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

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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.

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

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

麻布大学 AZABU UNIVERSITY

Dr. Satoshi Takagi

映像教材を主体とした獣医臨床教育の実践

○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 優眞[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)

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

Takagi et al. (Azabu University)

How to make Video Contents: Home made!

Submitting animal experiment plans; ensuring accurate technique implementation

Designing teaching materials and reviewing/adjusting content

Video staff

Faculty staff: Overseeing teaching materials and creating lesson plans

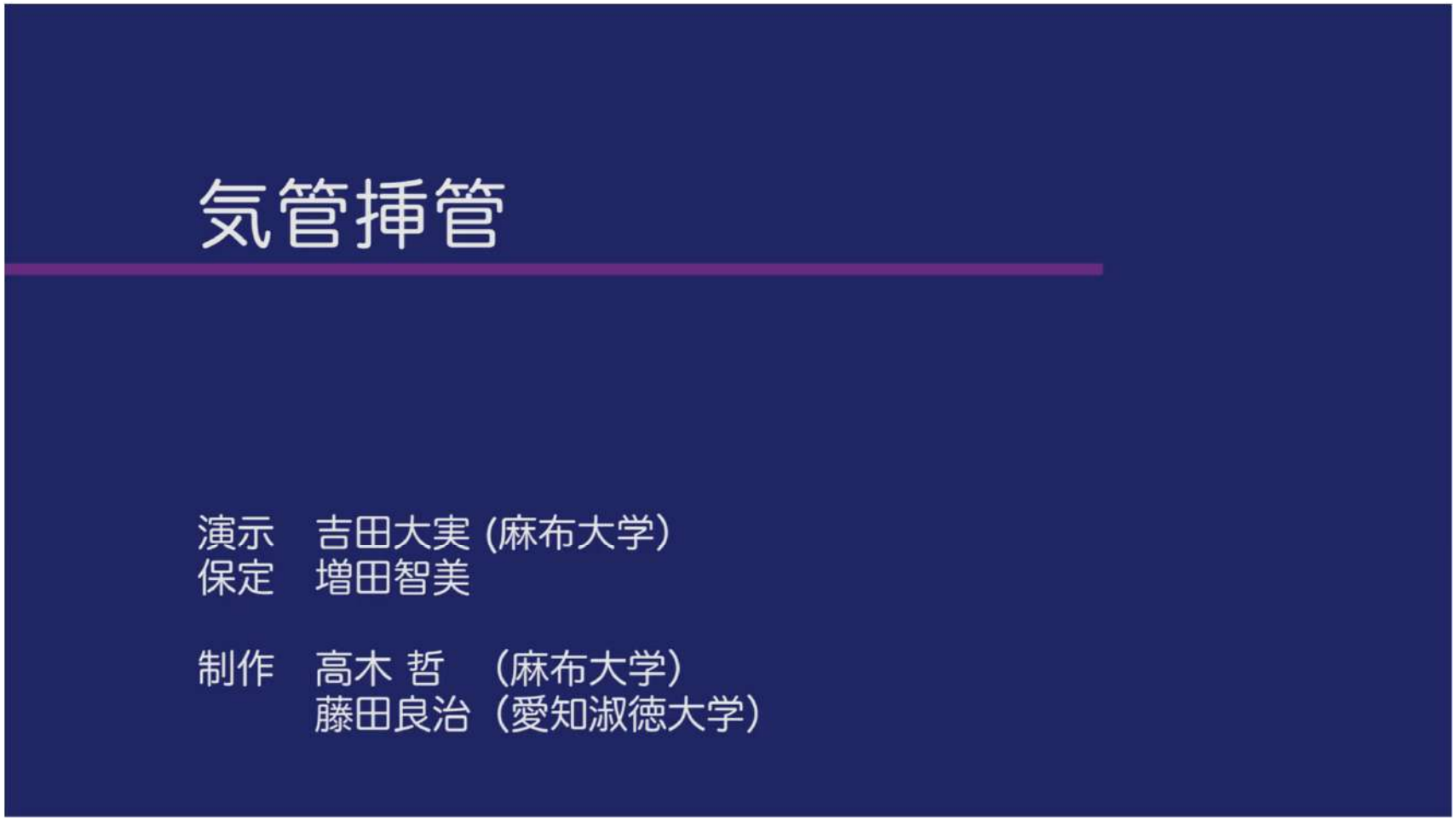
Veterinary nurses and veterinarians from animal hospitals

