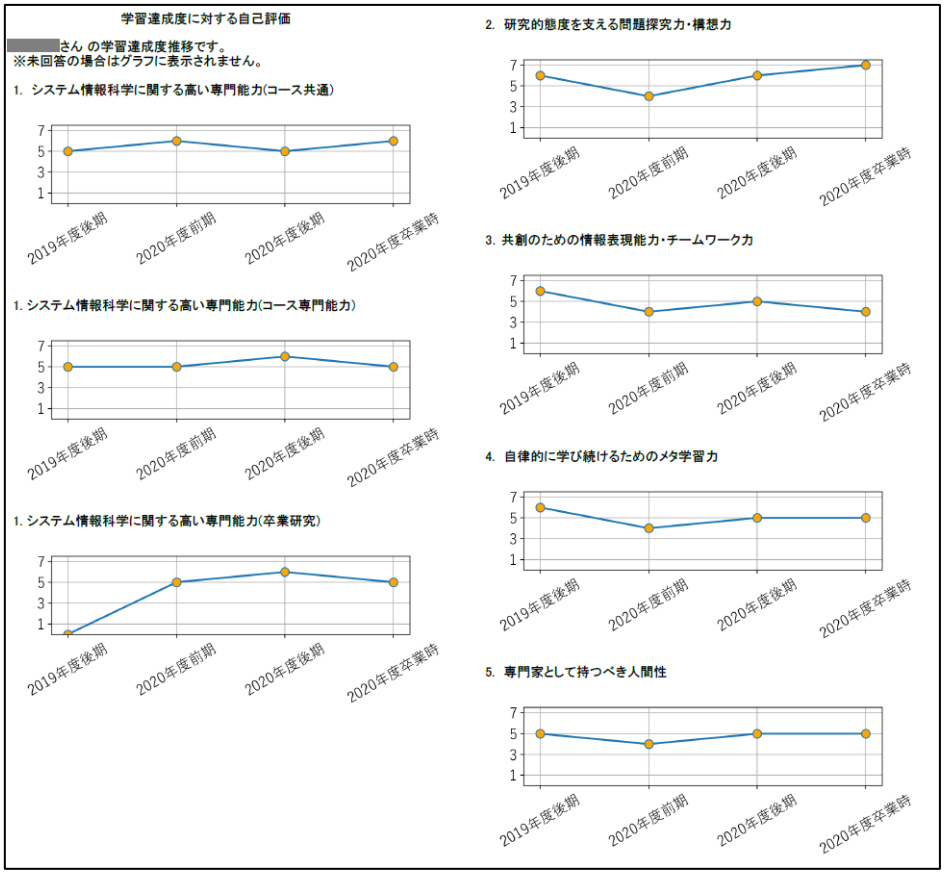


Figure 1. Graphs of trends in the learning-achievement level self-evaluations of one student

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

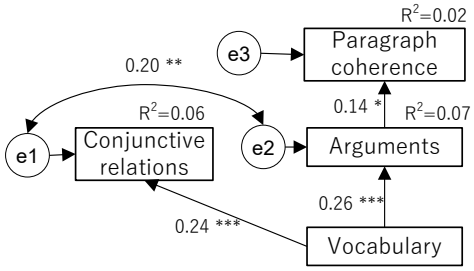
6. Special Research

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

1. Program description

Many universities in Japan provide writing classes where students learn how to write reports and academic papers.[1] Normally, writing classes in Japan involve writing practice and correction by teachers. This editing/correction work is broad-ranging, including compositional and content elements. As this is a time-consuming process, it is difficult to perform this work repeatedly, with indications that this is problematic in terms of little practice time provided to students. More efficient and effective teaching methods are needed. The special research by Tominaga and Ito [2] in 2019 developed a selective drill-type training system using the learning management system Moodle as a way to solve this problem, and conducted a trial test. The results of the Structural Equation Modeling suggested that vocabulary has an impact on the ability to think about connection relations and argumentation (Figure 1). Therefore, the purpose of this year's special research was to do the following three things.

