



Current Topic in Japanese Veterinary Education: Progress on Introducing Simulation-Based Practice

Dr Koichi Sato
Yamaguchi University, Japan
2025/11/8



Background

- Veterinary education in Japan has depended on live-animal training.
- In recent years, ethical and educational reforms have encouraged minimizing animal sacrifice.
- But, students are expected to acquire essential clinical skills before entering the polyclinic stage.
- Moreover, the new curriculum needs meat hygiene inspection training, but access to field training sites is often restricted.
- Japanese universities have independently developed and implemented various alternative simulation-based training methods.
- This presentation will introduce the approaches of five universities in Japan.
- The aim of this presentation is to deepen understanding of simulation-based practical training in Japanese veterinary education.



Original titles and authors of today's presentation

- **Practical Veterinary Clinical Education Using Video and VR Teaching Materials: Companion Animal Practice**
Satoshi Takagi, Ayano Kudo, Akinori Yamauchi (Azabu University)
- **Development and Implementation of Surgical Models in Veterinary Education: Companion Animal Surgery Practice**
Kazuhiro Watanabe, Shingo Miyawaki, Haruna Sakai (Gifu University)
- **Utilization of VR Teaching Materials in the Production Animal Clinical Training at Miyazaki University: Large Animal Practice**
Reiichiro Sato, Go Kitahara, Masahiro Ikeda (Miyazaki University)
- **Meat Hygiene Inspection Training Using VR at Rakuno Gakuen University: Meat Hygiene Practice**
Kohei Makita, Kyoko Chisato, Leo Uchida (Rakuno Gakuen University)
- **Initiatives for Digital Transformation in Veterinary Education at Yamaguchi University: Clinical and Meat Hygiene Practice**
Takashi Shimizu, Ai Takano, Kenji Tani (Yamaguchi University)



Practical Veterinary Clinical Education Using Video and VR Teaching Materials: Companion Animal Practice

Satoshi Takagi, Ayano Kudo, Akinori Yamauchi (Azabu University)



映像教材を主体とした 獣医臨床教育の実践



Dr. Satoshi Takagi

○高木 哲¹⁾、藤田 良治²⁾、佐藤 礼一郎³⁾、塚本 篤士⁴⁾、川本 恵子⁵⁾、吉田 大実⁶⁾、大下 諒^{1,6)}

工藤 綾乃¹⁾、加茂 慎太郎¹⁾、山内 章寛¹⁾、原田 優真¹⁾、金井 詠一¹⁾、藤田 幸弘¹⁾

1)麻布大学 獣医学部 獣医学科 小動物外科学研究室

2)愛知淑徳大学 創造表現学部 創造表現学科 メディアプロデュース専攻

3)宮崎大学 農学部 獣医学科 産業動物内科学研究室

4)麻布大学 獣医学部 獣医学科 実験動物学研究室

5)麻布大学 獣医学部 獣医学科 感染免疫学研究室

6)麻布大学 附属動物病院



Veterinary training without the use of live animals

Veterinary training without the use of live animals includes the following practices.

Video Teaching Materials

Simulators (Manikins)

- Commercially Available Models
- Custom-Made Models
- Provision of Skills Labs

Cadavers

- Anatomical Models
- Practice on Cadavers

Computer Simulation

- Primarily Anatomy (Static Objects)
- Anesthesia Simulators

Clinical Training

- Utilization of Diagnostic Imaging Databases
- Collaboration with Animal Shelters

Starting point of the idea: **Can't see well → Can't learn**



Takagi et al. (Azabu University) 