May be future graduate students or residency candidates

Editing: Assigned to veterinary students (part-time work)

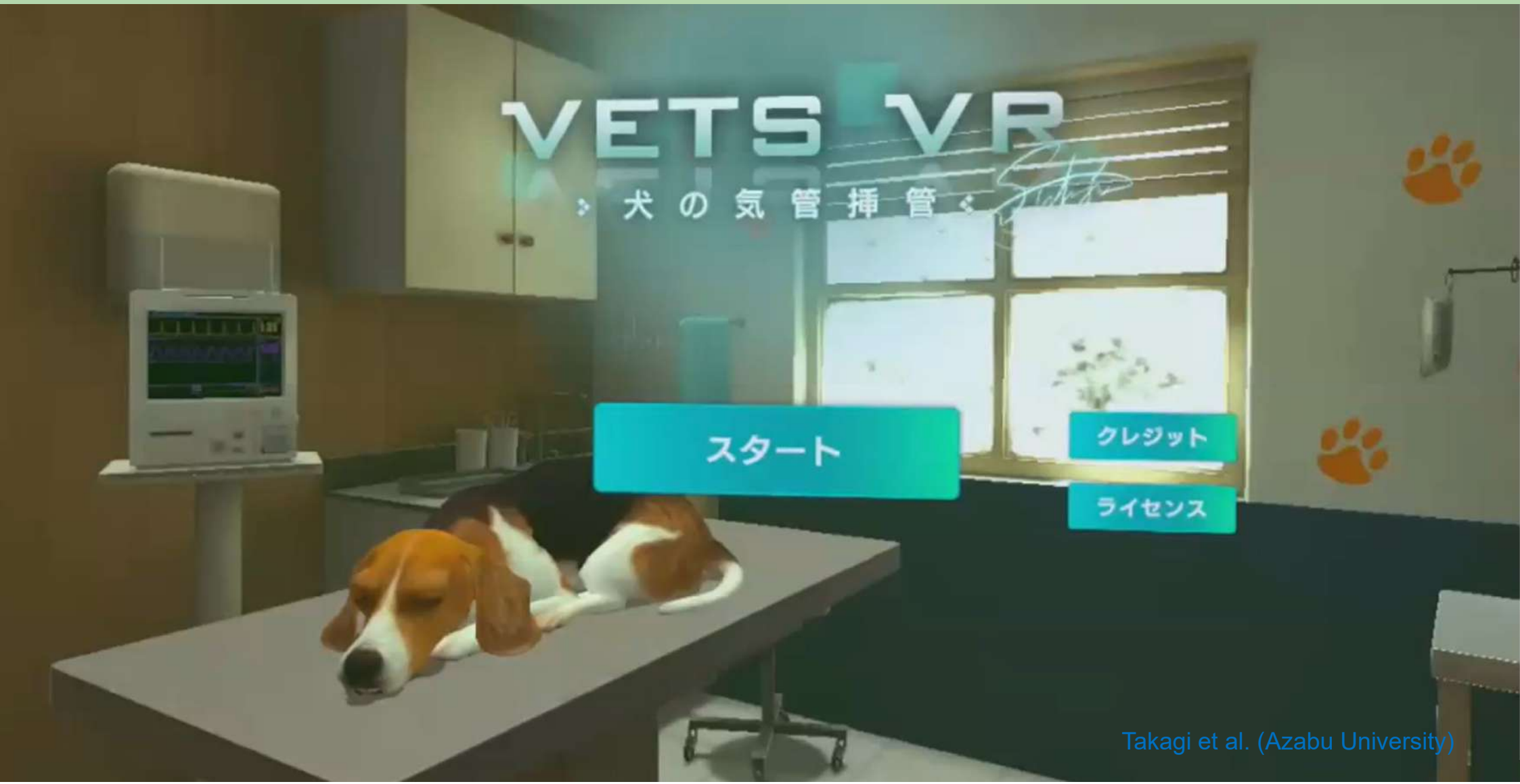
Takagi et al. (Azabu University)