1) Create a learning hierarchy diagram for vocabulary.
2) Create a test on the lowest level of the learning hierarchy.
3) To examine the validity of this test.



$\chi^2(2) = 1.435$, GFI = 0.997, AGFI = 0.984, CFI = 1.000, RMSEA = 0.000, AIC = 17.435

Figure 1. Final model

2. Overview of AY 2020 activity

(1) Creation of a learning hierarchy diagram for vocabulary

A "learning hierarchy diagram" organizes learning elements, clarifies their interrelationships (structuring), and shows the order in which they should be learned (systematizing). It analyzes the learning objectives from the highest level to the lowest level, and makes a hierarchy of these objectives. Students learn step by step, from the lowest level of lower goals to the highest level of higher goals. [3][4] For the present special research, using Suzuki[5] as a reference, the learning hierarchy diagram in Figure 2 was created.

(2) Creation of test (trial) questions

Test questions (40 questions) were created for the lowest-order of the learning hierarchy diagram ("The ability to explain the meaning of vocabulary words"). Vocabulary words presented within the test questions were selected from textbooks and reference materials for first-year university students, and from newspaper articles (Table 1). Figure 3 shows one of the test questions.

(3) Test performance

To investigate the validity of the test questions, the test was performed with university students. For data collection, the Fastask internet survey of JustSystems Corporation was used. For selection items 1. through 5., random changes were made in the order of presentation to the respondents. Selection items "6. None of the above choice items apply" and "7. I don't know" were fixed items, with no changes.

A screening survey was performed of 13,932 people, with responses from 1,468 people. From these, 397 university students were selected for completing the final (present) survey. Results were obtained from 224 university students.

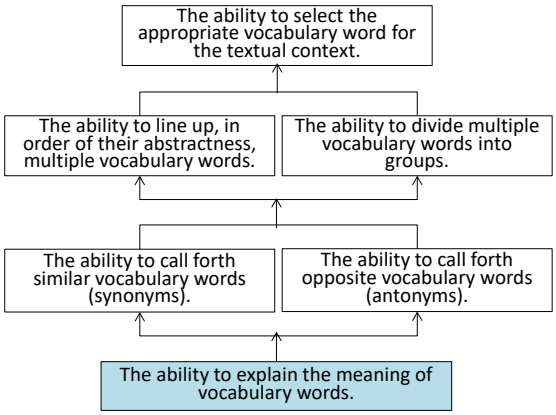


Figure 2. Learning hierarchy diagram concerning vocabulary abilities

For the word listed below, please select the meaning from the selection items that you think is most correct for that word. If you do not know the correct answer, you may select item "7. I don't know."

Q01 "Reasonable"
1. the resulting decision is appropriate.
2. the result is ideal.
3. the method for carrying out something is effective.
4. the timing for doing something is just right.
5. the result of the decision is convenient.
6. none of the above choices apply.
7. I don't know

Figure 3. Sample test question regarding the meaning of a vocabulary word

3. Outcomes

Analysis was conducted on 219 valid responses. There were 109 males and 110 females, with a mean age of 20.06 years (*SD* = 1.27). The mean number of correct answers was 18.04 (45.1% correct), *SD* = 7.51, the highest score 37, and the lowest score 0.

An S-P (student-problem) table[6] was used for investigating the validity of the test questions. With an S-P table, a graph is made for each of the test questions with the correct/incorrect results of the respondents. By calculating difference coefficients and attention coefficients, one can ascertain problem composition patterns, determine the appropriateness of each question, and discover respondents who require special attention. Japan's Ministry of Education encourages the active use of S-P tables in analyzing nationwide Japanese scholastic abilities and in surveys of the current status of learning.

In this study, an S-P graph was created by taking a correct answer as "1," an incorrect answer as "0," and "I don't know" as "no response (B)" (Figure 4). The S-P table creation macro of the Kochi Prefecture Board of Education, East District Education Office was used.

