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Using virtual fieldwork to support interprofessional and community-based learning: students from four faculties investigate life on a remote island in Japan

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Introduction: The Mishima Islands in Kagoshima Prefecture, Japan, are remote islands designated as medically underserved. Supporting the people living in such remote islands requires a multifaceted examination of the livelihoods of the residents, including their health, work, and living environment.

Methods: Students from the faculties of nursing, veterinary science, agriculture, and engineering participated in a 3-day virtual fieldwork session held synchronously from the campus of Kagoshima University and on a remote island in the Mishima Mura island group in Kagoshima Prefecture, Japan. Coursework and post-course surveys were analyzed to determine student engagement and learning. In particular, the analysis considered learning in relation to interprofessional learning and community-based learning.

Results and discussion: Students expressed being able to conduct fieldwork online, collaborate with students from multiple faculties and graduate schools, and apply their expertise. These outcomes were reflected in the five-point Likert scale evaluation responses, highlighting a sense of accomplishment and satisfaction. Virtual fieldwork can contribute to student learning by introducing new concepts and allowing them to consider development issues in remote areas from multiple perspectives.

KEYWORDS

virtual fieldwork, interprofessional learning, community-based learning, multidisciplinary study, remote islands

1 Introduction

Kagoshima University is located in Kagoshima Prefecture, in the southernmost part of Kyushu, Japan. It is a comprehensive university consisting of nine faculties with close ties to the local community. Kagoshima Prefecture spans approximately 600 km from north to south and includes 28 inhabited remote islands. It ranks first in terms of both island area and island population in Japan, with 10% of its residents living on these islands. Among the 28 islands, 17 are designated as “medically underserved areas” (Kagoshima Prefecture, 2018), and the small, isolated islands have few physical and human resources, making the lives of their residents vulnerable. Supporting the people of such remote islands requires a multifaceted examination of the livelihoods of the residents, including their health, work, and living environment.

Mishima Mura, Kagoshima Prefecture, is a municipality comprising three remote islands. Although these islands are the second closest island group to the mainland, their small size and distance from major island destinations, such as Yakushima and Tanegashima, severely limit access. Owing to historical efforts by the central government, each island has a public health center, city office, public elementary and junior high schools, gymnasium, post office, and ferry port. Once on par with mainland facilities, they are now aging, and the remoteness of the islands hampers building maintenance. The main industry is agriculture; in particular, farmers raise free-range wagyu cattle and sweet potatoes for the local shochu liquor industry. The Mishima Islands are ideally suited to these industries, yet the population decline means that farmers struggle to pass on their farms and farming knowledge to the next generation. The aging population requires considerable health support, and aging dwellings contribute jointly to resident health outcomes and population decline as the younger generation moves further afield for better accommodation and work opportunities. It is designated as a medically underserved area with no doctor. In addition, the islands are situated along a typhoon path and frequently experience storm damage that affects buildings, livestock, crops, transportation, the supply of goods and services, and residents' health.

In the face of these interconnected and challenging issues, the university developed a course to raise awareness about remote island conditions. It allows students to identify issues related to their field of study while considering ways to improve services on the islands from a multidisciplinary perspective. “Kagoshima de SDGs” is an advanced common education course positioned as “Collaborative Fieldwork on Remote Islands between Agriculture, Veterinary, and Industrial Sciences: Mishima Village Project for the Health of People, Crops, Animals, and Communities.” In this project, by leveraging the strengths of a comprehensive university, students from the fields of health sciences, agriculture, veterinary medicine, and engineering (architecture) conducted virtual fieldwork through web interviews with sweet potato and livestock farmers living on these remote islands. The interdisciplinary group of students collaborated to assess various aspects of life and shared the challenges they identified. Students earned one credit for the course, and course enrollment was open to undergraduate and graduate students. This paper examines how a group of students from different fields use virtual fieldwork to collaborate toward interprofessional education (IPE) through CBL in a remote island setting. As this is the first time this type of course has

been conducted, it is important to assess student learning. This paper reports the outcomes and challenges of this educational endeavor.