Endotracheal intubation



Takagi et al. (Azabu University)

Evolving to visual learning materials. VR simulators

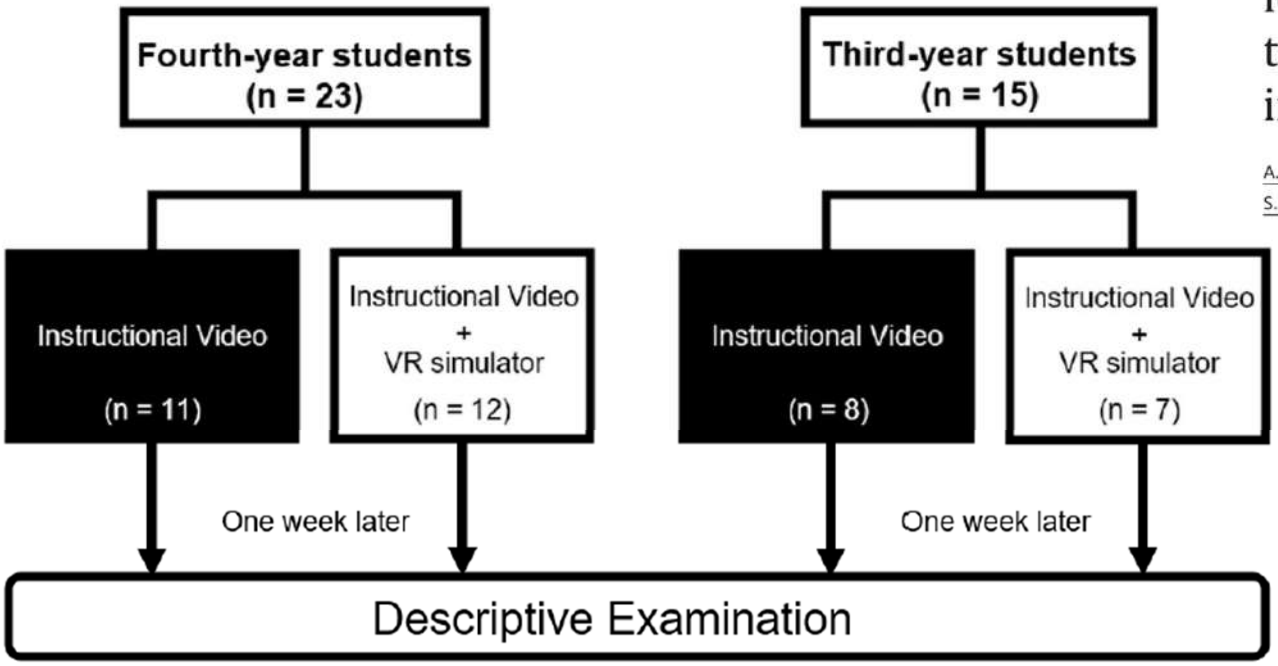


Takagi et al. (Azabu University)

Scenes during the practical training session

Takagi et al. (Azabu University)

Verification of the educational effectiveness of VR teaching materials



ELSEVIER

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)

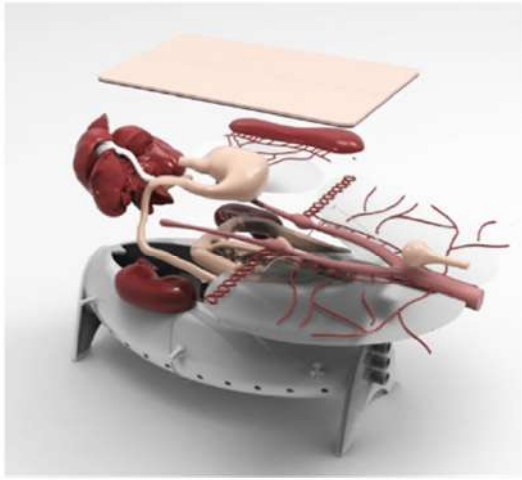
Development and Implementation of Surgical Models in Veterinary Education: Companion Animal Surgery Practice