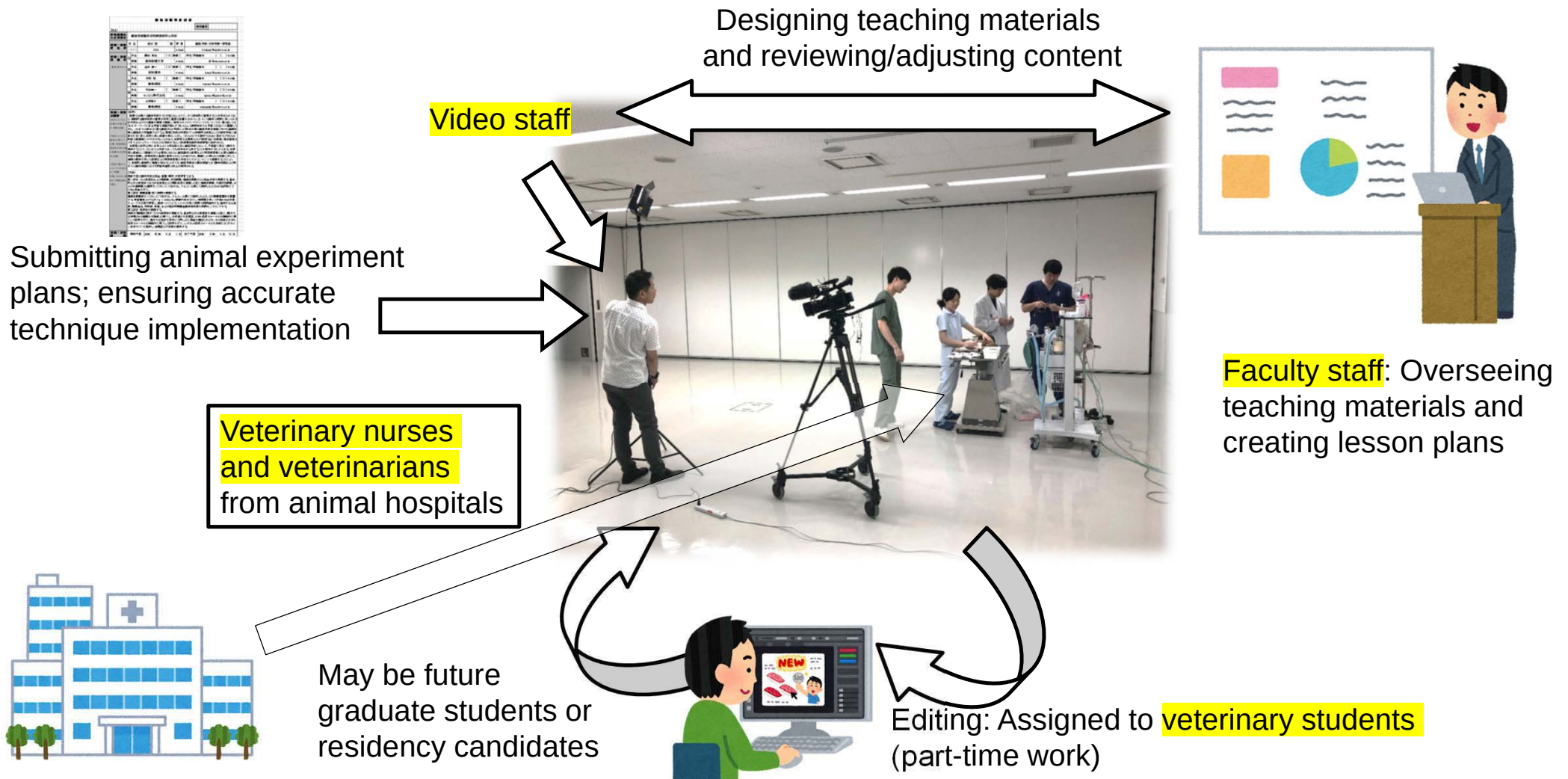
Yamaguchi University ~Discover it. Nourish it. Realize it. A Place of Wisdom.~

Advantages of Video Teaching Materials (Material Characteristics)

The advantages of Video Teaching Materials are

- “Anytime, anywhere, as many times as needed”
- Offers a greater volume of information compared to paper materials
- Enables the delivery of the same comprehensive explanation to every student.
- Particularly effective for universities with large student populations

How to make Video Contents: Home made!



Takagi et al. (Azabu University)

Endotracheal intubation

気管挿管

演示 吉田大実 (麻布大学)
保定 増田智美

制作 高木 哲 (麻布大学)
藤田良治 (愛知淑徳大学)

Evolving to visual learning materials. VR simulators



Takagi et al. (Azabu University)

