Evaluation and improvement of the surgical skillslab

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Abstract

The anxiety levels in students are higher during surgical education compared during non-surgical education. Pre-surgical courses in a surgical skillslab will reduce these levels before performing any operations. A surgical skillslab will give medical students the opportunity to practice several surgical skills on simulations of patients before performing them in real life. Therefore, the need to have a good and useful skillslab at a faculty has grown.

The current surgical skillslab at the department of companion animals at the Veterinary Medicine faculty in Utrecht was developed more than 5 years ago and has been running since. Students were asked to complete a specific questionnaire before the start of the skillslab courses and another questionnaire after completion of the skillslab courses. The aim of this study was to evaluate the skillslab and improve where needed. The 121 students returned 204 questionnaires; 59% of the questionnaires before and 41% of the questionnaires after the training sessions.

A surgical skillslab is of added value to a Veterinary Faculty because it will give veterinary students the opportunity to practice their surgical techniques. However, the current skillslab was perceived as disappointing on several aspects. Only 57% of participants thought it was a good preparation for their surgical clerkships and the average rating of the skillslab was a 6,4 out of 10 (the median was 7 out of 10). Because a surgical skillslab is intended as an added value to a Veterinary Faculty, a lot can be gained by improving and professionalizing the skillslab for the veterinary students.

Introduction

Competency-based veterinary education programs exist of 7 domains: Veterinary Expertise, Communication, Collaboration, Entrepreneurship, Health and Welfare, Scholarship, and Personal Development. Surgical accomplishments are part of the domain Veterinary Expertise and therefore an important subject of the veterinary education [1].

The surgical ambiance can be a stressful one. Langebæk et al. investigated whether the anxiety levels of students are higher during surgical education compared during non-surgical education. Their research showed a significant decline of anxiety under veterinary students after pre-surgical courses. A surgical skillslab is of added value to a Veterinary Faculty because a surgical skillslab will give medical students the opportunity to practise several surgical skills on simulations of patients before performing them in real life [2,3].

Medical schools need to provide opportunities for students to improve their surgical skills during schooling. The surgical skills young vets need to have are not learned during clerkship experiences only. During the set-up of a veterinary skillslab in Germany, Dilly et al. investigated the educational possibilities for the gap between academic study and professional skills. The results showed that the surgical skillslab helps the students to maintain their motivation, by learning the surgical skills early on the education program [4–7].

According to Rösch et al. a clinical skillslab should provide a good opportunity to develop and establish standardized practical learning. In addition, it offers the option of practising specific skills repeatedly, tailored to personal preferences or the desired career [7,8].

When students have the ability to practise their skills outside the operating room, they will have less anxiety and pressure, and more time to improve their technique. They can perform the components in the surgical skillslab step by step. Learning suturing or remove a tumour can help students to improve their anatomy, surgical skills and maybe also inspire them for a surgical career [3,8,9].

The current surgical skillslab is located at the department of companion animal medicine at the faculty of Veterinary Medicine in Utrecht. In May 2010 R.G.A. Metz first started the development of the surgical skillslab. The lab featured an orchiectomy on a dog, an orchiectomy on a cat and a cystocentesis model. In December 2010 C.J. Holleman added an othematoma model, a tracheostomy model and an esophagostomy model to the surgical skillslab. The last one is not running at this moment. In May 2011 M. Kort continued the development of the skillslab by adding the learning modules 'Wall of suture' and 'Name the instrument'. She also added a model for tapping blood and a model for removing a tumour. In 2013 C. Vermeij added the 'Suture and bowel resection' model and an ovariectomy model to the surgical skillslab [10–13].