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

Skin, Subcutaneous Tissue, Muscle Layer, Midline

=

Simulates canine abdominal surgery

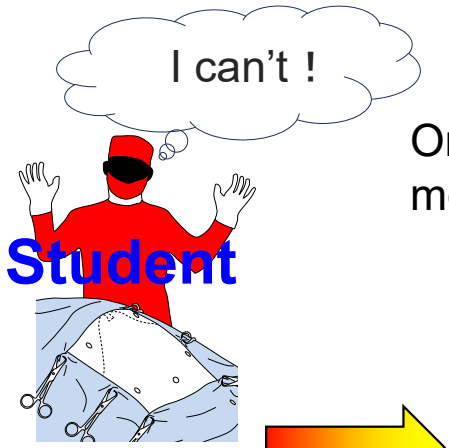
Elastomer model with interchangeable parts

＜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

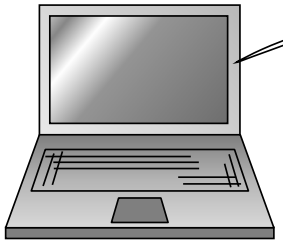
Watanabe et al. (Gifu University)

Surgical Training Using Surgical Models + Videos + Textbook



<Worldwide surgical training>

On-demand surgical model video viewing



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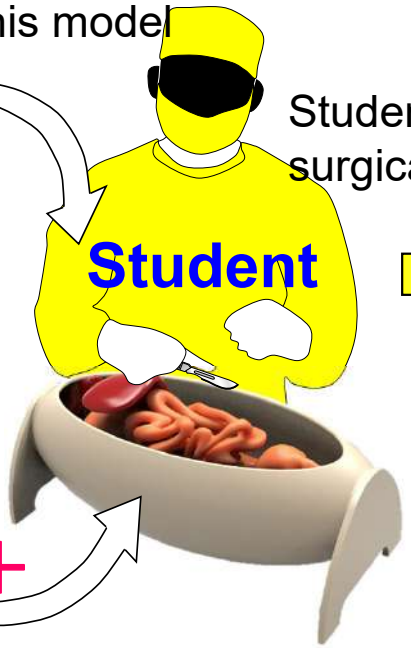
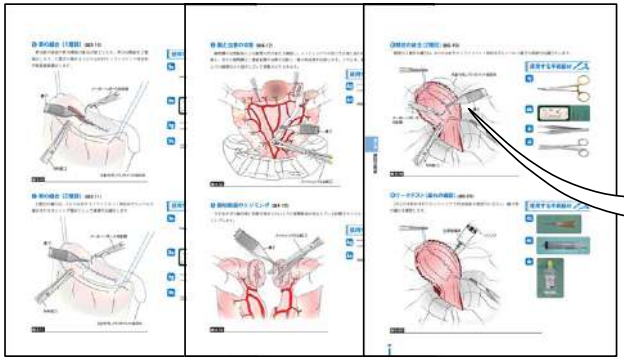
Frequent training with this model