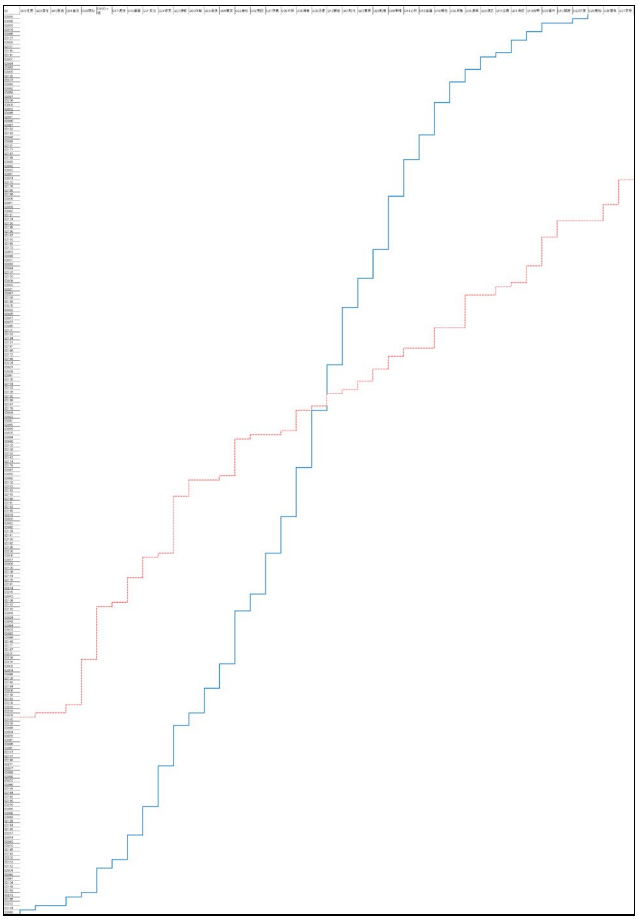


Figure 4. S-P table

In this S-P table, the solid blue line is the S (student) curve, and the red dotted line is the P (problem) curve. Comparing the locations of the S curve and P curve with the classifications of Sato[6] (p. 29), Fig. 4 is classified as a test type (I). With this test type (I), the mean correct response rate is 50%, and from the P curve shape, the correct response rate for test questions is distributed from 20% through 80%. As for the S curve, with its "S" shape, the majority of respondents had a correct response rate of around 50%, with diminishing numbers as the graph approaches the full score (100% correct) and 0 points. The current results thus match this test type (I). This pattern is considered to be frequently encountered in standardized scholastic ability tests, practical abilities tests, etc.

According to Sato's evaluation criteria [6], out of 40 questions, 27 were good questions, 9 required consideration, and 4 were poor. A comparative analysis was made of the four good questions with the poor questions. The results suggested the possibility that these poor questions included incorrect responses that confused higher-level test respondents. It is thus thought that the following points require special care when creating test questions:

- Differences between the correct answer and incorrect answers should be made clear and easy-to-understand.
- For unfamiliar vocabulary words, it is easy for a mistake to occur for terms where the kanji (Japanese written character) is a homonym (homophone).
- For incorrect choices, vocabulary words that are familiar to university students should be used.

Addendum: This document was created on the basis of the Future University Hakodate AY 2019 Special Research E5 Report.

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[5] Katsuaki Suzuki (2002) The design of teaching materials. Kitaooji Shobo Publishing
[6] Takahiro Satoh (1985) Introduction to student-problem (S-P) score tables. Meijitosho Shuppan

Staff: Atsuko Tominaga, Kei Ito

6-2. An Extended 300-Item Five-Factor Measure of Personality in Predicting Academic Achievement (E6)

1. Introduction

Students at Future University Hakodate (FUN) progress along delineated trajectories of academic achievement during their course of study. Students with similar intellectual abilities and prior academic records will acquire different levels of academic attainment at FUN. Educational psychology and individual difference research – central to the idea of meta-learning – attempts to account for variance in academic achievement by identifying the cognitive antecedents of behavioral action. The current study undertakes an assessment of the role of personality (i.e., individual differences) in predicting academic achievement at FUN using the Japanese 50-item IPIP representation of the Goldberg (1992) markers for the five-factor structure (IPIP-BFM-50) (extraversion, agreeableness, conscientiousness, neuroticism and intellect). Data drawn from n=304 students indicates that the role of personality is differentiated in relation to individual trait and course.