The current surgical skillslab has the opportunity to showcase the following labs: orchiectomy model (cat), orchiectomy model (dog), a cystocentesis model, an othematoma model, a tracheostomy model, a blood tapping model and a surgical removal of a tumour model. However, not all of these skillslabs are running. In the first year of the master program, the students start with a module about sutures, suture material and the instruments. Each module was scheduled for one part of the day (mornings mostly). Then they will participate in skillslab 1 of Ear-Nose-Throat (tracheostomy, othematoma). Skillslab 2 is about General surgery (suturing and bowel resection). Skillslab 3 is about urology (orchiectomy dog and cat, cystocentesis). In year 2 the students have to make the same module about sutures, suture material and the instruments. Skillslab 1 is about tumour resection (mastocytoma), skillslab 2 is an ovariectomy model. As described in the master research thesis of Metz, Holleman, Kort and Vermeij, most skillslabs are performed on modified teddy bears [10–13]. Although the intention of the skillslab's inanimate models is not to mimic a real

animal but to incorporate all the important steps in general surgical procedures, it does require some imagination abilities of the students.

The aim of this research is to evaluate and improve the current surgical skillslab at the department of companion animals at the Veterinary Medicine faculty in Utrecht. The working hypothesis for the present study is that there is a difference in outcome between the two questionnaires.

Material and methods

The goal of this research was to evaluate the current surgical skillslab at the department of companion animals at the Veterinary Medicine faculty in Utrecht. For the evaluation of the skillslab, a questionnaire was used (Appendix I). Students were asked to complete a specific questionnaire before the start of the skillslab courses, referred as the Before questionnaire, and another questionnaire after completion of the skillslab courses, referred as the After questionnaire (Appendix I). The before questionnaire then was compared with the after questionnaire to see if the experience of the students met their expectations or if it was disappointing. When needed, the surgical skillslab would be improved.

Participants

Every year approximately 100 veterinary medicine students start with their three-year master's degree in Companion Animal Health. The veterinary skillslab is scheduled in the first and second year of the master program, in the surgical rotation. Questionnaires were offered during the skillslab; the students were asked to fill in the questionnaire before and after participating in the skillslabs. Questionnaires over a period of 5 year (2011-2015) were collected for this research, which resulted in 121 participating students. Incomplete questionnaires with less than 80% answered questions were excluded.

Questionnaires

Two types of questionnaires were distributed among the participants (appendix 1). The first questionnaire, containing 13 statements about the expectations of the skillslab, was administered before participating in the skillslab. The second questionnaire evaluated the experiences of the students with 27 statements and was achieved at the end of the skillslab. Both questionnaires were designed by Dr. S.A. van Nimwegen and Drs. M.L. Kort [12]. Most statements were rated on a 2 point scale (distributed ordinal; 1=agree, 2= disagree), others were rated on a 3 or 5 point Likert scale (distributed nominal; 1 = totally agree, 2=agree, 3=neutral, 4=disagree, 5 = totally disagree)[14,15].

Methods

The results of the questionnaires were collected and organized in Microsoft Excel ® (appendix II). Only a certain amount of questions from the before questionnaire was comparable with a question in the after questionnaire. Therefore, the questionnaire is split up into comparable and non-comparable questions (appendix III).

For the non-comparable questions of the questionnaire descriptive results were generated.

For the comparable questions it is important to check if the observations are distributed normally (Kolmogorov-Smirnov and Shapiro-Wilk test). The assumption of normality will test whether the sample distribution or the difference between the means of different groups is normally distributed. This method shows how big the chance at a certain observation is. Because there was no normal distribution, a different kind of statistic test was chosen. The pairs were divided into two groups; one group for the questions with an ordinal answer option and one for the questions with a nominal answer distribution.

As a result of the ordinal distribution of the 3 and 5 point Likert scale, the nonparametric Mann-Whitney *U*- test was used for the pairs 1, 2, 3, 9 and 10 [16]. For the remaining pairs, which were nominal distributed, a χ^2-test was used [15,16]. This test will test if the difference between the expected values (E) and the observed values (O) are linked. A big difference indicates there is no coincidence; the values are dependent on each other. Statistical significance was presumed as a p-value of less than 0.05.

Results

Of the total 203 questionnaires by 121 students, 59% covered the before questionnaire and 41% the after questionnaire. The results are presented in two categories: comparable and non-comparable questions. An overview of the comparable questions (pairs) can be found in appendix III. The remaining questions are the non-comparable questions. Statistical analysis were performed using IBM SPSS Statistics version 25 for Mac (appendix IV).