Scenes during the practical training session



Verification of the educational effectiveness of VR teaching materials

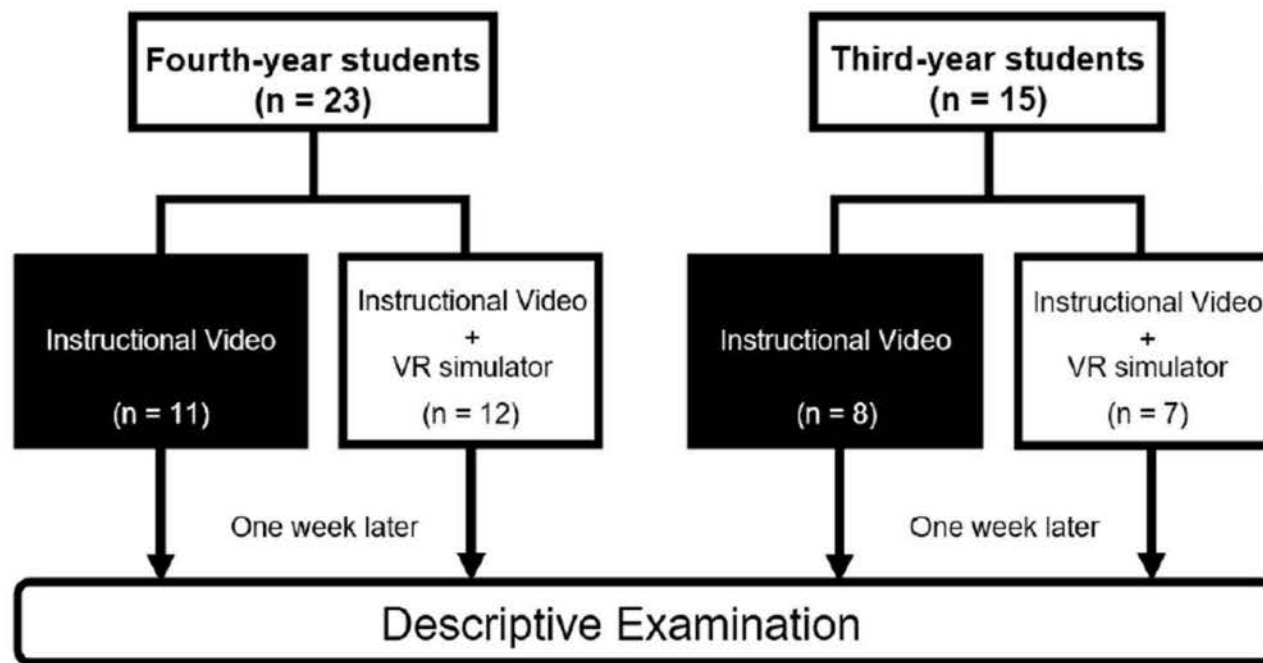


The Veterinary Journal
Available online 26 July 2024, 106203
In Press, Journal Pre-proof [What's this?](#)



Development of a virtual reality simulator for training canine endotracheal intubation technique and evaluation of the educational impacts

A. Yamauchi ^a, R. Oshita ^a, A. Kudo ^a, M. Umezawa ^a, R. Shimizu ^a, S. Kamo ^a, Y. Fujita ^b, S. Takagi ^a



Takagi et al. (Azabu University)

Yamaguchi University ~Discover it. Nourish it. Realize it. A Place of Wisdom.~

Development and Implementation of Surgical Models in Veterinary Education: Companion Animal Surgery Practice

Kazuhiro Watanabe, Shingo Miyawaki, Haruna Sakai (Gifu University)

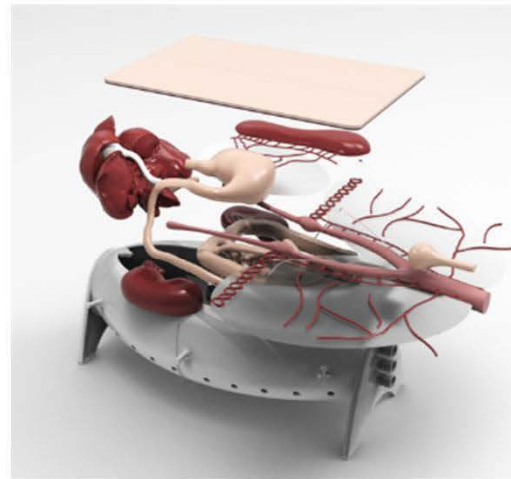


GIFU UNIVERSITY



Dr. Watanabe
Dr. Miyawaki

獣医学教育における手術模型の開発と実践



渡邊 一弘 宮脇 慎吾 酒井 陽菜
(岐阜大学応用生物科学部獣医外科学研究室)

Watanabe et al. (Gifu University) 

From living animals using practice to alternative practice

Objective:

To create a realistic, reusable, and low-cost surgical simulator that enables every student to practice independently before performing at the animal hospital practice.

Key Required Features:

- Enables incision, suturing, and organ manipulation
- Realistic abdominal anatomy using elastomer components
- Cost-effective for repeated use
- Enhances understanding of surgical sequence and anatomy
- Can improve OSCE surgical skill evaluations



