Innovative tools to teach pregnancy and parturition in the horse

- Innovation in Veterinary Education -

Christian Hanzen (ULg)
Jan Govaere (Ugent)
Innovation in Veterinary Education

- How is veterinary medicine taught in Europe? – a survey
  Christian Hanzen

- How to teach (clinical skills in) Veterinary Medicine?
  Jan Govaere

- What to expect / where to invest?
  Jan Govaere
Innovation in Veterinary Education

How is veterinary medicine taught in Europe? – a survey

Christian Hanzen
Some preliminary questions?

• Are you convinced that the amount of knowledge has increased?
• We are teaching but are you sure that the students are learning?
• Do you believe that what we are teaching is in line with the expectations of the society?
  • 60% of human diseases come from animals
  • farmers are facing important economical problems
  • Some diseases have disappeared and others are emerging
• Do you think that our students are the same that 30 years ago?
• Are you still using the same tools to teach than before?
Preliminary background (FVE Survey published in April 2015)

- 24 participating countries
- 243,000 veterinarians (44% under 40 years)
- 13,000 have completed the questionnaire
- 157 millions companion animals
- 342 millions cattle, sheep, goat and pigs

What are we doing?

- 60% clinical practice (predominantly small animals)
- 19% public services
- 6% education and research
- 4% industry and private research
- 10% others areas as veterinarian
Veterinary unemployment (3%) or underemployment (23%) is a problem in some countries.

They are too many graduated veterinarians and not enough in new fields (monitoring animal welfare, exotic animals, disease control ...)

Day one competencies will become more important as the profession will become more specialised in the future.

Most of practices have less than 5 veterinarians but there is a trend towards increasing corporisation and the creation of larger practice groups.

Females are paid 28% less on average than their male colleagues.

26% of females work part-time vs 12% of males.

We observed a significant shift away from practice earnings based on drug sales.
Why to have initiated such survey in Theriogenology?

• To initiate a thought on the curriculum in the field of animal reproduction...
• ...and more precisely by a first step
• To identify European human resources in theriogenology: who’s who
  • To share experiences and multimedia resources for learning
  • To compare evaluation methods

• To collect information on
  • Who: student population, numbers and method of selection
  • What and how: contents and time devoted to theriogenology
  • Resources: used to develop the knowledge and skill of the students
  • With whom: human resources
  • Evaluation: methods
Brief recall to understand the context of any teaching activity (3 aspects)

Consistency

Learning outcomes

Evaluation

Sommative

Formative

Resources

Human
Animals
Methods

Ressources

Communication, management, research, teamwork, leaderships

To palpate a follicle
To make a C-section

....
Innovation in Veterinary Education

- How is veterinary medicine taught in Europe? – a survey
  *Christian Hanzen*

- How to teach (clinical skills) in Veterinary Medicine?
  *Jan Govaere*

- What to expect / where to invest?
  *Jan Govaere*
Our survey: general data

Invitation sent (July) by e-mail to 82 veterinary faculties (out of 97 members of AEEEV)

Excel file to fill name and address

Answers to the question on line (one / faculty)

12 analysed
Our survey: general data (12 faculties)

Organization of the faculty

Organization of the learning activities

Number of years

Discipline
Species
Discipline
Species
5 years
6 years

ESDAR Sept 2015, Varna, Bulgaria - C. Hanzen & J. Govaere WS3
Innovation in Veterinary Education
- Huge differences between faculty: plethoric situation in Belgium
- On average 35 students qualified per year

### Comparison of students number in first and last year

<table>
<thead>
<tr>
<th>Country</th>
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Process of admission of the students in 17 faculties

In 16 out of 17, there is a process to select the students

- Lottery (in Liège) to select the French students
- Exam in 6 cases
- Interview in 1 case
- Scores of secondary school in 7 cases
Question: Is it necessary to improve the selection of the veterinary students before the studies

1. Not at all

2. Yes because the financial means of the faculties are decreasing

3. Yes to increase the quality of learning

4. Yes because under employment is increasing
- Three students out of four are women
- Differences between faculties

Comparison of % of female students in first and last year

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Question : The high percentage of female students is a chance for the profession

1. YES
2. NOT AT ALL
Most wanted: practice in small animals

% of students by option in Gent, Liège and Tartu

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Huge differences between faculties in total number of hours spent by the student in theriogenology (average 232 vs 503 h)

Comparison of total number of hours in Theriogenology according to differentiation or not during the cursus
Question: The theriogenology contents needs to be integrated with contents of internal medicine, surgery and medical imaging for a given species

1. I AGREE

2. I DISAGREE
WHAT AND HOW?

Learning by listening or by doing?