With regards to the tests the following hypothesis for the 95% confidence interval are formulated for the questions. The null-hypotheses (H_0) will be rejected if the significance (p)< 0,05 [15,16].

- H_0: the two samples have been obtained from populations that have similar distributions with the same mean.
- H_1: the two samples have been obtained from populations that do not have similar distributions

Comparable questions

The results of the test of normality show that none of the answers were distributed normally (appendix IV). The results of the nonparametric test and of the χ^2 test can be found in appendix IV. The figures 1 to 11 show the mean response, p-value and difference (Δ) in de mean response per pair.

Pair 1, 2, 3, 9 and 10 showcases the trend in answering the questionnaire before and after the skillslab. The trends for pairs 1 and 9 showed a downgrade in the answers whereas the trends for pairs 2, 3 and 10 are more positive. For pairs 4, 5 and 7, more students agreed with the statement afterwards, whereas for pairs 6, 8 and 11 less students did.

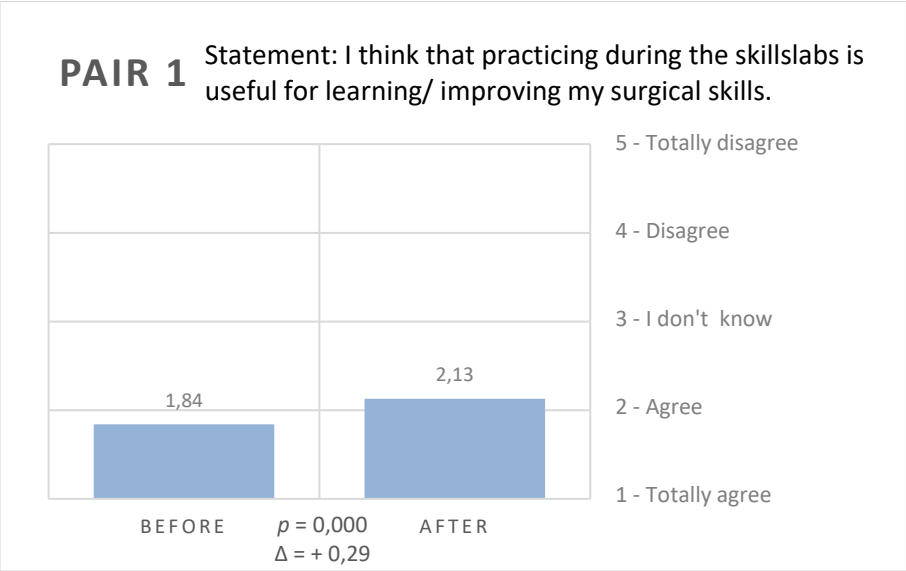

Figure 1 - Pair 1

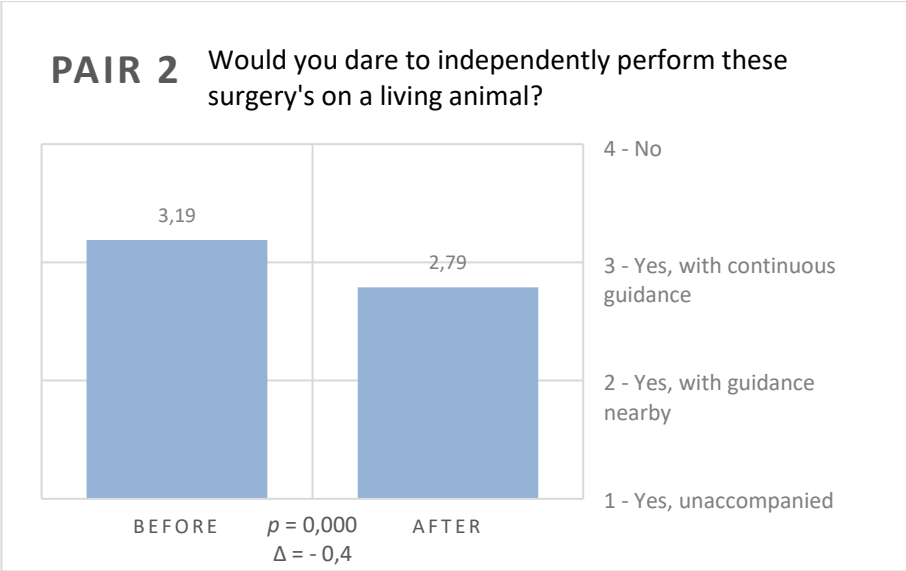