Create surgical models that provide an immersive surgical experience

Abdominal Case



Organ Model



Skin Model



Simulates canine abdominal surgery



Elastomer model with interchangeable parts



<Good Surgical Model Requirements>

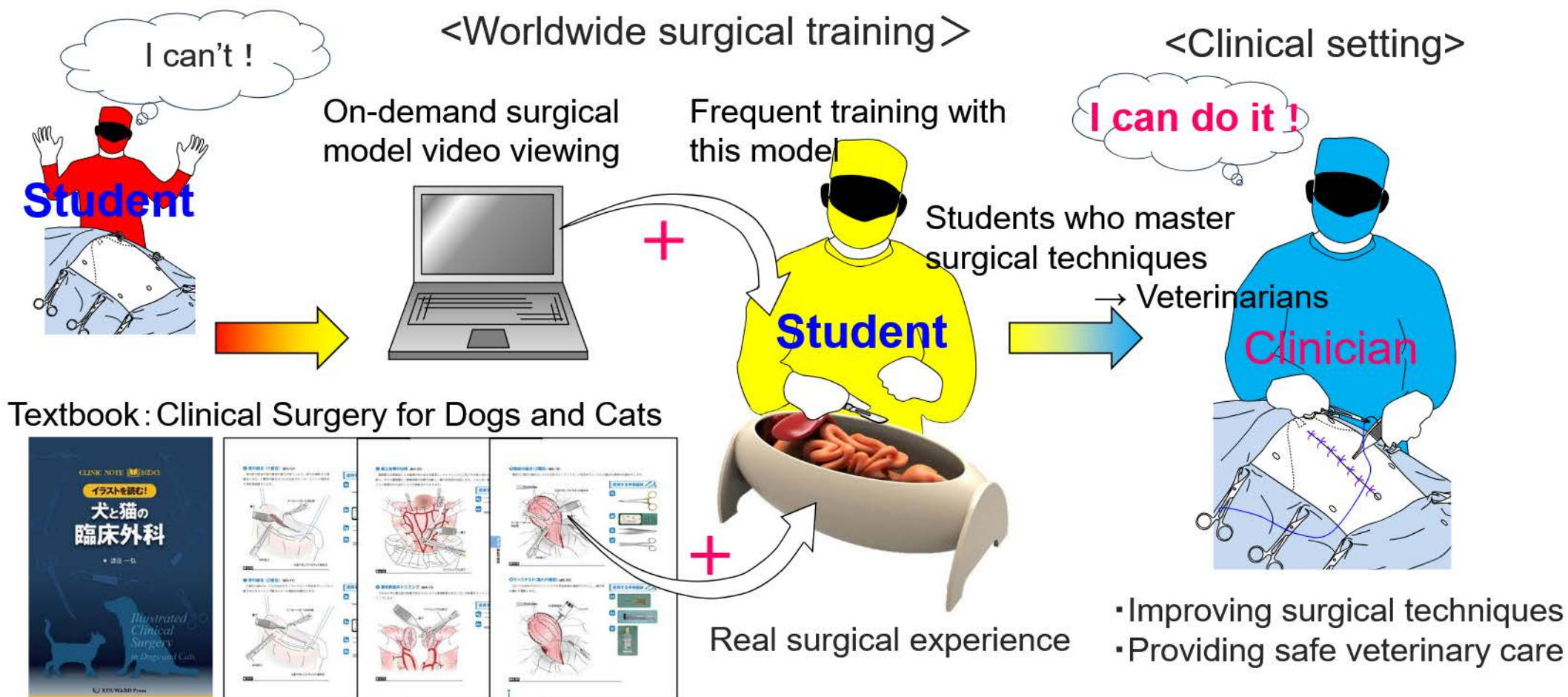
- **Allows incision and suturing:** Functions as a surgical simulator, not just an anatomical model
- **Inexpensive and reusable:** Enables repeated practice until students master surgical skills
- **Precision of skin model:** Realistically replicates laparotomy and closure procedures
- **Three-dimensional arrangement of abdominal organs:** Enables learning with procedural understanding and immersive surgical experience
- **All participants can experience as surgeons (not expensive):** Delivers educational impact exceeding live animal use, moving beyond observation

Watanabe et al. (Gifu University)