2. Methods and Results

Consenting participants were 304 students at FUN (246 (80.9%) male students and 58 (19.1%) female students) who were contacted via Japanese language email and invited to participate in research concerning individual differences and achievement. Despite an initial intention to use the 300-item NEO-PI-R (Costa & McCrae, 1985), practical limitations surrounding the novel coronavirus forced a reconsideration. The Japanese 50-item IPIP representation of the Goldberg (1992) markers for the five-factor structure (IPIP-BFM-50) was therefore used. The IPIP-BFM-50 retains a focus on personality assessment in the lexical tradition while avoiding the limitations of adjectives and elaborate sentences. The measure presents short-sentence referents in behavioral terms. The IPIP-BFM-50 assesses five factors of personality including extraversion, agreeableness, conscientiousness, neuroticism and intellect. Items were assessed on a five-point scale ranging from “very inaccurate” to “very accurate” and were distributed so that items from the same scale were not presented in consecutive order. Within each scale there was an equal split between positive and negative keyed items (except for the agreeableness scale).

Student achievement records between 2019 and 2021 were accessed with administrative permission. Due to variability in grading methods apparent across each course (observed through means, standard deviations, normal distribution and raw score increments), several courses were combined that clustered together in relation to grade distribution and subject origin. Three composite clusters were created. The first mathematics cluster included grades from Linear Algebra I (線形代数学), Analysis (解析学) I and Comprehensive Mathematics Exercise I (数学総合演習). The second Communication cluster comprised of grades from Communication I and II (コミュニケーション I + II) and Communication III and IV (コミュニケーション III + IV). The third programming cluster used grades from programming basics (プログラミング基礎). All raw score grades were then transformed to a five-point scale with significant outliers and missing cases removed. While there was an overall significant effect of intellect ($\Delta R^2 = .23$***), when looking within each of the course, only programming ($\Delta R^2 = .14$***) demanded intellect in achievement. Programming also positioned extraversion, agreeableness and conscientiousness as negative influences. Programming therefore demands explicit prior knowledge for success and does not reward positive approaches to learning through the application of conscientious behavior. The mathematics ($\Delta R^2 = .06$***) and communication ($\Delta R^2 = .12$***) courses were similar in the role awarded to personality. That is, students who demonstrated conscientiousness received higher achievement outcomes while

agreeableness was an indicator of lower achievement outcomes. Overall, a combined regression model was able to account for ($\Delta R^2 = .12$***) of the observed variance in achievement through the role of personality traits.

Table 1. Descriptive statistics for variables (n=304)

	Min	Max	Mean	SD
Extraversion	10.00	49.00	27.91	7.79
Agreeableness	13.00	49.00	33.78	6.03
Conscientiousness	13.00	48.00	29.44	6.28
Neuroticism	10.00	47.00	26.24	7.12
Intellect	16.00	50.00	30.01	5.41
Mathematics Achievement	1.50	5.00	3.51	.73
Programming Achievement	1.00	5.00	3.36	1.03
Communication Achievement	1.00	5.00	3.23	.88
Overall Achievement	1.17	5.00	3.36	.64

A regression procedure was undertaken to assess the contribution of the five-factor personality traits to achievement across the three course clusters and the overall achievement outcome. In simple terms, the five personality traits accounted for 6% of the observed variance in mathematics achievement. Conscientiousness was the only positive contributor while agreeableness had a significant negative impact. The five personality traits accounted for 14% of the observed variance in programming achievement. Intellect was the only positive contributor while extraversion, agreeableness and conscientiousness had a significant negative impact. The five personality traits accounted for 12% of the observed variance in communication achievement. Conscientiousness was the only positive contributor while agreeableness and neuroticism had a significant negative impact. The five personality traits accounted for 12% of the observed variance in overall achievement. Conscientiousness and intellect were positive contributors while extraversion, agreeableness and neuroticism had a significant negative impact. Figures 1 to 5 show the spread, distribution and linear trajectory of the impact made by the five individual personality traits on the overall achievement of the n=304 students. These figures indicate that conscientiousness and intellect are the only two personality traits able to inform an upward trajectory in achievement outcomes. In contrast, extraversion, agreeableness and neuroticism are indicative of lower achievement outcomes.