Textbook：Clinical Surgery for Dogs and Cats



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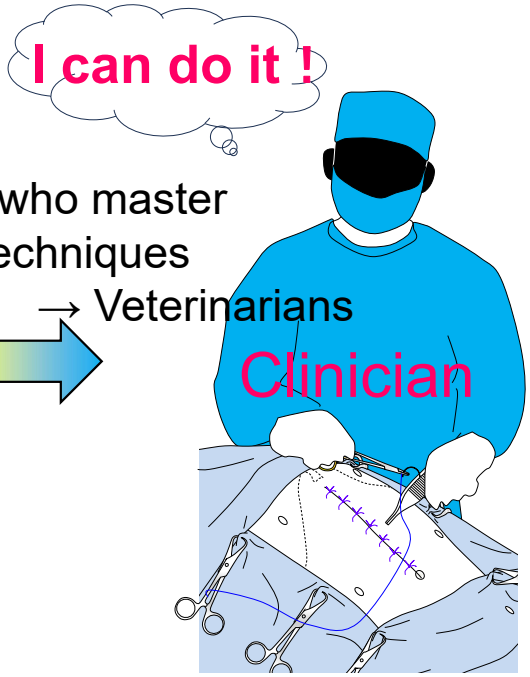
Real surgical experience

Students who master surgical techniques
→ Veterinarians

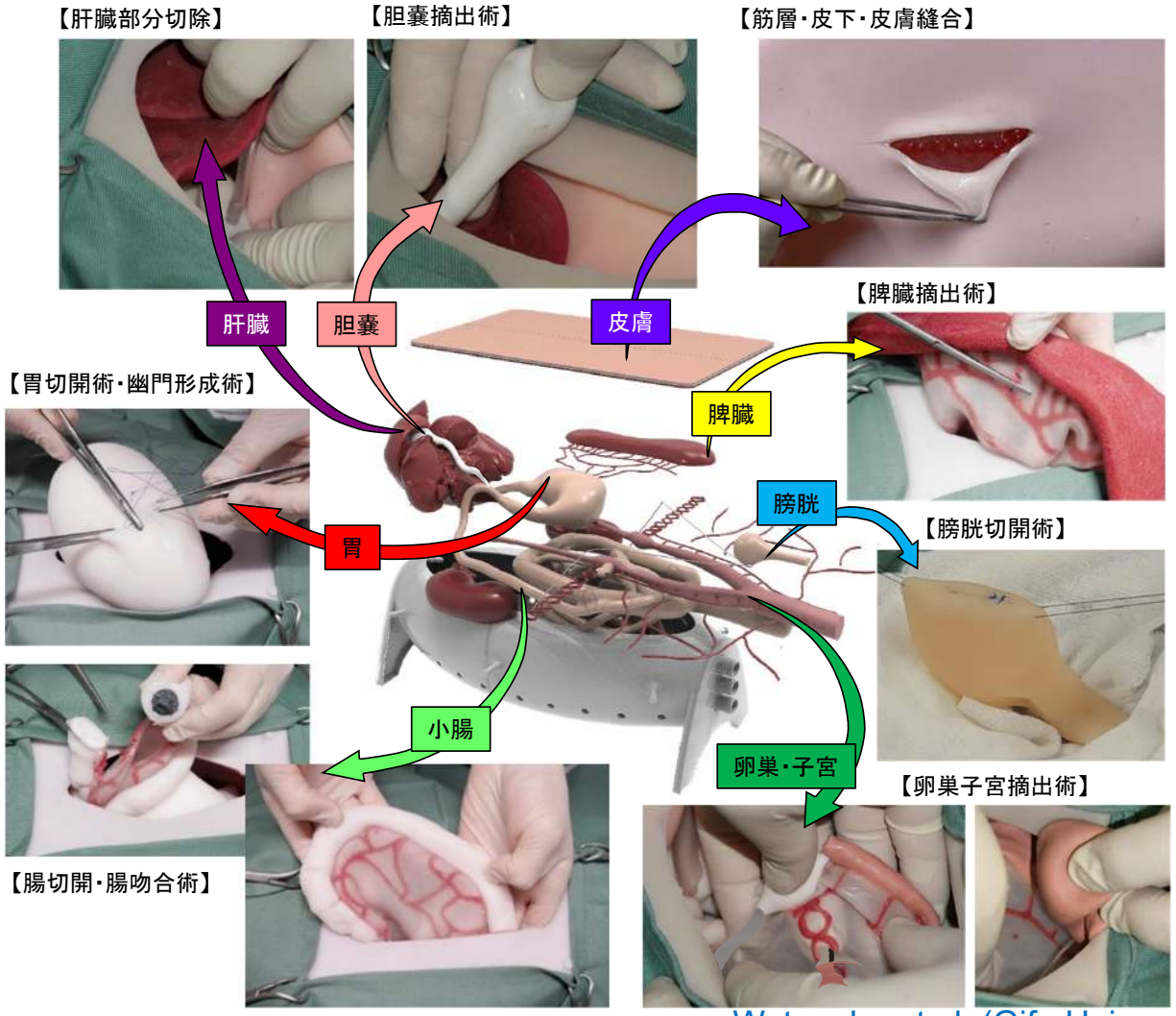
<Clinical setting>



- Improving surgical techniques
- Providing safe veterinary care

Watanabe et al. (Gifu University)

You can touch the actual model!



Watanabe et al. (Gifu University)

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
University of Miyazaki

Dr. Reiichiro Sato

宮崎大学の産業動物臨床分野における VR教材の活用

佐藤 礼一郎[1]　北原豪[1]　高木哲[2]　池田正浩[1]1

[1] 宮崎大学農学部　[2] 麻布大学獣医学部

Background of Miyazaki University

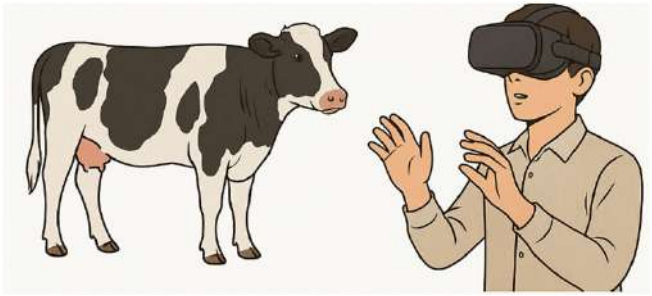
- 2017 Establishment of the “Committee for Considering the Introduction of Animal Alternatives in Practical Training”
