



# A New Online Hands-on Practical Training Method Suitable for COVID-19 Social Distancing Regulations

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## Abstract

Online classroom lessons for agricultural and livestock personnel and instructors (animal clinical veterinarians) have been established as alternative ways of learning to allow for the social distancing required to prevent the spread of the coronavirus disease (COVID-19) that emerged and expanded in 2020. However, significant issues remain in developing ways to effectively convey experimental and practical lessons to students. Some of these challenges have been addressed by developing and implementing a new online hands-on practical training method for various veterinary subjects. Currently, online training is limited to watching videos; however, this trial has the potential to provide novel hands-on training online. In our trial, students watched live or asynchronous videos of instructors using a capture board, from which they learned hands-on practices. The learning environment of the students was transmitted by a web camera attached to their PCs and displayed on a large screen visible to the instructor. This enabled the instructor to provide the students with online instructions. In the future, Yamaguchi University's animal welfare philosophy and newly developed alternative online learning methods can be applied to education in other fields.

**Keywords** Equine · Veterinary education · Online hands-on training · Recurrent education

## Introduction

Online classroom lessons have become prevalent as alternative learning methods amid the COVID-19 social distancing restrictions implemented in 2020; however, significant issues remain in developing ways to successfully conduct effective experimental and practical lessons remotely. We addressed some of these challenges by developing a new online hands-on practical training method suitable for COVID-19 social distancing regulations.

The Yamaguchi University Joint Veterinary School has provided undergraduate and recurrent education for horse clinical education that can be conducted at metropolitan or urban universities. The European Association of Establishments for Veterinary Education (EAEVE) and the American Veterinary Medical Association Council on Education (AVMA-COE) are international associations that evaluate

and certify veterinary education. Accreditation from EAEVE certifies the clinical skills of graduates, global standard level of education, and a substantial level of the curriculum and facility of the evaluated faculty. EAEVE is a neutral and reliable external reviewer for veterinary universities [1, 2]. Our faculty was accredited by EAEVE in June 2019, a first for an Asian veterinary university, with a validity period of 7 years. EAEVE attaches great importance to postgraduate education, which is obviously desirable during and after the COVID-19 pandemic. Prior attempts to guide online teaching methods did not sufficiently incorporate experiment and practice [4–10].

Yamaguchi University has been making efforts to replace normal live animal training with simulated models to practice animal welfare-based training methods in veterinary education. During this process, we devised and improved the hands-on training for clinical techniques as well as an equine clinical hands-on training program that can be applied to all universities. The existing hands-on training using simulated model teaching materials has enabled a new online hands-on training development. Here, we examined the educational effect of this online hands-on training.

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## Methods

### Online Hands-on Training Trial

The study was approved by the Research Ethics Committee of Yamaguchi University (No. 02–67). The studied program consisted of 120 h of in-person attendance and 40 h of e-learning as pre-self-study. It was based on *Equine Emergencies* [3], which was used as the text for the course. The students could study abstracts, lesson videos, quizzes, and final exams at their convenience (such as at night or during their holidays). Additionally, hands-on clinical training was offered as a 5-day intensive training in August. The lecturers, comprising 40 working veterinarians, were trained by joint veterinary faculties, off-campus faculties, and clinical veterinarians.

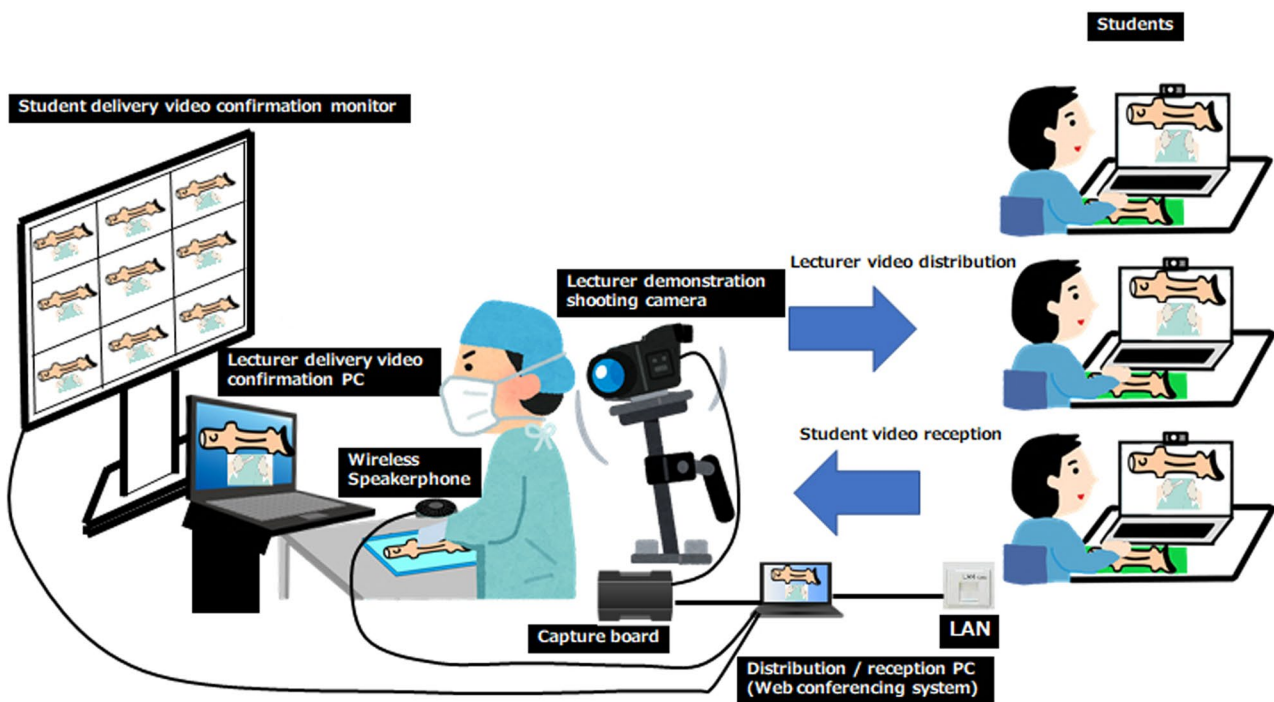
The student participants visited Yamaguchi University and conducted intensive face-to-face training until 2019, then transitioned to online (conference system) as an alternative during the COVID-19 lockdown. The training equipment, like the models, was sent to the students in advance, and they watched the lecturer's demonstration on a PC at home, concurrently conducting hands-on training (Fig. 1). The students' participation was recorded in their homes with a web camera attached to their computer screens. The videos of the students' work were sent to the instructor, who gave them direct instructions based on their progress.