2 Background

Achieving progress and development requires not only people with expertise in individual fields but also the collaboration of individuals who are willing to work together toward common goals. In higher education, collaborative learning has been shown to promote meaningful relationships among group members and enhance the psychological well-being of participants (Johnson and Johnson, 2014). Several educational practices have proven effective in supporting cross-disciplinary studies and collaboration, including IPE (also known as interprofessional learning; IPL) and community-based learning (CBL). Since these approaches foster the teamwork and communication skills necessary for professionals in all fields represented in this study, they significantly influenced the design of the course and course materials.

In the field of healthcare, with the advancement of team-based healthcare, IPE has become essential, with the World Health Organization (WHO) publishing the “Framework for Action on Interprofessional Education & Collaborative Practice” (Gilbert et al., 2010). A key component of IPE is collaboration across disciplines and professions. This typically occurs in fields closely related to healthcare and has been documented to extend to fields such as education and social care (Garnweidner-Holme and Almendingen, 2022). To focus on sustainability and considerations for improving the living conditions of remote island residents, the course described in this study included students of agriculture, veterinary medicine, and engineering (architecture), as well as core health sciences students. IPE has previously been successfully applied to occupational therapy and architecture students (Hitch et al., 2012), and the need to consider the health of agricultural workers provides a basis for IPE between health sciences, agriculture, and architecture students.

Community-based learning is an important practice in agricultural sustainability (McKim et al., 2019) and has been shown to have strong transformational potential, leading to increased participant agency (Lotz-Sisitka et al., 2017). Over the past three decades, CBL has come to play a fundamental role in architecture education, contributing to students' development as professional practitioners (Wilson, 2008). In nursing, CBL has been found to increase students' communication skills (Sensenig, 2022), as well as provide opportunities to apply theory in practice (Clark, 2022).

Interprofessional education and CBL have previously been integrated into healthcare education to support career development (Keshmiri and Barghi, 2021), and a core feature of both educational practices in existing studies is collaboration between diverse groups of participants. This fosters the teamwork and communication skills necessary for professionals in all fields represented in this course. This study confirms the results of previous studies and demonstrates the value of collaboration between students in fields that are not normally considered related.

Drawing upon the promising outcomes of existing research and insights such as those referenced above, this course was tailored to cater to students across disparate fields typically perceived as unrelated. Capitalizing on Kagoshima University's robust multidisciplinary environment, students hailing from health sciences,

agriculture, veterinary medicine, and engineering domains engaged in virtual excursions to the domiciles of farmers residing on a secluded island.

To elucidate the achievements and hurdles encountered in this pedagogical endeavor, this study aims to investigate the extent and manner in which students from diverse backgrounds can collaborate in evaluating different facets of island residents' lifestyles and uncovering associated challenges.

3 Methods

This study confirms the results of existing studies and demonstrates the value of collaboration between students in fields that are not normally considered related. We investigate the extent and manner in which students from diverse backgrounds collaborate in conducting virtual fieldwork on a remote island, and uncover associated challenges. To elucidate the achievements and hurdles encountered in this pedagogical endeavor both qualitative and quantitative data was analyzed.

Combining IPE and CBL, and capitalizing on Kagoshima University's robust multidisciplinary environment, students from health sciences, agriculture, veterinary medicine, and engineering domains engaged in virtual fieldwork at the domiciles of two farmers residing on a remote island. Faculty from Health Sciences, Food Production, Large Animal Veterinary Studies, and Architecture collaborated on the development of the course. These fields were selected since they were all judged to have a direct relationship to the community in Mishimamura by participating faculty. The project design and implementation was managed by the Faculty of Health Sciences through their existing involvement with the Public Welfare Division in Mishimamura. This connection was also the source of the project, designed as a means to better understand the problems faced by island residents. Collaboration with faculty from Food Production and Veterinary sciences was related to their own involvement in industry on the island. Collaboration with Architecture came through faculty engaged in historical building preservation and conservation in Kagoshima's islands.

In terms of course participation, the breakdown of the participating students by field was as follows: Health Sciences—Nursing (three students), Physical Therapy (one student), Occupational Therapy (one student), Agricultural Sciences (one student), Veterinary Medicine (Livestock) (one student), and Engineering (Architecture) (two students). Students majoring in Nursing, Physical Therapy, Occupational Therapy, and Agricultural Sciences were undergraduates, while those majoring in Veterinary Medicine and Engineering were graduate students.