Figure 2 - Pair 2

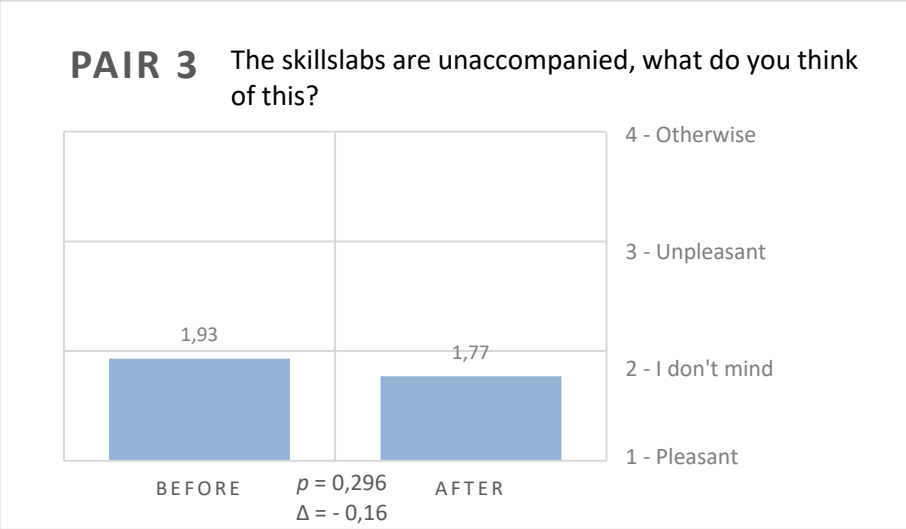

Figure 3 - Pair 3

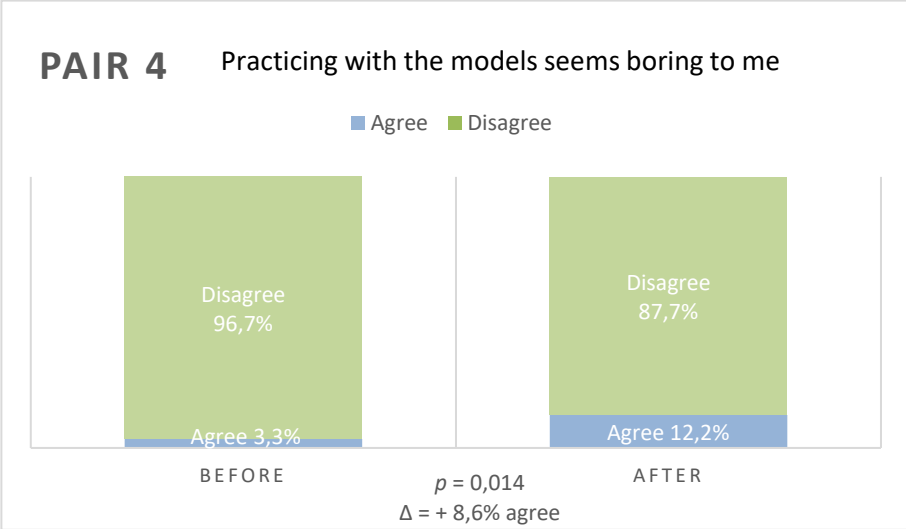

Figure 4 - Pair 4

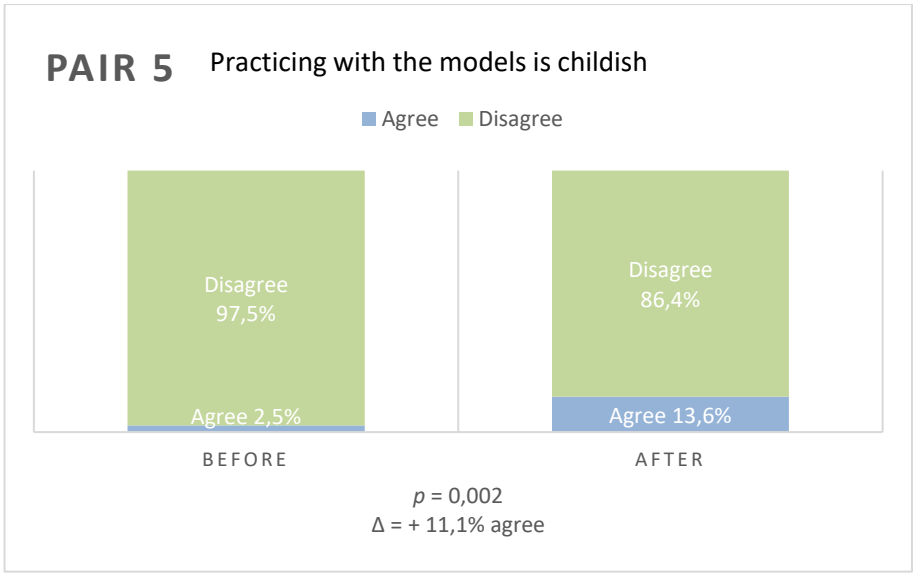

Figure 5 - Pair 5

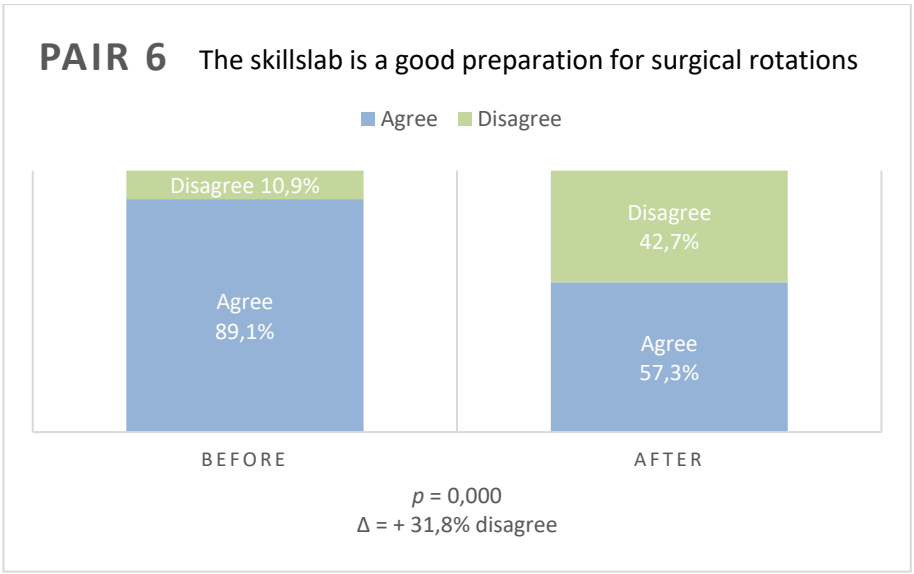

Figure 6 - Pair 6

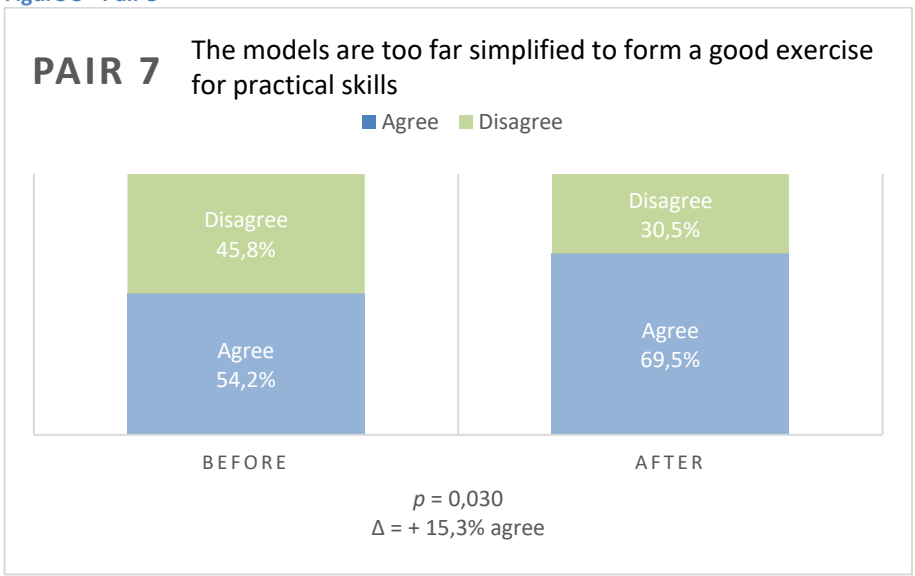

Figure 7 - Pair 7

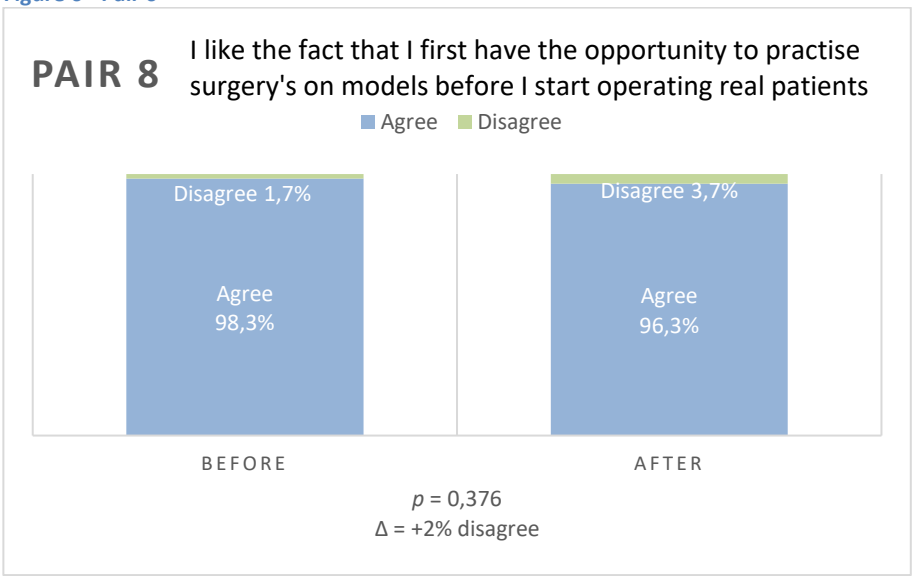

Figure 8 - Pair 8