Yamaguchi University ~Discover it. Nourish it. Realize it. A Place of Wisdom.~



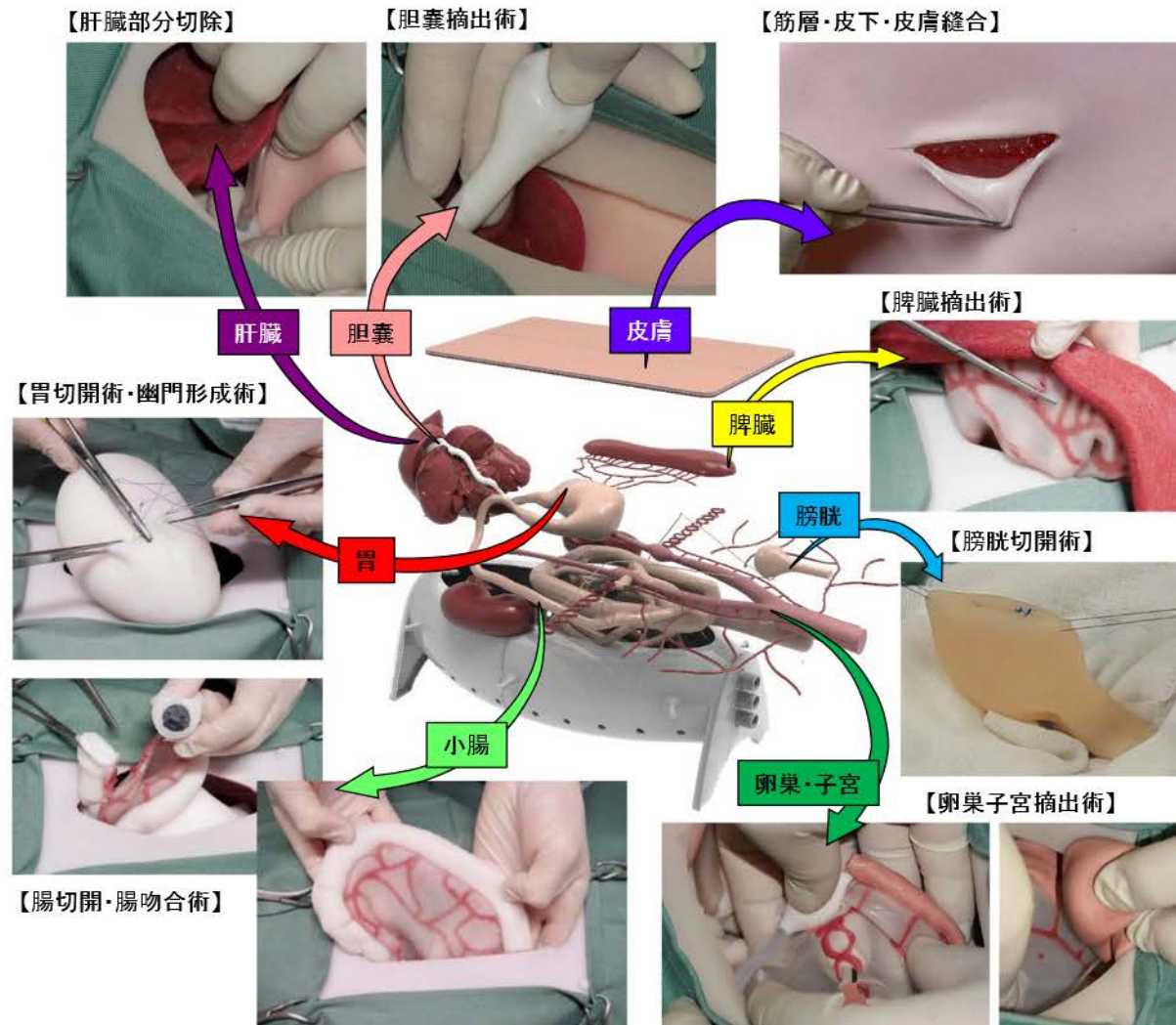
Surgical Training Using Surgical Models + Videos + Textbook

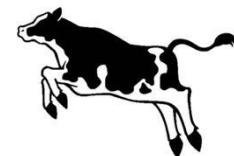


Watanabe et al. (Gifu University)

Yamaguchi University ~Discover it. Nourish it. Realize it. A Place of Wisdom.~

You can touch the actual model!





Utilization of VR Teaching Materials in the Livestock Animal Clinical Training at Miyazaki University: Large Animal Practice

Reiichiro Sato, Go Kitahara, Masahiro Ikeda (Miyazaki University)



宮崎大学の産業動物臨床分野における VR教材の活用



Dr. Reiichiro Sato

佐藤 礼一郎¹ 北原豪¹ 高木哲² 池田正浩¹

¹ 宮崎大学農学部 ² 麻布大学獣医学部

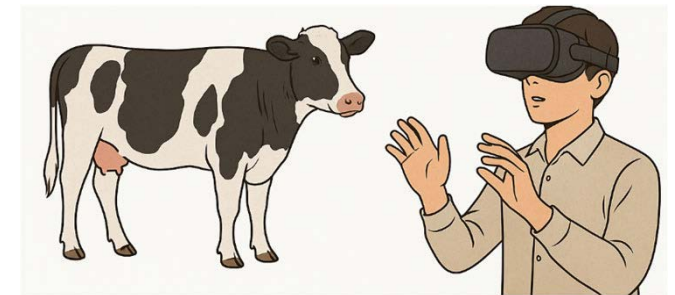
Sato et al. (Miyazaki University) 