3.1 Course objectives

The overarching objective for all students was to develop the ability to investigate individual and community needs to support aging in place for residents in isolated island communities from the perspective of their specialization. They achieve this aim through inquiry learning with community participants. The specific objectives for each field were set as follows:

3.1.1 Health sciences

Students in Health Sciences aimed to discover daily living conditions, including those that affect physical and mental health, family and social relationships, labor and material resources and their application, and how individuals with different areas of expertise cooperate to support community life on the remote island.

3.1.2 Engineering

On remote islands, where it is difficult to procure supplies immediately and carry out highly specialized construction work, how should the maintenance and management of settlements be carried out so that residents can live safely and comfortably? By discovering the actual status of built environment maintenance and management activities through interviews with village residents, we will explore the scope of adaptive DIY building maintenance and management and consider how external support should be provided.

3.1.3 Veterinary medicine and agricultural sciences

Students in this field aimed to discover the relationship between livestock farmers and their animals and its impact on daily life and to develop a deeper understanding of how the availability of labor and material necessities affect animal health. We also explored how livestock farming fosters the passing down of family knowledge, interdisciplinary and multidisciplinary collaboration, and social relationships on this uniquely remote island.

3.2 Community and participants

The furthest island in the Mishima Mura island group is Kuroshima, with a population of less than 200 and nearly half of the population over the age of 65. This site was chosen because of its inaccessibility (intermittent ferry service lasts over 5h) and small population. Two nurses resided in Kuroshima and worked at an island health clinic. Public health nurses from the mainland regularly visit the island to conduct health checkups and health education, and a doctor visits the island once every 3 months to provide medical care. Other professional support, such as veterinary care and building maintenance/construction work, is also carried out by intermittent visitors. One community participant was selected for each of the two student groups. While all community members have health concerns (nursing field) and live in dwellings (architecture field), these participants were chosen due to their work in farming and animal husbandry (food production field; veterinary field) respectively.

[Participant 1] A farmer in his 80s, living alone in a traditional hand-built wooden detached home that he had progressively renovated and added to over the years. He cultivates sweet potatoes and oranges. The sweet potato field is on a hill, and the orange orchard is on sloping terrain; therefore, he uses a motorcycle to move around the fields. Health issues included lower back pain and a heart condition.

[Participant 2] A livestock farmer in his 60s living with his wife and dog. They raised 60 heads of cattle that grazed freely on the pasture and had a unique dietary habit of consuming naturally growing bamboo in addition to regular feed. The farm primarily produces black wagyu beef, and calves are raised in cattle sheds until ready for shipping to the mainland. Veterinary checkups were

conducted twice monthly. This farmer had a medical history but no chronic illnesses during the interview.

3.3 Course implementation

Originally planned as an on-site fieldwork course, the COVID-19 pandemic necessitated a shift to online education as travel to the Mishima Mura Islands was severely restricted. Accordingly, the course components were adapted and implemented as described below.

The course was held for 3 days, from November 25 to 27, 2022. With the assistance of the Mishima Mura municipal staff, who introduced the participants and provided logistical support, faculty members traveled to Kuroshima with video recording equipment in 2020. They recorded the preliminary interviews with the participants and created video footage of their living and working environments. This footage was viewed by students in 2022 in order to prepare for their virtual fieldwork. An online orientation was conducted on the first day of the course. Following the orientation, students engaged in self-directed learning by viewing prerecorded video footage and using downloadable worksheets that set preliminary tasks for the Kuroshima virtual fieldwork (Appendix 1). On the second day, students and faculty members gathered on campus and connected with the faculty on Kuroshima online. Based on their preliminary task, the students conducted web interviews and virtual fieldwork with two community participants. During virtual fieldwork, students observed the participants' homes, grazing environments for cattle, cattle sheds, and the process of transporting calves via a video call. They interviewed the subjects and observed their daily lives regarding sweet potato and orange fields, livestock work, and the environment of the village, including residences, infrastructure, roads, and so on, and asked about the health and physical condition of the participants and their families. Subsequently, to ensure an equal distribution of students from each field, the students were divided into two small groups, and each group conducted group work according to a virtual fieldwork follow-up worksheet (Appendix 2). After completing the group work on campus, students once again connected to the faculty on Kuroshima, who were joined by the two community participants and municipal nursing staff. Students presented their reflections on virtual fieldwork and held discussions about the living conditions on Kuroshima with participants and municipal nursing staff. On the final day, the students compiled information from their worksheets and conducted a self-assessment activity to reflect on their learning experiences.