  ⇒ Discussions toward introducing animal alternatives in veterinary clinical education

  ・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

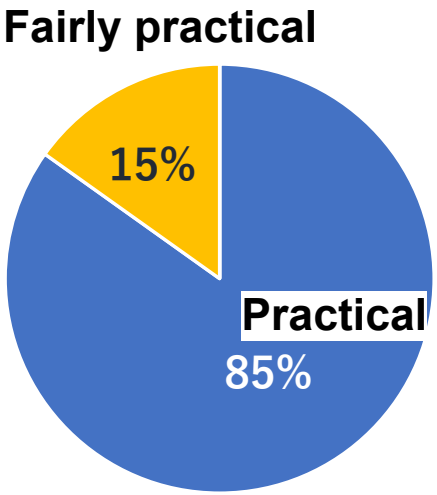
Sato et al. (Miyazaki University)

Scenes during the practical training session

Sato et al. (Miyazaki University)

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



<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.

Sato et al. (Miyazaki University)

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

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

RAKUNO GAKUEN UNIVERSITY
酪農学園大学

Dr. Kohei Makita

酪農学園大学における食肉衛生検査学実習とVRの活用

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・渡邉敬文・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

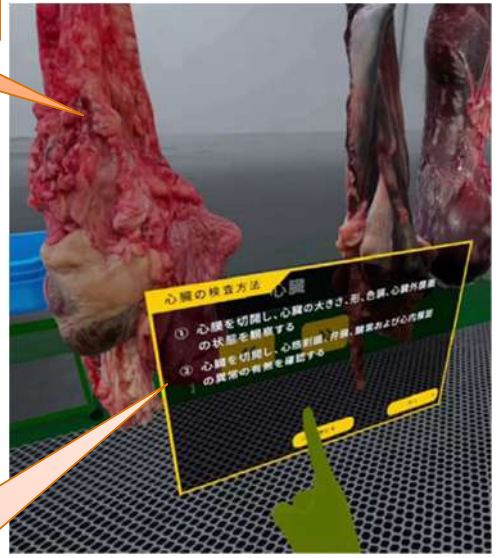
World Organisation for Animal Health
Founded as OIE