Comparison (%) of theoretical, practical and clinical hours according to the two kinds of faculty (differentiation or not)

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Quite more theory

Quite more clinics
Question: As a teacher, I am interested to build a MOOC with others colleagues (MOOC: Massive Open Online Course)

1. YES
2. NOT AT ALL
3. I am not concerned
Comparison of number of individual cases according to the number of final year students in the faculties with or without differentiation

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- Herd medicine is developing

Comparison of herds visit, examined animals according to the number of final year students

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## Comparison of compulsory stages (if any) according to the year of study

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### Stages distributed during the cursus

- 4 stages in the 1st year
- 4 stages in the 2nd year
- 5 stages in the 3rd year
- 4 stages in the 4th year
- 7 stages in the 5th year
- 12 stages in the 6th year

### Relatively large time for contextual education
Comparison of human resources

- Relatively few internship and residency
- Compare with the number of students in final year
- On average one academic or scientific for 10 students

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<td>17</td>
</tr>
<tr>
<td>Ghent</td>
<td>6</td>
<td>17</td>
<td>26</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>12</td>
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<td>65</td>
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<tr>
<td>Liège</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>8</td>
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<td>Average</td>
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<td>4,8</td>
<td>5,9</td>
<td>0,3</td>
<td>0,4</td>
<td>0,7</td>
<td>2,2</td>
<td>0,7</td>
<td>16,5</td>
</tr>
</tbody>
</table>
Question:
In my faculty, teaching activities are more recognized (for an academic career) than research activities

1. YES

2. NOT AT ALL
## Evaluation

- More often written than oral exams
- What importance of formative tests

### Methods of theoretical and clinical evaluations (1st choice)

<table>
<thead>
<tr>
<th>Location</th>
<th>Theoretical</th>
<th>Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camerino</td>
<td>oral exam</td>
<td>oral (Mini Clinical Exam)</td>
</tr>
<tr>
<td>Latvia</td>
<td>oral exam</td>
<td>oral (OSCE)</td>
</tr>
<tr>
<td>Messina</td>
<td>written exam (MCQ)</td>
<td>continuous</td>
</tr>
<tr>
<td>Liège</td>
<td>written exam (MCQ)</td>
<td>oral (Mini Clinical Exam)</td>
</tr>
<tr>
<td>Tartu</td>
<td>written exam (MCQ)</td>
<td>oral (OSCE)</td>
</tr>
<tr>
<td>Leon</td>
<td>written exam (OQ, SLEQ)</td>
<td>continuous</td>
</tr>
<tr>
<td>Dublin</td>
<td>written exam (OQ, SLEQ)</td>
<td>continuous</td>
</tr>
<tr>
<td>Helsinki</td>
<td>written exam (OQ, SLEQ)</td>
<td>oral (OSCE)</td>
</tr>
<tr>
<td>Skopje</td>
<td>written exam (OQ, SLEQ)</td>
<td>continuous</td>
</tr>
<tr>
<td>Ghent</td>
<td>written exam (OQ, SLEQ)</td>
<td>oral Mini Clinical Exam</td>
</tr>
</tbody>
</table>

**Abbreviations:**
- OQ : Open questions
- MCQ : Multiple choice questions
- SLEQ : Short/Long Essay Questions
- OSCE : Objective Structured Clinical Examination
- How to define success of a curriculum?