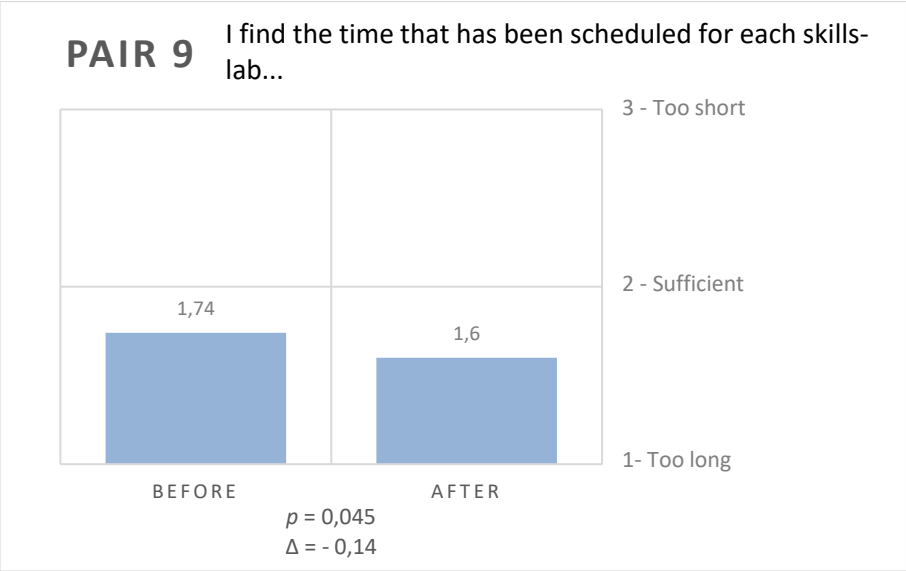

Figure 9 - Pair 9

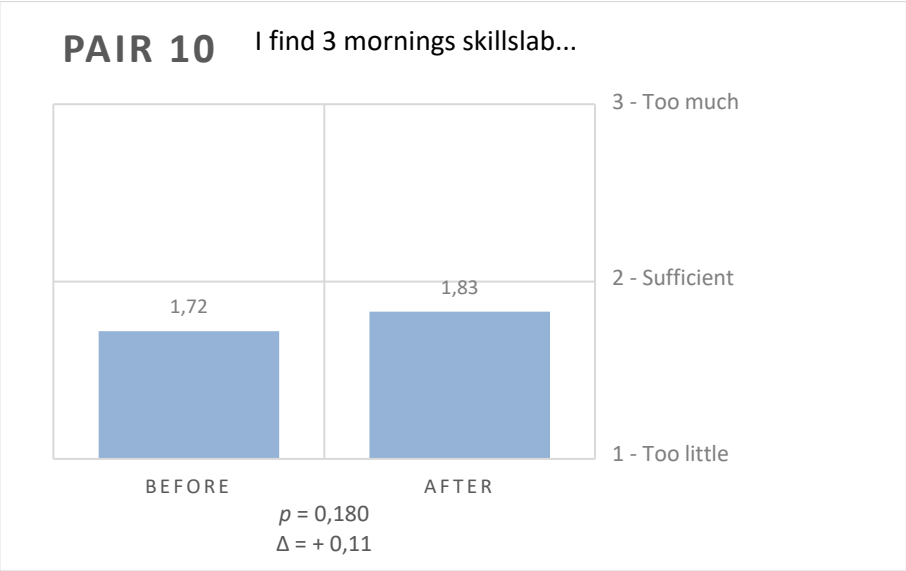

Figure 10 - Pair 10

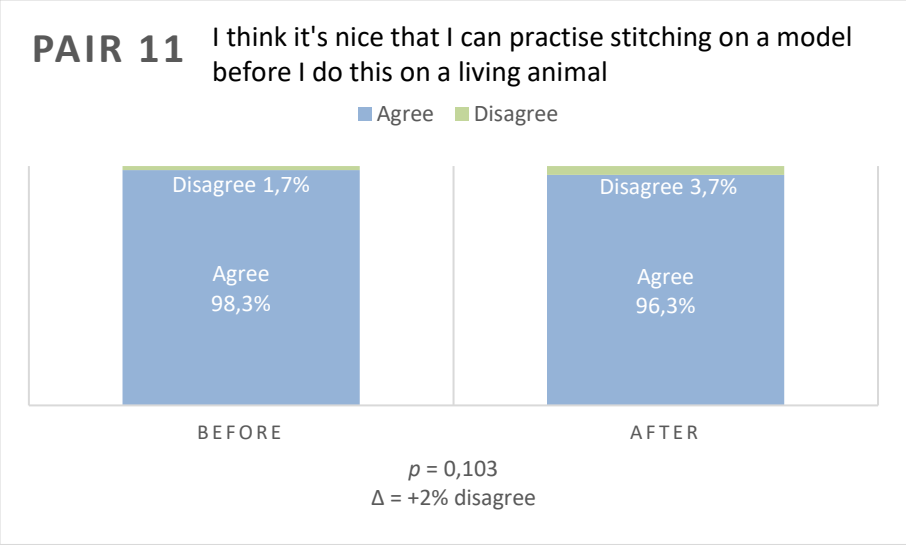

Figure 11 - Pair 11

Non-comparable questions

The descriptive results of the non-comparable before questions (BQ) and after questions (AQ) can be found in appendix IV. The figures 12 until 21 and table 1 show the mean response per question.