Multi Learning Mode for inspection (ex. Heart)

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

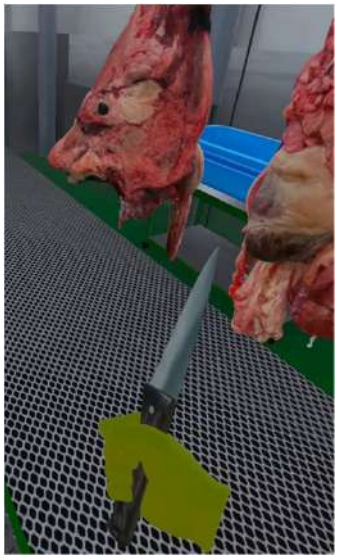
A board displaying text. Students click on it to control various learning activities.

①Cardiac examination methods



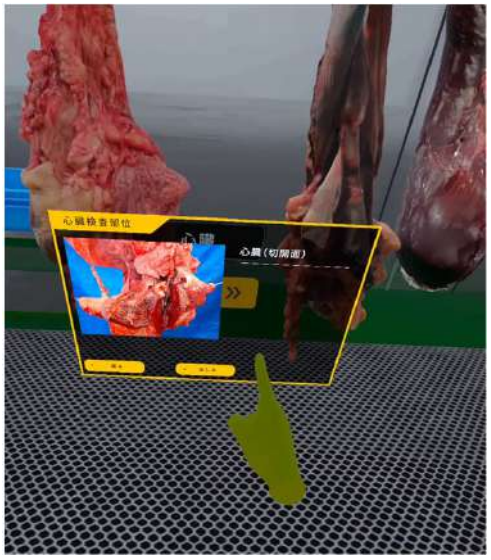
You touch the heart. An explanatory text about the examination method appears on a panel.