## Success rate according to the year of studies

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
<th>6th</th>
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</thead>
<tbody>
<tr>
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<td>80</td>
<td>80</td>
<td>70</td>
<td>70</td>
<td>80</td>
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<tr>
<td>Latvia</td>
<td></td>
<td></td>
<td></td>
<td>30</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Leon</td>
<td></td>
<td></td>
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<td>75</td>
<td>75</td>
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</tr>
<tr>
<td>Dublin</td>
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<tr>
<td>Helsinki</td>
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<td>97</td>
<td>95</td>
<td>93</td>
<td>90</td>
<td>70</td>
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<tr>
<td>Skopje</td>
<td>48</td>
<td>33</td>
<td>24</td>
<td>20</td>
<td>16</td>
<td>15</td>
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<tr>
<td>Liège</td>
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<td>67</td>
<td>79</td>
<td>80</td>
<td>94</td>
<td>100</td>
</tr>
<tr>
<td>Tartu</td>
<td>80</td>
<td>85</td>
<td>90</td>
<td>90</td>
<td>95</td>
<td>100</td>
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</table>
Main problem encountered with teaching reproduction

<table>
<thead>
<tr>
<th>Location</th>
<th>Main problem (1st choice)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leon</td>
<td>high numbers of students</td>
</tr>
<tr>
<td>Liège</td>
<td>high numbers of students</td>
</tr>
<tr>
<td>Ghent</td>
<td>high numbers of students</td>
</tr>
<tr>
<td>Tartu</td>
<td>high numbers of students</td>
</tr>
<tr>
<td>Dublin</td>
<td>no problem at all</td>
</tr>
<tr>
<td>Messina</td>
<td>not enough live material (experimental animals)</td>
</tr>
<tr>
<td>Latvia</td>
<td>not enough live material (experimental animals)</td>
</tr>
<tr>
<td>Helsinki</td>
<td>not enough live material (experimental animals)</td>
</tr>
<tr>
<td>Skopje</td>
<td>not enough live material (experimental animals)</td>
</tr>
<tr>
<td>Camerino</td>
<td>not enough time to teach all content</td>
</tr>
</tbody>
</table>

High numbers of student
Not enough time to teach all content
Not enough live material (experimental animals)
Not enough clinical cases
No problem at all
Innovation in Veterinary Education

• How is veterinary medicine taught in Europe? – a survey
  Christian Hanzen

• How to teach (clinical skills in) Veterinary Medicine?
  Jan Govaere

• What to expect / where to invest?
  Jan Govaere
How to teach (clinical skills in) Veterinary Medicine?

Q3: ultrasound in the mare: the ‘best’ way to learn?

- setting -

A1: clinical rotation
A2: theory first / clinical rotation
A3: theory
A4: whatever + questioning during the exam
How to teach (clinical skills in) Veterinary Medicine? rectal examination - US scanning - how many repetitions
How to teach (clinical skills in) Veterinary Medicine?

Q2: rectal examination - US scanning - how many repetitions?
- in an academic educational program –

A1: 10
A2: 10-30
A3: >30...
How to teach (clinical skills in) Veterinary Medicine? rectal examination - US scanning - how many repetitions

• In cattle
  • 100 palpations
    • Cx, horns: size and consistency
    • Pregnancy 60d
    • Perioestrus period
    • Postpartum
  • -> ovarian palpation - and early pregnancy diagnosis

• In horses?
How to teach (clinical skills in) Veterinary Medicine?

HOW ?: Ugent- evaluation of education – gynaecol. Ultrasound of the mare

- = mini-CEX
  Mini clinical exam

- = MCQ
  Multiple choice questions

- SE (self assessment)
- Evaluation of Education
- PT (practical knowledge testing)
How to teach (clinical skills in) Veterinary Medicine?

• SE (self assessment)
  “confident and ready to give practical veterinary guidance in a stud farm concerning equine reproduction”

• Evaluation of Education
  “how do you appreciate theoret., clinical and practical education”,
  “advises-remarks”

• PT (practical knowledge testing)
PT (practical knowledge testing) - I

1. Stage of cycle
2. Uterus echogenity grading
3. When should you use hCG
4. When to cover the mare
PT (practical knowledge testing) - III

Ultrasonographic image of uterus with an embryonic vesicle

1. where will the embryonic disc appear?
2. define: “encroachment”
3. can you indicate on the diagram the future course of the umbilical cord
How to teach (clinical skills in) Veterinary Medicine?