The training content included early diagnosis, first aid, ophthalmology, cardiology, respiratory, lameness diagnosis, image analysis, digestive organs, orthopedics, genitals, anesthesia management, and pathological autopsy, which are important when practicing horse emergency veterinary care. Practical training (practice) items such as group discussions were carried out using a simulated model.

A horse limb model (2800–7 Equine Right Thoracic Lime Soft Tissue W/3<sup>RD</sup> Carpal Fx Split Bone Fx P1Fx C3 Fx, manufactured by Sawbone) was used for some items in the orthopedic practice. In addition to the bone joint structure, other structures such as muscles, tendons, and ligaments were reproduced. This horse limb model can also be used for diagnostic anesthesia; grasping the bone positional relationships at the time of diagnostic imaging; confirming the arthroscopic insertion position; palpation to diagnose lameness, plate, and screw fixing; and bandaging, mounting, and cast fixing.

Additionally, during the training period, online lectures and hands-on training were conducted for outside lecturers who were located in areas where their movement was restricted. Ophthalmology training equipment and pig eyeballs were sent to the participants for the ophthalmology training, and the external instructor provided online training such as corneal suturing, conjunctival flap, sub eyelid perfusion methods, eyelid suturing, and eyeball local dissection.

Online hands-on training requires lecturers to have specific equipment, such as PCs, video cameras, tripods, capture boards, sound-collecting speakers, wired LAN, lighting, and a large



**Fig. 1** The hands-on training equipment (models and tools) sent to the students to use in their remote learning spaces during online classes

monitor. Additionally, the students need equipment (a PC or tablet terminal and a web camera with microphone) and Wi-Fi.

### Evaluation Questionnaire

An evaluation questionnaire was conducted with 20 students (average age:  $43.9 \pm 14.0$  (mean  $\pm$  S.D.), 11 men and 9 women) who had participated in the face-to-face hands-on training conducted in the previous year (2018, 2019) and 20 (average age:  $42.2 \pm 9.1$  (mean  $\pm$  S.D.), 10 men and 10 women) who had participated in this year’s (2020–2021) online hands-on training. In the questionnaire, 11 items related to the lesson were asked with responses at 5 levels (see Table 1). The obtained values are displayed in the table as median (minimum value, maximum value). For statistical analysis, the Mann–Whitney *U* test was used, and a significance level of less than 5% was considered to be significant.

### Results

Self-study time significantly increased during online learning time compared to face-to-face ( $P < 0.05$ ) (see Table 2). This is thought to be because COVID-19 extended the waiting time at home. The instructor’s explanation was well

**Table 2** The evaluation scores from the face-to-face and online hands-on training courses (median score and range of scores)

Question	Face-to-face hands-on training	Online hands-on training
1	1 (1, 3)	1 (1, 2)
2	4 (3, 4)	2 (1, 3)*
3	3 (1, 4)	3 (1, 5)
4	1 (1, 2)	1 (1, 2)
5	1 (1, 2)	1 (1, 2)
6	1 (1, 2)	1 (1, 2)
7	1 (1, 2)	1 (1, 2)
8	1 (1, 2)	1 (1, 2)
9	2 (1, 3)	2 (1, 3)
10	1 (1, 2)	1 (1, 2)
11	1 (1, 2)	1 (1, 2)

Numerical values are displayed as median (range)

understood in both face-to-face and online learning. There was no significant difference between face-to-face and online learning in terms of student achievement and satisfaction. Additionally, the degree of satisfaction of the participants in the evaluation questionnaire was generally high, and it was considered an equivalent educational effect level. For