Background of Miyazaki University

- 2017 Establishment of the “Committee for Considering the Introduction of Animal Alternatives in Practical Training”
 - ⇒ Discussions toward introducing animal alternatives in veterinary clinical education
- Livestock Hygiene Management Standards ⇒ Difficulty conducting on-farm practical training
- Practical training using live animals ⇒ Exposure and transmission risks for livestock infectious diseases and zoonotic diseases

Considering and promoting the introduction of animal alternative training without live animals

- Utilizing digital devices such as VR (Virtual Reality)



Sato et al. (Miyazaki University) 

VR teaching materials used in livestock animal clinical education

1. VET VR: Assisting with Bovine Calving (with EDUWARD Press)



2. Cattle Clinical Laboratory Training (VR contents)

- ① Body part names ② Body temperature measurement ③ Heart sound auscultation
- ④ Lung field auscultation ⑤ Rumen auscultation ⑥ Visible mucosa examination
- ⑦ Injection technique ⑧ Blood collection method



Scenes during the practical training session



Sato et al. (Miyazaki University) 

Yamaguchi University ~Discover it. Nourish it. Realize it. A Place of Wisdom.~

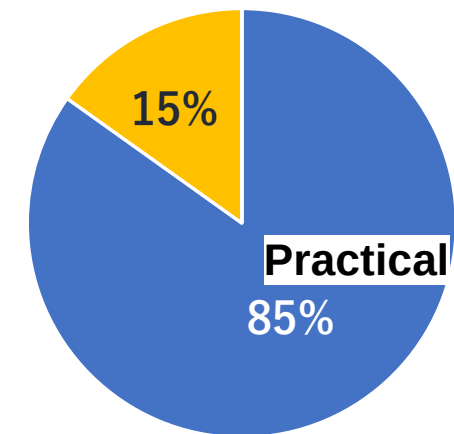
Student Survey Results: Regarding VR



● Advantages

- More hands-on practice
- Easier to understand than videos
- Helps visualize things in 3D
- Made it easier to grasp the fetus

Fairly practical



<Conclusion>

- There is no resistance to VR, and it is an effective educational tool that the students can approach with interest.
- However, VR needs to be combined with textbooks, videos, and other materials.



Meat Hygiene Inspection Training Using VR at Rakuno Gakuen University: Meat Hygiene Practice

Kohei Makita, Kyoko Chisato, Leo Uchida (Rakuno Gakuen University)



酪農学園大学における 食肉衛生検査学実習と VRの活用



Dr. Kohei Makita

蒔田浩平・内田玲麻・千里今日子・松山亮太・浅倉真吾・臼井優・福田昭・
福森理加・及川伸・樋口豪紀・権平智・村松康和・菅野美樹夫・横山敦史・
長野秀樹・宇佐美佳秀・渡邊敬文・秋庭正人・岡本実・鈴木一由
酪農学園大学 獣医学群 獣医学類



酪農学園大学 獣医学群



WOAH食の安全
コラボレーティングセンター



World Organisation
for Animal Health
Founded as OIE



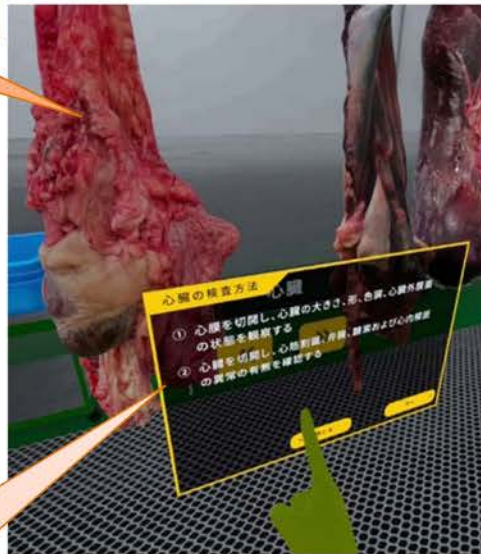
Multi Learning Mode for inspection (ex. Heart)

3D-scanned actual bovine heart, rendered in VR.



A board displaying text. Students click on it to control various learning activities.

① Cardiac examination methods



You touch the heart. An explanatory text about the examination method appears on a panel.

② Incision using a surgical knife



Hold the examination knife and place it against the heart (=cut the heart) .

