



# CowScope

## Evaluation of its benefits as a training tool in artificial insemination courses

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### Introduction

Artificial insemination (AI) training consists generally of theory including anatomy, and practical training on live animals. Students first learn anatomy from textbooks, models, and possibly slaughterhouse material. In the next stage, students practice rectal palpation and then attempt to perform an insemination. Learning the technique requires transferring the theoretical knowledge onto the situation in the live animal. This is where a visual tool can help to bridge the gap between theory and practice. The CowScope is an endoscope for visualizing the process of artificial insemination on a smartphone. Its simple design, great ease of use, and high-resolution camera make it an ideal tool for AI training.



### Study to evaluate the CowScope as a tool in AI courses

#### Scope

The CowScope was evaluated as a training tool in the scope of artificial insemination (AI) training courses at the IFN Schönow. IFN Schönow is a research institution and training center in the field of livestock breeding.

#### The study was designed around three questions:

1. Does the use of the CowScope video endoscope in AI training result in measurably faster positioning of the AI instrument in the correct place for depositing semen compared to the use of other training techniques?
2. Does the initial use of the CowScope video endoscope in AI training have a measurable effect on the performance of a subsequent conventional insemination (i.e., without visual control)?
3. How do the participants evaluate the practicality of the device? How do the participants rate themselves?

## Method

The participants took part in the usual course at the IFN. On day 1, theory lectures were given on the anatomy and physiology of the female bovine sexual tract. This was followed by theoretical instruction on the accurate performance of AI in cattle. The participants then practiced this on reproductive tracts obtained from a slaughterhouse and also on bovine training models.

After this practical exercise, all participants received an initial questionnaire, on the basis of which they were classified as “experienced” or “inexperienced”. Participants were classified as „experienced“ if they had performed a transrectal gynecological examination in cattle more than 200x and/or had been able to place an insemination device in the uterine body of cattle at least once. All other participants were considered “inexperienced”.

The CowScope was presented and explained to the participants.

On the second day of the course, the first practical exercise of AI took place at the biotechnology station of the IFN, where 20 non-pregnant, non-lactating cows were available for this course. They were fixed in a headlock in a feed bunk. The participants had 20 minutes to feel important structures such as the cervix uteri etc. via rectal palpation.

Then the instructor demonstrated AI using a speculum and a conventional AI instrument. The participants were divided into three randomized groups of equal measure “experienced” and “inexperienced”.

Group “A” (n=7) practiced conventionally with the AI instrument.

Group “B” (n=7) used a speculum with the cow to be inseminated. The aim was to determine whether visualization of the external cervix would provide an advantage during the subsequent insemination. After the speculum was removed, participants in group “B” also trained with the conventional insemination device.

Group “C” (n=7) practiced insemination with the CowScope and subsequently also with a conventional AI instrument.

For each participant, the time from the spreading of the vulval lips of the animal to the time when the participants thought they had reached the uterine body with the AI instrument was measured using a stopwatch. The instructor then verified the position of the AI instrument. Time taken and position of the device were recorded for each participant, as well as whether injuries occurred (due to visible blood on the insemination device).

Afterwards, the participants filled out a questionnaire for reporting their motivation, self-efficacy, and satisfaction on a scale from 1 to 10.



## Results

A total of 21 prospective herdsman-inseminators participated (n=21). Using the questionnaires, they were asked about satisfaction after the exercise, motivation (“How motivated are you to work as an in-house inseminator at this time?”), and self-efficacy (“How confident are you in performing artificial insemination in cattle yourself?”). In total, participants (n=21) were able to place the insemination device 25x in the uterine body for all measurements collected on both days.

Group	Satisfaction (/10 points)	Motivation (/10 points)	Self-efficacy (/10 points)	Successful exercises (n)	Successful exercises in %
A (n=7)	7,42	8,42	6,71	4	16
B (n=7)	6,85	8,85	6,57	4	16
C (n=7)	7,28	9,0	8,0	<b>11 (with CowScope)</b>	<b>44</b>
				6 (without CowScope)	24
Total				25	

## Key findings

- The course instructor monitored transrectally the position of the AI instrument. When the CowScope was used, the participants always placed the device at least in the cervix uteri, and never remained in the vagina.
- Not once was blood visible at the tip of the insemination device with the CowScope.
- The average time measured for successful insemination exercises without CowScope (n=14) was **4:43 min.**
- The average time measured for successful insemination exercises with CowScope (n=11) was **2:42 min.**
- Group “C” accounted for the majority of a “successful” artificial insemination, both with and without the CowScope.
- Group “C” had the highest motivation and self-efficacy.
- Participants succeeded faster with the CowScope than without.



## Summary

Using the CowScope allows you to visualize the process of artificial insemination. With this tool, it is easy to understand the anatomy involved, and master the technique of artificial insemination. The trainees feel more empowered to master the technique, and the higher results with CowScope objectively confirm the training success. Last but not least, animal welfare is improved by avoiding early mistakes while becoming proficient in manipulation. All in all, the CowScope is a training tool for AI courses that benefits everyone involved and leads to greater training success.