**Table 1** The evaluation questionnaire completed by 20 participants in the face-to-face hands-on training conducted in the previous year (2018–2019) and by 20 participants in this year’s (2020–2021) online hands-on training

No.	Question items and scores
1	How much of the e-learning have you attended? 1. 90% or more 2. 80–90% 3. 60–80% 4. 40–60% 5. Less than 40%
2	How much extra study (preparation/review/homework/report writing/exam study) did you do in this class? Please average the total time and convert it to the time per lesson. 1. About 3 hours or more 2. About 2 hours 3. About 1 hour 4. About 30 to 50 minutes 5. Less than 30 minutes
3	Do you think you had the basic academic ability to understand Equine Emergency? 1. Yes 2. Somewhat 3. Don’t know 4. Not really 5. No
4	Do you think that the instructor’s way of speaking in the intensive training was clear and easy to hear and the explanation of the training method was easy to understand? 1. Yes 2. Somewhat 3. Don’t know 4. Not really 5. No
5	Did the training books, board writing, and handouts in the intensive training help you understand and implement the contents of the intensive training? 1. Yes 2. Somewhat 3. Don’t know 4. Not really 5. No
6	Are you satisfied with the teacher’s response to questions during the training and office hours? 1. Yes 2. Somewhat 3. Don’t know 4. Not really 5. No
7	Did animal training focus on safety? 1. Yes 2. Somewhat 3. Don’t know 4. Not really 5. No
8	Did this intensive training follow the syllabus? 1. Yes 2. Somewhat 3. Don’t know 4. Not really 5. No
9	Do you think you have achieved the learning goals listed in the syllabus? 1. Yes 2. Somewhat 3. Don’t know 4. Not really 5. No
10	Did you understand the content of this lesson? 1. Yes 2. Somewhat 3. Don’t know 4. Not really 5. No
11	Was this class satisfying for you? 1. Yes 2. Somewhat 3. Don’t know 4. Not really 5. No

This survey was conducted in 1999 and 2000; 100% of the participants answered

example, a participant (female) who had not been working for several years due to marriage, childbirth, and childcare, commented, “By taking classes online at home, I did not have to leave my child.”

## Discussion

At Yamaguchi University, “horse emergency medical care” is provided for working veterinarians who are occupied with “work” or “housework/childcare” and cannot afford the full cost for course attendance or “cannot find an appropriate education and training institution.” In 2018, we established a “horse emergency veterinary practice training program” to provide an opportunity for students to learn practical thinking, knowledge, and skills. This program meets the requirements of the “Certificate of Course” recommended by the Ministry of Education, Culture, Sports, Science and Technology, Japan. It is the first to be offered by a veterinary university in Japan that develops vocational skills to promote learning at universities, graduate schools, junior colleges, and colleges of technology to improve the skills of working adults (e.g., refresher courses for professionals).

Furthermore, in 2020, the program was designated as a “specialized practical education and training course” in the education and training benefit system of the Ministry of Health, Labor, and Welfare. Consequently, students who meet certain conditions will receive a 50% reduction in the tuition fee. Additionally, based on certain conditions after completing the program and if they became employed, students would receive a 20% subsidy and a 70% reduction in tuition fees. This has created an environment that is convenient for working people.

Our study revealed that practical online training is possible and useful for students in the horse emergency veterinary practice training program at Yamaguchi University. During this online training, it was possible to conduct many of the hands-on training items performed during the preclinical period. To pursue this option, however, it is necessary to consider the IT environment of the students for any long-term training. Practical training by a specialized external instructor can be practiced in undergraduate education using the methods described above. It is believed that this opens up the possibility for educational coordination between affiliated universities.

The recurrent education course is for working graduates. As it is often difficult for them to attend classes at the university, on-demand (video) and online lessons can help them learn effectively by allowing them to study at night and on holidays. In addition, it is considered that the educational effect of the model is sufficiently high.

Responses to our questionnaire survey indicate a high degree of satisfaction with the option to take classes online.

The ability for students in remote areas and with lifestyle restrictions to take classes has the advantage of broadening the options for students.

Yamaguchi University has established an industry-academia-government collaboration that includes agricultural colleges, university departments, livestock promotion associations, and veterinary associations and businesses to develop and implement recurrent programs for agricultural and livestock personnel and instructors (clinical veterinarians). This project was adopted by the Ministry of Education, Culture, Sports, Science and Technology as part of their “Specialized Training College’s Core Human Resources Development Project for Regional Industry (2019–2020).” The program was expanded for practicing clinical veterinarians (cattle and horses) and agricultural and livestock-related persons (e.g., farmers and horsemen). In the future, Yamaguchi University will develop training programs that enable lifelong learning for working adults, including veterinarians, and will actively work on recurrent education that adapts to changes in social conditions. In particular, the online hands-on training using the model is effective in animal welfare; hence, students can learn without hurting animals. Additionally, the Yamaguchi University animal welfare philosophy and alternative methods developed to continue training during the COVID-19 pandemic could be applied to education in other fields.

## Declarations

**Competing Interests** The author declares no competing interests.

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