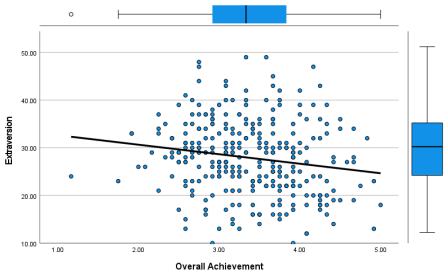

Figure 1. Extraversion on Overall Achievement

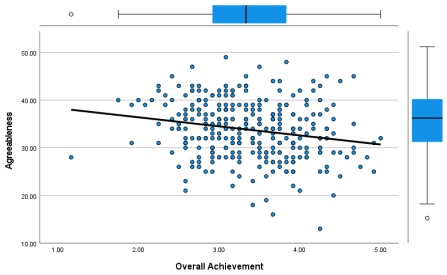

Figure 2. Agreeableness on Overall Achievement

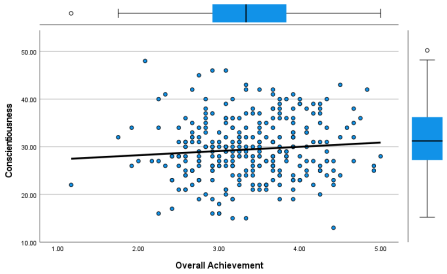

Figure 3. Conscientiousness on Overall Achievement

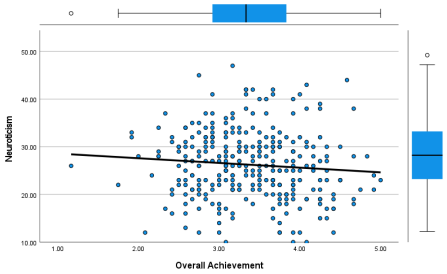

Figure 4. Neuroticism on Overall Achievement

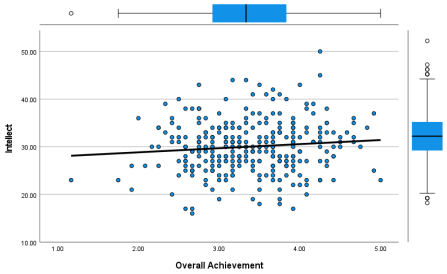

Figure 5. Intellect on Overall Achievement

3. Conclusions and Observations

The data shows that personality traits are able to significantly impact course achievement. Moreover, the observed impact is differentiated between individual trait and course. This is suggestive of two factors. First, different courses demand different approaches by students in relation to basic individual differences as expressed through personality traits. Within educational psychology research, conscientiousness has repeatedly been identified as the most consistent predictor of academic achievement. However, personality traits should be considered as indicators of potential behavior or applied action in that personality traits are not demonstrative behavioral actions likely to influence course achievement. It is the actual behavioral indicators or applied actions manifesting through conscientiousness that impact achievement. To this end, the current study recommends that teachers and students work to identify what conscientious behavioral routines and actions are required for success. Second, course differentiations are apparent in terms of knowledge required and assessment and grading practice. Programming appears to demand prior explicit knowledge in a manner absent on other courses. From the data, it might be suggested that students entering into the programming course either 1) lack the basic amount of knowledge required or 2) are assessed and graded in a manner that requires knowledge drawn from beyond the course. These ideas are further supported by the finding that even conscientiousness had a negative impact on programming achievement. In basic language, it appears that even positive learning behaviors and applied study actions are insufficient for achievement on the programming course (i.e., explicit knowledge is fundamental and therefore requires intellect). While the mathematics and communication clusters showed similar outcomes relative to achievement, the questions of common assessment and grading practices needs to be considered, especially within the same course structures. For example, as evidenced in the faculty meeting on March 15th, Communication 1 failed more freshmen students than any other compulsory course during 2020 (excluding VEP). The number of freshmen students failed represented an 175% increase on 2019 and a 312.5% increase on 2018. Communication 2 failed 253.8% more freshmen students in 2020 than in 2019. Although the direct evidence explaining such a high percentage of failed students needs further analysis, it seems unhelpful and illogical to have teachers testing and assessing students on different criteria and in relation to different standards of acceptance within the same course. In order to best enable the measurement of learning progress and to isolate learner-centered variables, it is vital that assessment practices are controlled and standardized whenever possible.