3.4 Course assessment

The course assessment adopted a multiple methods approach to gain a full understanding of the course's value for students. The effectiveness of the course as an integrated IPE/CBL learning experience was measured through the quantitative analysis of a post-course student survey. Additionally, qualitative data from a sample of course worksheets was extracted to elucidate student learning related to SDGs and life on remote islands.

All responses were gathered in the students' first language (Japanese) and analyzed by faculty members, whose first language was Japanese. For the purpose of reporting in this paper, questionnaire content and relevant responses were translated into English by a

professional translator and confirmed by bilingual L1 Japanese/L2 English and L1 English/L2 Japanese research authors.

3.4.1 Post-course student survey

A post-project questionnaire survey was conducted anonymously online (using Google Forms), targeting nine participating students. Questionnaire responses were collected between February 9 and March 5, 2023. The response rate was 100%. The questionnaire had two sections: a section with a five-point Likert scale evaluation and a section with open-ended responses. The Likert-scale questionnaire comprised the following 14 items shown in Table 1.

Each item was evaluated on a scale of 1–5, with 1 being the lowest and 5 being the highest. The response data was analyzed using a horizontal bar graph (average \pm S.D.) in Microsoft Excel, and a graph was created comparing responses to the 14 items (Figure 1).

The open-ended questionnaire included five items as follows:

- 1 Was the content suitable for the course?
- 2 Was the course valuable to you?
- 3 Opinions and suggestions for improving this course.
- 4 Was the content appropriate for conducting discussions between multiple faculties?
- 5 Opinions regarding improvements in lecture content and progress for the next academic year.

Responses to the open-ended questionnaire were analyzed using User Local, a commonly available Japanese AI text mining application.