SE: 63%

PT: 43.2% (16.5%)

TT: 65.5% (69%)

- expectancy
- teaching quality
- variability in case load
  - ↑
  - ≠

- Feedback
- Continuing education
- IQ > EQ
How to teach (clinical skills in) Veterinary Medicine? rectal examination - US scanning - how many repetitions

- scores on practical test – weakly correlated with numbers of Rectal Palp performed \( (r=0.281) \)

- Voluntary commitment does not imperatively lead to skills acquisition
  
  -> For most students, the driving force is “what will be on the test” rather than understanding concepts

- The No of rectal exams performed had no influence on results in the theoretical test

Govaere et al. 2016

Senger et al. 2012
How to teach (clinical skills in) Veterinary Medicine?

Q5: How to teach complex topics – your personal opinion

A1: stimulate students to make their own scheduals, diagrams etc
A2: provide tekst, pict, movies etc
A3: complete animated material “ready to swallow”
How to teach (clinical skills in) Veterinary Medicine?

Q: How can animations help you when teaching?

- Example -

A1: it’s fun to look at
A2: gives in an easy way insight in the structure – evolution
A3: its the 21\text{th} \text{ cent.} \text{ drawing/schedual}
A4: enables students to rehearsal the subject again without guidance
How to teach (clinical skills in) Veterinary Medicine?

Q: How can animations help you when teaching?

A1: faster acquisition of knowledge / insights for the audience
A2: better knowledge retention in long term
A3: both A1 and A2
A4: no significant differences with a good old ex cathedra teaching method; knowledge acquisition and retention
A5: gives more confusion due to access. detail
1.2. stage 2: expulsie

- Exposure 2-20
- Cool recumbent farrowing
- Pigs +
<table>
<thead>
<tr>
<th>PRETEST</th>
<th>UNIVERSITY GENT</th>
<th>TEST T1</th>
<th>UNIVERSITY DE LIEGE</th>
<th>TEST T2</th>
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</thead>
<tbody>
<tr>
<td>K</td>
<td>K</td>
<td>K</td>
<td>K</td>
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<td>3,18</td>
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<td>4,19 12,67 58,09</td>
<td>5,04 14,89 56,43 4,79</td>
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<td>5,07 18,21 60,40 4,95</td>
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<td>3,54</td>
<td>4,32 16,78 63,46</td>
<td>6,01 14,29 64,34 4,89</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How to teach (clinical skills in) Veterinary Medicine? Animations: any benefit?

- multimedia presentation
- effective to teach complex concepts in a shorter time
- better knowledge retention
- audience even without specific training can understand complex concepts

Govaere et al. 2012
Govaere et al. 2012
How to teach (clinical skills in) Veterinary Medicine?
Q5b: when teaching how to rectal examine the mare, which of the pict would you prefer?
How to teach (clinical skills in) Veterinary Medicine?
Q5b: when teaching how to rectal examine the mare, which of the pictures would you prefer?
How to teach (clinical skills in) Veterinary Medicine?

Q5c: How to teach complex evolutions and topographic anatomic changes in (equine) reproduction

Message in illustration:
A1: simple – one message at the time
A2: physiological as complete/with all complexities
A3: provide only clinical relevant items/details
How to teach (clinical skills in) Veterinary Medicine? How can animations help you when teaching?