Addendum: The ethical guidelines of the Japan Society for the Promotion of Science (https://www.jsps.go.jp/j-kousei/data/rinri.pdf) were adhered to throughout. For the detailed results and a complete reference list see the E6 2020 *tokubetsu kenkyu* report.

Staff**:** Damian Rivers, Michael Vallance, Michiko Nakamura

6-3. Practice and Evaluation of Online Lecture in Introductory Mathematics (F3)

1. Program description

The Center for Meta-Learning has been providing introductory education for the study of mathematics to incoming enrollees and new students. For incoming enrollees, we have been mailing and grading problems in the field of high school mathematics, which is the basis for learning mathematics at the university. In addition, supplementary mathematics lectures (Mathematics IIB courses and Mathematics III courses) have been offered to new students after their arrival on campus to supplement their mathematics courses at the university. In previous years, the special mathematics courses were offered in a face-to-face format. However, from the first semester of the AY2020 (R2), lectures at the university were offered online to prevent the spread of the new coronavirus. This had an impact on the implementation of the supplementary mathematics lectures. It was decided that the supplementary mathematics lectures would be conducted in an online format. In this study, we focused on introductory mathematics education in an online environment. This study examines the educational effects of supplementary mathematics lectures in an online environment and how to provide effective introductory education.

2. Overview of AY2020 activity

The supplementary mathematics lectures (Math IIB and Math III) for the AY2020 started in the fourth week of May using an e-learning system. Math IIB was compulsory to students who were judged to need the supplementary class by the faculty in charge of the freshman Analysis courses (55 students in the first semester, 41 in the second semester). For Math III, voluntary attendance was open to all students taking Analysis. The number of students taking Math III in the first semester was 176, and 132 in the second semester.
In conducting the course, lecture videos were recorded, and lecture materials and videos were distributed. Participants downloaded the lecture materials, watched the lecture videos, and submitted assignments using the e-learning system. After the due date had passed, answers to the assignments were made public on the e-learning system and students graded their own work. For Math IIB, students were required to submit the assignments and their self-assessment results after the answers were made public. For Math III, only the assignments were submitted.
The status of assignment submissions and assignment grades were shared among the instructors in charge of "Analysis" for reference in future instructional policies.

3. Outcomes

Through this study, the following findings were obtained regarding the supplementary mathematics lectures in the online environment.

(1) Supplementary Mathematics Lectures and their Impact on Analysis I, II Grades

We compared the performance in Analysis I and II of students who took Math IIB online in 2020 and in person in previous years (2018 and 2019). Results revealed no differences in the final test scores of Analysis I and II between the two groups of students suggesting that the online lectures in 2020 were as effective as in-person learning in previous years.
Similar analyses for Math III indicated that the final exam scores of Analysis I and II were higher for the 2020 students than for the students in previous years. One possible factor is that more students took Math III in 2020 than in previous years, suggesting that even advanced students may have taken the lectures in 2020 as the online format made them more easily accessible.

(2) Issues for future consideration

More students abandoned Analysis I and II in the middle of the semester in the AY2020 than in previous years. In the future, it would be desirable to detect such students early and provide them with more targeted assistance in the supplementary mathematics lectures.

Addendum: The detailed results of this study can be found in the AY2020 Special Research Report (F3).