3.4.2 Course worksheet analysis

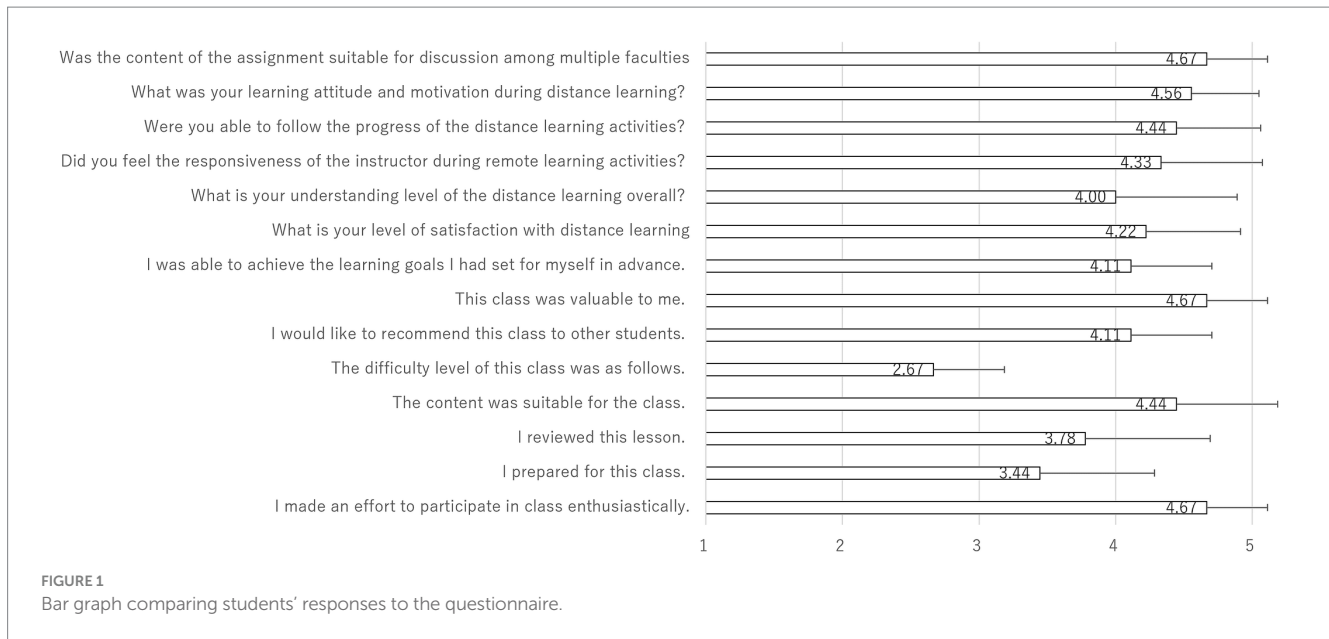
To gain a qualitative understanding of student learning, worksheets from the virtual fieldwork activities were analyzed. There were two worksheets assigned during the course; one was completed individually and one was completed by the group. The aim of the worksheets was to have students reflect on their learning and articulate their perceptions in writing. Six undergraduate students from Nursing (3), Physical Therapy (1), Occupational Therapy (1) and Agriculture (1) submitted both worksheets, "Kuroshima Post-Visit Assignment (Individual)" and the "Kuroshima Post-Visit Assignment (Group Work)." We analyzed what students had written under the headings of "professional learning" and "achievement of group goals." Using content analysis, we extracted students' description of their learning, and assigned categories to them. The first two authors independently analyzed the text and confirmed common categories. They then sought and received consensus on the decided categories from the collaborating authors. The categories are as follows: entries under "professional learning" were classified into seven categories: "life of the interviewees," "house," "industry," "relationship with animals," "interdisciplinary collaboration," "power of government," and "learning for the future." Entries under "achievement of the group goals" were classified into six categories: "life of the interviewees," "house," "animals," "industry," "interdisciplinary collaboration," and "prospects for the future."

3.5 Ethical considerations

The Sakuragaoka District Epidemiological Research and Ethics Committee at Kagoshima University granted approval for this study

TABLE 1 Survey questions and anchors.

Questions	Anchor range				
	1	2	3	4	5
1: I made an effort to participate in class enthusiastically.	Not at all	Rarely	Sometimes	Usually	Always
2: I prepared for this class.	Not at all	Rarely	Sometimes	Usually	Always
3: I reviewed this lesson.	Not at all	Rarely	Sometimes	Usually	Always
4: The content was suitable for the class.	Totally inappropriate	Inappropriate	Neither	Somewhat appropriate	Totally appropriate
5: The difficulty level of this class was as follows.	Very difficult	Difficult	Normal	Easy	Very easy
6: I would like to recommend this class to other students.	Not at all	Not really	Neither	Somewhat recommend	Highly recommend
7: This class was valuable to me.	Not at all	Not really	Somewhat	Valuable	Very valuable
8: I was able to achieve the learning goals I had set for myself in advance.	Not at all	Not really	Somewhat	Could be achieved	Could be achieved easily
9: What is your level of satisfaction with distance learning	Not satisfied at all	Not satisfied	Satisfied	Quite satisfied	Very satisfied
10: What is your understanding level of the distance learning overall?	Couldn't understand at all	Couldn't understand	Understand	Understand well	Understand very well
11: Did you feel the responsiveness of the instructor during remote learning activities?	Not at all	Not really	Somewhat	Yes	Very much so
12: Were you able to follow the progress of the distance learning activities?	Not at all	Not really	Somewhat	I could	Very much so
13: What was your learning attitude and motivation during distance learning?	Very low	Low	Usual	High	Very high
14: Was the content of the assignment suitable for discussion among multiple faculties	Not at all	Not really	Somewhat	Yes	Very much so



(approval number: 220077). We provided the research participants with both oral and written descriptions covering the study's background, objectives, and importance, along with details on research methodologies, potential burdens, anticipated risks and benefits of participation, the process for giving consent and withdrawing from the study, handling and disposal of samples, and measures for ensuring privacy protection. Written informed consent was obtained from all participants.