③ Showing the incision site

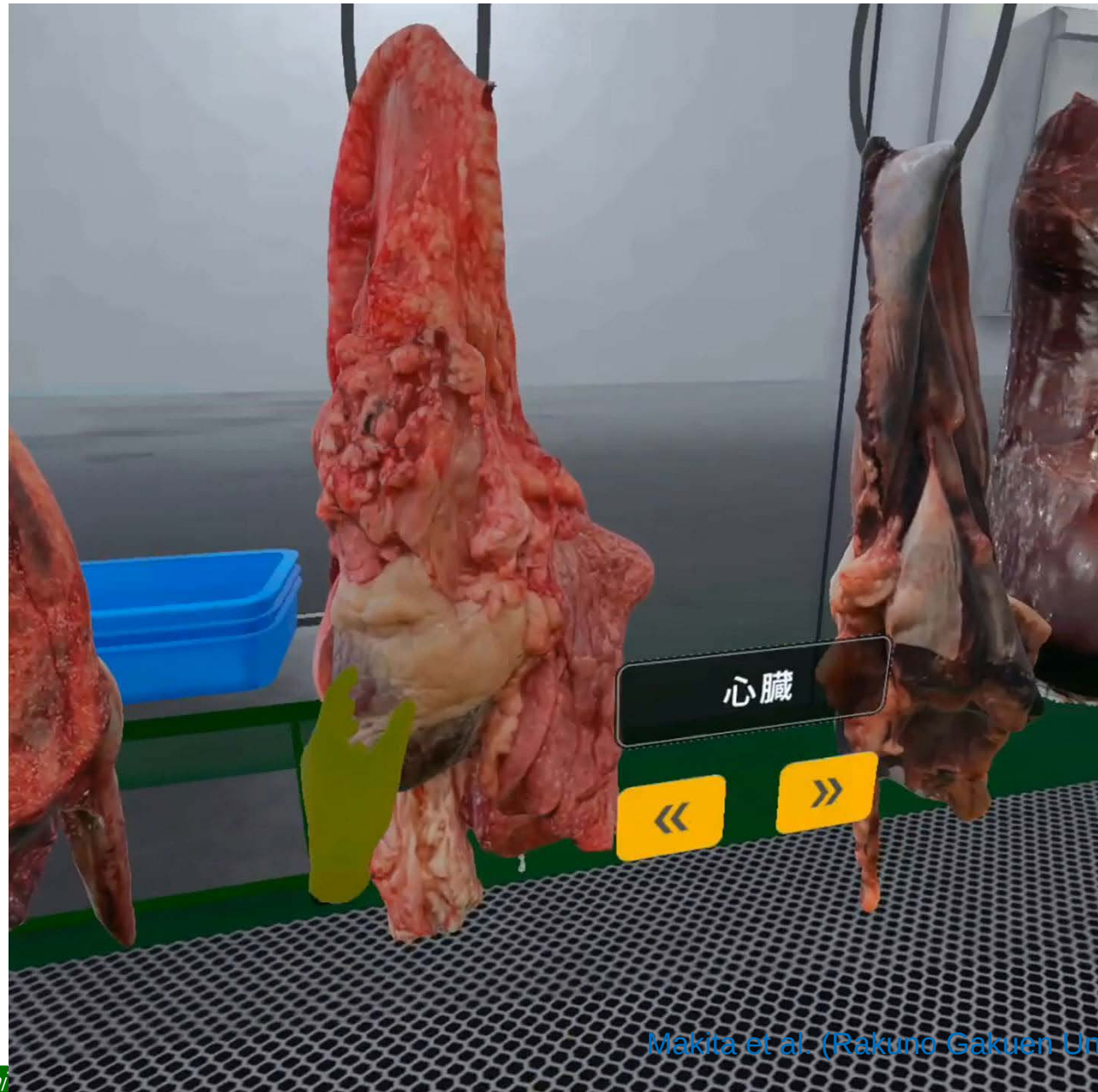


An image of the heart after incision is displayed.

VR: Bovine heart inspection mode

The panel explain how to cut, what you should check, etc.

You can hold the knife and cut the heart.



Initiatives for Digital Transformation in Veterinary Education at Yamaguchi University: Clinical and Meat Hygiene Practice

Takashi Shimizu, Ai Takano, Kenji Tani (Yamaguchi University)