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7. Activities Involving Online Classes Performed in Response to the Coronavirus Pandemic

1. Program description

In response to the coronavirus pandemic, all classes in the first half of AY 2020 were changed to online classes. In the second half of AY 2020, a portion of courses were held as blended-type or hybrid-type classes. At the Center for Meta-Learning, various activities were undertaken: a guidebook was created to support online classes, online teaching assistant (TA) training was performed, and online-class workshops were held.

2. Overview of AY 2020 activity and Outcomes

(1) Creation of a guidebook for online classes

Since most faculty members at Future University Hakodate have no experience with online classes, a guidebook titled "How to Proceed with Online Classes" was created. This guidebook, distributed to all teaching staff, included information about the types of online class available and their characteristics, methods of stimulating and supporting continuous learning, the use of copyrighted materials in online classes, and links to online sites with related resources.

A further guidebook was created and distributed to all teaching staff. Titled "Methods of Performing Online Classes by Class Type," this guidebook provides specific instructions on what to prepare and how to implement the following six types of online classes:

- On-demand class with slides and other materials: Zoom
- Realtime class with slides and other materials: content without audio
- Realtime class with slides and other materials: content with audio
- Realtime class with board lessons: Zoom delivery from the classroom
- On-demand class with board lessons: Recorded in the classroom
- On-demand class with board lessons: using pen tablets

(2) Online TA training

In addition to the teacher of an online class, so-called "e-mentors" (people who support student learning) are also indispensable. Our TAs, however, had no previous experience with online classes. Therefore, five on-demand online TA training courses were performed, with contents as stated below. During the training period from April 21 through May 11, 2020, 27 people participated in this online training.

Session 1: Online classes using ICT
Session 2: Advantages and disadvantages of online classes
Session 3: The Work of Online Ta
Session 4: Support for the start of classes
Session 5: Instructions for learning content and methods in online classes

After completion of the training sessions, a survey was performed with questions from the learning motivation ARCS (attention, relevance, confidence, and satisfaction) model[1], with responses made along a five-point scale ranging. Respondents numbered 25 people. Table 1 shows the means and standard deviations (SD).

Table 1. Post-TA training questionnaire results

Question items	Mean	SD
1. Did this training stimulate your interest in online TA work?	4.00	0.75
2. Do you think the training contents will be helpful for your online TA work?	4.60	0.49
3. Do you think you can now perform your online TA work well?	3.64	0.93
4. Are you satisfied with the training contents?	4.24	0.81

(3) Performance of online-classes workshops

To enable faculty members to share their knowledge and know-how regarding online classes, online-class workshops were held using Zoom. Table 2 shows the contents, presenters, and number of participants for each of these workshops.

Table 2. Online class workshops

Date of workshop	Contents	Presenter	Participants
September 7, 2020	Personal views on how to conduct lectures with mathematical content	Ei-Ichi Osawa, Professor	43
	A Trial of Online Lecture with Mixed Styles of Real-time and On-demand	Kei Ito, Assistant Professor	
September 14, 2020	Practical report of a math class using a pen tablet	Kengo Terasawa, Assistant Professor	34
	Use of Live Comment Posting System like Nico Niko Douga in Online Lectures	Shigeru Sakurazawa, Professor	
February 12, 2021	Blended learning design tips	Atsuko Tominaga, Professor	28
February 17, 2021	Introduction of a HyFlex-type course in "Fundamentals of Electronic Engineering"	Yuichi Fujino, Professor	34
	Introduction of a HyFlex-type course in "Fundamentals of Programming"	Yoh Shiraishi, Professor	
March 8, 2021 2021	Introduction of "engineering ethics/liberal arts courses" with effective and efficient feedback	Emiko Tayanagi, Professor	34
	Methods of effective and efficient feedback	Atsuko Tominaga, Professor	

[1] Keller, J. M. (2009) Motivation design for learning and performance: The ARCS model approach. New York: Springer SBM (Katsuaki Suzuki, Translation Supervision (2019) Designing motivation for learning: Instructional design using the ARCS model. Kitaooji Shobo, Kyoto)

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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.

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