4 Results

4.1 Results of post-course student questionnaires

Responses to the open-ended questionnaire were analyzed using User Local AI text mining.¹ For questions 1–4, the most prevalent word that surfaced by text mining, occurring in the present and past tense, was *dekiru/dekita* (can/could). The number of times this word surfaced for each question was as follows: Q1, 10x; Q2, 12x; Q3, 5x; Q4, 8x. Based on these results, the student responses, including *dekiru/dekita* (can/could), were further categorized thematically using after-coding to pick up the most common areas of response. The three most common words related to *dekiru/dekita* (can/could) for each question are listed below, followed by their text-mining scores in brackets:

Q1 Was the content suitable for the course? A: solve (2.12), specialization (1.92), and occupation (0.44).

Q2 Was the course valuable to you? A: diverse (3.28), point of view (0.16), and discussion (1.66).

Q3 Opinions and suggestions for improving the course design. A: meaningful (0.26), outlook (0.16), and point of view (0.11).

Q4 Was the content appropriate for conducting discussions between multiple faculties? A: exchange ideas (2.01); jointly contribute (1.40); comprehensive (0.99).

In response to these open-ended questions, the expression of “can/could” indicates a favorable view of the course content and design. Expressions of can/could were prevalent across student disciplines, indicating that students found the course to be valuable in terms of professional learning, and they could experience the community setting virtually.

For Question 5 (regarding suggestions for improving future course iterations), the can/could categorization did not apply. The three most common words that surfaced were carry out, deepen, and smoothly.

Among the 14 items rated on the Likert scale in the questionnaire, five questions were related to the evaluation of virtual fieldwork: (Q9) overall satisfaction with remote learning, (Q10) understanding gained through remote lectures, (11) innovative approaches by instructors in remote lectures, (12) ability to keep up with the progress of remote lectures, and (13) attitude and motivation in remote learning. In all these items, the median score was 4 or higher, with an average of 4.5 (for three questions), 4.25 (for one question), and 4 (for one question), indicating high ratings.

4.2 Results of course worksheet analysis

4.2.1 Demonstration of professional learning

Supplementary Table S1 shows the responses written by participating students on the individually-written course work sheets, classified as described 3.4.2. Since the responses are long and numerous, below we describe the general results.

1 Interviewee life: Comments included appreciation for individuals who manage farming activities alone, recognition of the importance of roles in sweet potato cultivation and the establishment of daily routines, positive notes on family and neighborhood relationships, mentions of close-knit

¹ <https://textmining.userlocal.jp/>

communities, and concerns about the potential adverse effects of aging.

- 2 **Housing:** Comments mainly related to the interviewed sweet potato farmer. Students found it valuable to focus on approaches to building repairs, responses to the island's characteristic landscape, improvements in disaster preparedness, knowledge of fire risks based on the positions of exhaust fans and interior finishes, and the benefits of housing renovations. The importance of community maintenance was also highlighted.
- 3 **Industry:** Comments mentioned the potential to add value to sweet potatoes to increase income without increasing production volume by applying sustainable agriculture that aligns with the SDGs.
- 4 **Relationship with animals:** Students discussed topics such as the potential impact of pathogens carried by stray cats on healthcare, psychological aspects of the challenges of keeping pets in the absence of an animal hospital, animal welfare considerations related to grazing in pastures, and the novel perspective of viewing humans and animals as mutually interconnected.
- 5 **Government power:** Comments mentioned the need to seek assistance from local authorities and the involvement of public health nurses in daily life.
- 6 **Interdisciplinary collaboration:** Students recognized the need for information dissemination beyond the medical profession, gained knowledge not covered by their nursing specialization, understood the importance of viewing situations from multiple perspectives, and felt a sense of connection with various fields.
- 7 **Future prospects:** Students mentioned gaining insights into the concerns and opportunities that lie ahead for Kuroshima, recognizing the usefulness of Internet utilization, and realizing the challenges of limited resources for field visits, thus making government intervention more challenging.