Dr. Takashi Shimizu

山口大学獣医学教育 における DX 活用 の取り組み

○清水 隆¹、加納 聖²、日下部 健³、佐々木 直樹⁴、
高野 愛⁵、谷 健二⁶、佐藤 晃一⁷

¹山口大学共同獣医学部 One Welfare 国際研究センター

²山口大学共同獣医学部発生学・実験動物学研究室

³山口大学共同獣医学部獣医解剖学研究室

⁴山口大学共同獣医学部大動物臨床学研究室

⁵山口大学共同獣医学部獣医疫学研究室

⁶山口大学共同獣医学部獣医外科学研究室

⁷山口大学共同獣医学部獣医薬理学研究室

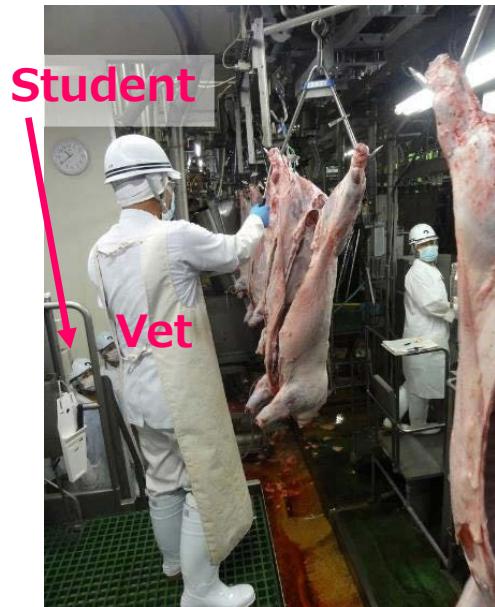


Shimizu et al. (Yamaguchi University) 

Yamaguchi University ~Discover it. Nourish it. Realize it. A Place of Wisdom.~

VR Education Sharing System (iVRES)

Slaughterhouse



Cramped – Noisy - Dangerous
= Difficult to explain



Take a 360° or 180° video
→ Explain in the classroom

Classroom



Teacher (control the video)

Local storage



360°, 180°
Video

Local Wi-Fi
(Closed)

【 Futures 】

- Closed environment usage
- Pointers enabled in VR
- Video mark in VR is possible
- Displayed students as avatar
- Visible student's facing
- Teacher can control videos



Max 10 students can
access simultaneously



Student A



Student B



Student C

Shimizu et al. (Yamaguchi University)

Yamaguchi University ~Discover it. Nourish it. Realize it. A Place of Wisdom.~

VR Education Sharing System



Insta 360 pro2



KISHiVR
キシブル
iVRES
International VR
Education Share system

Shimizu et al. (Yamaguchi University) 

Yamaguchi University ~Discover it. Nourish it. Realize it. A Place of Wisdom.~

Conclusion

■ Overview

Veterinary education in Japan is transitioning from live-animal training to simulation-based learning before clinical rotations in teaching hospitals. Concerns over animal welfare, biosafety, and accreditation standards drive this shift. Five universities are leading innovation through the development of VR, video, and surgical models.

■ Issues

- High implementation costs and limited technical support
- Lack of standardized evaluation metrics for non-animal practices
- Potential risk of “gamification drift” among students
- Need for systematic integration with live-animal practice

■ Improvements

- Multi-institutional collaboration and shared evaluation frameworks
- Open-access educational content and cost reduction strategies
- Faculty development and enhancement of digital infrastructure
- Hybrid use of VR, video, surgical model and traditional practice

■ Future Outlook

Toward animal welfare, sustainable, and competency-based training across Japan and Asia

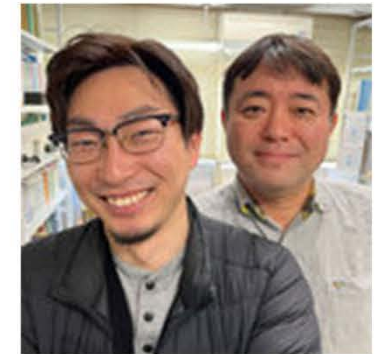


Acknowledgements



Dr. Satoshi Takagi

- Practical Veterinary Clinical Education Using Video and VR Teaching Materials: Companion Animal Practice
Satoshi Takagi, Ayano Kudo, Akinori Yamauchi (Azabu University)
- Development and Implementation of Surgical Models in Veterinary Education: Companion Animal Surgery Practice
Kazuhiro Watanabe, Shingo Miyawaki, Haruna Sakai (Gifu University)
- Utilization of VR Teaching Materials in the Production Animal Clinical Training at Miyazaki University: Large Animal Practice
Reiichiro Sato, Go Kitahara, Masahiro Ikeda (Miyazaki University)
- Initiatives for Digital Transformation (DX) in Veterinary Education at Yamaguchi University: Clinical and Meat Hygiene Practice
Takashi Shimizu, Ai Takano, Kenji Tani (Yamaguchi University)
- Meat Hygiene Inspection Training Using VR at Rakuno Gakuen University: Meat Hygiene Practice
Kohei Makita, Kyoko Chisato, Leo Uchida (Rakuno Gakuen University)



Dr. Watanabe
Dr. Miyawaki



Dr. Reiichiro Sato



Dr. Takashi Shimizu



Dr. Kohei Makita