② Incision using a surgical knife



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

③ Showing the incision site

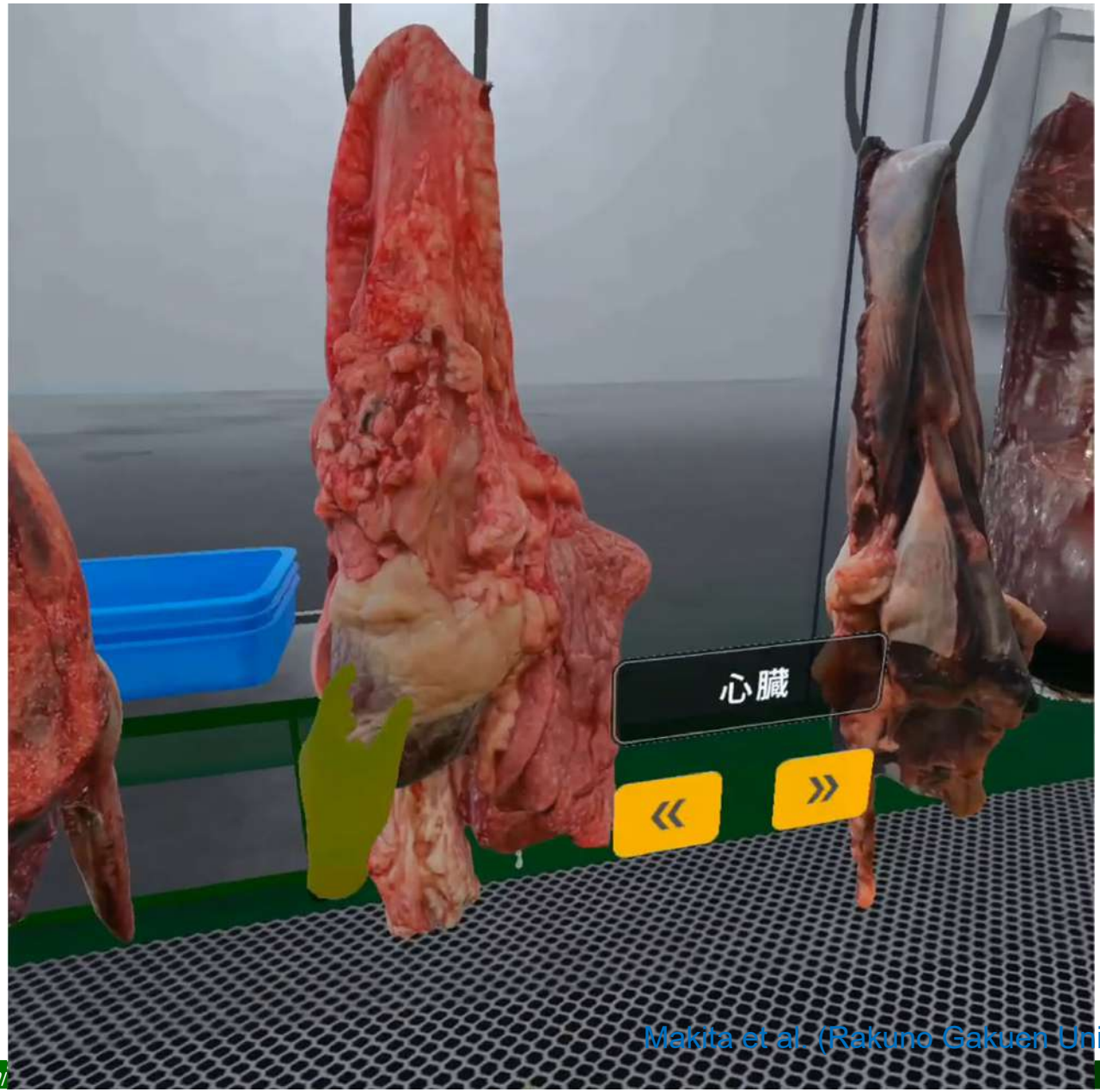


An image of the heart after incision is displayed.

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)

YAMAGUCHI UNIVERSITY 山口大学

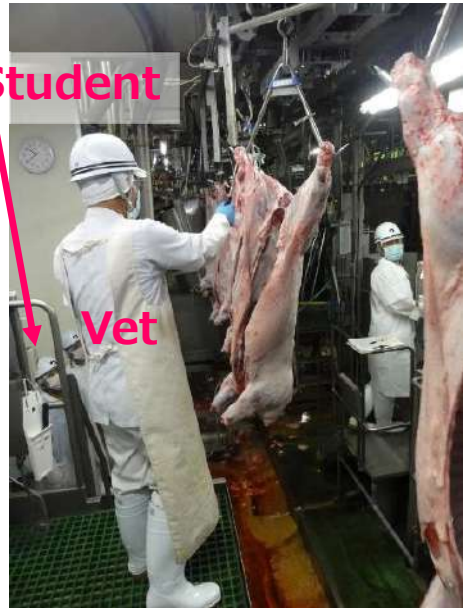
Dr. Takashi Shimizu

YAMAGUCHI UNIVERSITY

Shimizu et al. (Yamaguchi University)

VR Education Sharing System (iVRES)

Slaughterhouse



Cramped – Noisy - Dangerous
= Difficult to explain

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

Classroom

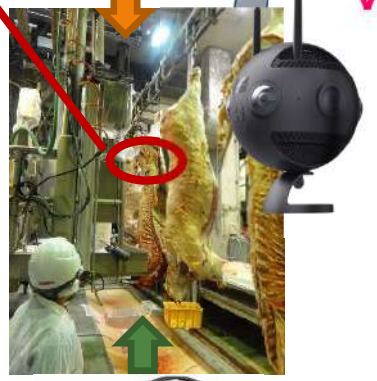
Teacher (control the video)

Local strage

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 students facing
- Teacher can control videos



Max 10 students can access simultaneously

Student A

Student B

Student C

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VR Education Sharing System

Insta 360 pro2

KiSHiVR
キシブル
iVRES
International VR
Education Share system

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

Acknowlegements

麻布大学 AZABU UNIVERSITY

- 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)
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