4.2.2 Achievement of group goals

[Supplementary Table S2](#) presents the responses written by participating students on the group-written course work sheets, classified as described in 3.5.2. Again we describe the general results referring to [Supplementary Table S2](#) for detail.

- 1 **Interviewee life:** Comments included "It's important to consider how to live with a purpose" and "It's important to find a way to maintain or improve current living conditions." Students expressed concern about how to support island residents in the future.
- 2 **Housing:** Comments related to the maintenance of buildings with a particular focus on how the condition of residential buildings might affect the future convenience of residents.
- 3 **Relationship with animals:** Concern regarding zoonotic disease transmission was raised.
- 4 **Industry:** Comments such as "Livestock can be put to pasture without stress, which is valuable" and "transportation problems and the low number of veterinary visits are problems which need to be addressed" show an understanding of the issues affecting the island industry.
- 5 **Interdisciplinary collaboration:** Many responses included positive remarks, such as "We broadened our perspectives and

were able to think about new things from the standpoint of each field by learning about the connections between various fields." Critical comments indicated that "We had not deeply considered support for residents to lead their own lives."

- 6 **Future prospects:** insights included "We learned about concerns for the future of Kuroshima in all fields," "We realized the usefulness of internet usage," and "The cost of visits makes government intervention difficult," reflecting unique challenges and prospects specific to remote islands.

5 Discussion

5.1 Interprofessional education

Examination of this course supports previous research, indicating that students participating in IPE develop teamwork skills, interprofessional knowledge, and positive attitude toward study ([Djukic et al., 2015](#)). Additionally, feedback in the report on the achievement of group goals ([Supplementary Table S1](#)), stating, "By expressing and sharing opinions from various fields, we were able to learn about the connections between different disciplines," aligns with prior research indicating that such a positive attitude fosters and enhances relationships among professionals ([Leadbeater et al., 2021](#)).

In the open-ended responses to the post-course survey, participating students expressed that they were able to conduct fieldwork online despite the physical distance in a remote island setting, collaborate with students from multiple faculties and graduate schools, and apply their expertise. These outcomes were reflected in the five-point Likert scale evaluation responses, highlighting a sense of accomplishment and satisfaction.

The responses from the worksheets indicated that participants learned a great deal about the lives of the local residents, suggesting that the interviews were effective. From a professional perspective, student responses captured the residents' resilient way of life, the depth of connections among them, and concerns about their well-being as they aged. The responses also highlighted aspects unique to island life. They demonstrated that students effectively addressed housing-related issues, such as renovations and disaster preparedness, the relationship between humans and animals (including animal welfare), and the need for government support. The students were able to grasp these aspects, allowing them to appreciate different perspectives from other fields and broaden their horizons while deepening their understanding of their own areas of expertise.

The discussion between the students was also attended by the participants and a public health nurse in Mishimamura. The participants listened to the students' presentations on their own life and health, expressed verbal gratitude to the students for giving them advice with serious consideration for themselves, and expressed that they had learned the importance of adjusting living habits for continued health. In addition, a public health nurse agreed that student recommendations should be considered by municipal administration, and promised to raise the issues identified by students with administrative staff. We believe that this student education has been beneficial through mutual feedback and is a clear example of IPE paired with CBL.

Other studies involving IPE activities across five or more medical disciplines have reported that results were hampered by the amount of coordination needed for students from various disciplines working on a single activity (Djukic et al., 2015). This project also required a lot of time and effort to coordinate the schedules of the four disciplines and to select participants whose living situations were relevant to each discipline. Moreover, reducing the number of disciplines within each team can increase student involvement and improve the interprofessional experience (van Diggele et al., 2021). We believe this project's four fields of interdisciplinary education may have been the upper limit for effective progress.

5.2 Community based learning

This course was rooted in CBL, meaning that students were to participate in experiential learning in a community setting, rather than the classroom. However the COVID pandemic necessitated student connection to the community via video link, mediating their experience and making it virtual. This presented some challenges which were highlighted in the results.