Animations
Describe time-related changes

+ powerful learning intervention

- Learning can be depressed with excessive verbiage or images

Senger et al. 2012
Betrancourt 2005
Mayer et al. 1996-
How to teach (clinical skills in) Veterinary Medicine? How can animations help you when teaching

Learning

-> auditory + optic (dual coding)

-> limited processing capacity & easily overloaded

-> learning: when engaged in processing information

Paivio 1986
Clark and Paivio 1991
Baddeley 1986, 1999
Witrock 1989; Mayer 2005
How to teach (clinical skills in) Veterinary Medicine? How can animations help you when teaching

Animations
  - goal: facilitating learning
  
  - topic
  - priority (detail of knowledge)
  - what visual aids?
  - script

Senger 2012
How to teach (clinical skills in) Veterinary Medicine? How can animations help you when teaching

Animations, structure

- PRE training
- MODALITY (auditory and optical) –
  - scientific textbooks: ‘only’ optic sensory input
  - overload / confusion
  - students minimize pre-class reading

Polloc et al 2002, Mayer et al. 2002
Tindall-Ford et al. 1997

Senger 2012
How to teach (clinical skills in) Veterinary Medicine? How can animations help you when teaching

Animations, structure

- PRE training
- MODALITY (auditory and optical) –

Polloc et al. 2002, Mayer et al. 2002
Tindall-Ford et al. 1997

Senger 2012
How to teach (clinical skills in) Veterinary Medicine? How can animations help you when teaching

Animations, structure

- PRE training

- MODALITY

- COHERENCE

  - “unessential detail”

  - ~ level of (pre)knowledge

  - ~ level of required detail – specific audience

Senger 2012
How to teach (clinical skills in) Veterinary Medicine? How can animations help you when teaching Animations, structure
- PRE training
- MODALITY
- COHERENCE
-
How to teach clinical skills in Veterinary Medicine?

How can animations help you when teaching?

Animations, structure-PRE training MODALITY-COHERENCE ESDAR Sept 2015, Varna, Bulgaria

C. Hanzen & J. Govaere WS3

Innovation in Veterinary Education Senger 2012
How to teach (clinical skills in) Veterinary Medicine?
How to teach (clinical skills in) Veterinary Medicine? How can animations help you when teaching

Animations, structure

- PRE training
- MODALITY
- COHERENCE
- PERSONALIZED

- “now that we have described the structure we will have to know how....”

Kartal 2010; Mayer et al. 2004; Moreno and Mayer 2000, 2004
How to teach (clinical skills in) Veterinary Medicine? How can animations help you when teaching

Animations, structure

- PRE training
- MODALITY
- COHERENCE
- PERSONALIZED
- ANIMATION

– dynamic processes easily understood when animated

Gonzales 1996; Betrancourt 2005; Trevistan et al. 2010

ESDAR Sept 2015, Varna, Bulgaria - C.Hanzen & J. Govaere WS3
Innovation in Veterinary Education
How to teach (clinical skills in) Veterinary Medicine? How can animations help you when teaching Animations, structure

- PRE training
- MODALITY
- COHERENCE
- PERSONALIZED
- ANIMATION
  – dynamic processes

ESDAR Sept 2015, Varna, Bulgaria - C.Hanzen & J. Govaere WS3 Innovation in Veterinary Education

Gonzales 1996; Betrancourt 2005; Trevistan et al. 2010
How to teach (clinical skills in) Veterinary Medicine? How can animations help you when teaching

Animations, structure

- PRE training
- MODALITY
- COHERENCE
- PERSONALIZED
- ANIMATION

– dynamic processes easily understood when animated
- exploration of animation

Gonzales 1996; Betrancourt 2005; Trevistan et al. 2010
Innovation in Veterinary Education

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• What to expect / where to invest?
  Jan Govaere
What to aspect / where to invest?

• Invention of printing almost 600y ago
  read – listen- re-reading & review notes – testing

• Since 60y: overhead, doc camera, PPT ....

• ? Mobile technology?

-> reduce time of delivery and improves understanding

Senger et al. 2012

Trevisan et al. 2010
What to aspect / where to invest?

- “digital immigrants”
- “erosion of (classroom) authority”
What to aspect / where to invest?
What to aspect / where to invest?

Nisky et al. 2012

Baillie S 2009
Innovation in Veterinary Education
What to aspect / where to invest?

3D animation (pixel – voxel)

‘Realistic’ models

Tactile / haptic

Education

Research

Therapy
Innovation in Veterinary Education