When examining the results of the Likert scale five-point evaluation in the questionnaire, it was evident that for the participating students, this initiative represented their first experience in trying to understand the daily lives of residents and engaging in virtual on-site discussions, which they found challenging. However, responses regarding satisfaction with participation and willingness to recommend the experience to others were positive, suggesting that, despite the perceived difficulty, students gained a sense of achievement and satisfaction. Furthermore, in the open-ended responses, the participating students expressed that they were able to conduct fieldwork online despite the physical distance of the remote island setting, while collaborating with students from multiple faculties and graduate schools, and applying their expertise. These outcomes were reflected in the five-point Likert scale evaluation responses, highlighting a sense of accomplishment and satisfaction.

Among the five questions related to virtual fieldwork, the one with the most significant variation in responses and the lowest average score of four points was "Understanding gained through remote learning." Students likely found the investigation a challenging task, as it was their first attempt, and understanding the overall lives of the residents and engaging in online discussions seemed to have posed difficulties. However, the high ratings for "Overall satisfaction with remote learning" and "Attitude and motivation in remote learning" indicate that this result does not represent a negative or rejecting attitude toward virtual fieldwork. Furthermore, the results of text mining identified words related to making connections, points of view, and collaboration, which were positive on the whole. The construction of the original Japanese grammar indicated that students felt they could apply or experience the concepts present in the results of text mining. This demonstrates that students were able to make virtual connections with island residents despite the physical remoteness of the island, providing confirmation that although the experience was virtual, it can still be considered to be an example of CBL.

6 Conclusion

The blend of diverse expertise among students facilitated a comprehensive understanding of the island residents' lives. In this project, we collaborated with two remote-island residents who engaged in sweet potato farming and livestock farming, and a public health nurse from Mishima Mura also participated, making this a community-based learning initiative. Students were able to conduct a comprehensive community assessment, not only of the lives of the participants but also of community connections, government support, and disaster preparedness. The challenge of virtual fieldwork is that it requires considerable preparation, which differs from in-person fieldwork, and the quality of activities can be influenced by the content of the video footage. However, virtual fieldwork allows fieldwork beyond physical boundaries, albeit with less sensory immersion. Students can participate without the financial and time burden of travel, and the video material recorded for this lesson can be reused to contribute to the archival footage of remote island life in Southern Japan. Furthermore, virtual fieldwork is likely to become more prevalent in real-world settings, particularly in remote areas. Therefore, it is meaningful for students to gain experience and proficiency using this methodology.

Furthermore, to support effective team communication, it is necessary to educate participants in advance on terminology and concepts in their fields of expertise. Scheduling each field, identifying common topics, selecting participants, and reducing the burden on stakeholders and instructors in each field will challenges in the future. Creating and implementing an IPL/CBL course is a complex task with many difficulties and requires a significant time commitment from stakeholders. Without the dedication of participants, administrative support, and enthusiasm from instructors in various fields, it would be impossible to perform. However, the efforts invested in IPL/CBL are believed to positively impact community members and related organizations, ultimately leading to the development of engaged citizens in the next generation. We hope the students who participated in this project will use this experience to further develop professional and social connections in remote areas.

In terms of study limitations, this study involved only nine students and yielded constrained results from a single year. We aim to extend this project in the future and enhance the evidence supporting educational approaches by gathering and analyzing student feedback continuously.

Data availability statement

The original contributions presented in the study are included in the article/[Supplementary material](#), further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving humans were approved by Kagoshima University Sakuragaoka Area Epidemiological Research Committee (Acceptance Number: 220077). The studies were conducted in accordance with the local legislation and institutional requirements.

The participants provided their written informed consent to participate in this study.

Author contributions

RY: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. FM: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing. BC: Formal analysis, Investigation, Methodology, Validation, Visualization, Writing – review & editing. KI: Conceptualization, Methodology, Project administration, Resources, Software, Writing – review & editing. JK: Conceptualization, Methodology, Project administration, Resources, Supervision, Writing – review & editing. NM: Conceptualization, Methodology, Project administration, Resources, Supervision, Writing – review & editing. KH: Data curation, Methodology, Writing – review & editing. YA: Conceptualization, Funding acquisition, Methodology, Project administration, Supervision, Writing – review & editing. KU: Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/feduc.2024.1421218/full#supplementary-material>

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