The before questions 0, 3 and 4 showcases the percentages of the different answers. For the after questions 2, 4, 7, 8, 9, 11 and 31, the different percentages of each answer is given as well. For the after questions 20, 21, 23, 25, 26, 27, 28, 29 and 30, the majority of the students agreed with the statement. For the after questions 16 and 22, the majority disagreed with the statement.

Before participating the skillslab

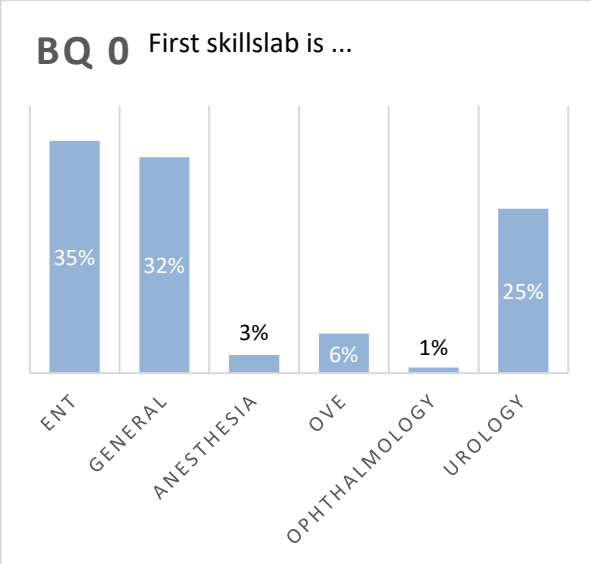

Figure 12 - Before question 0

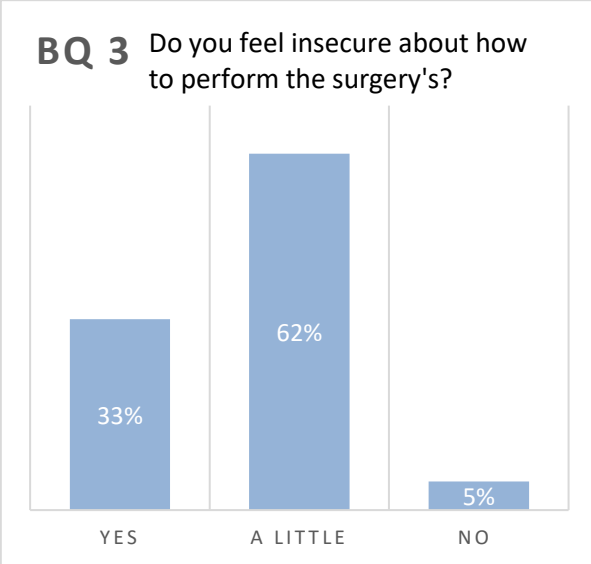

Figure 13 - Before question 3

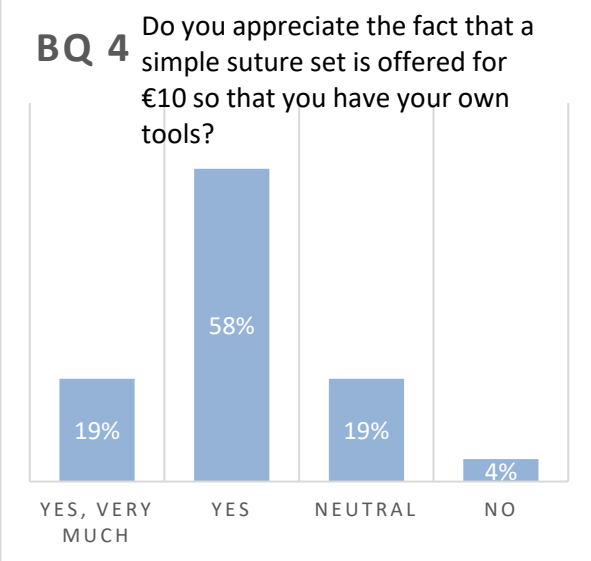

Figure 14 - Before question 4

After participating the skillslab

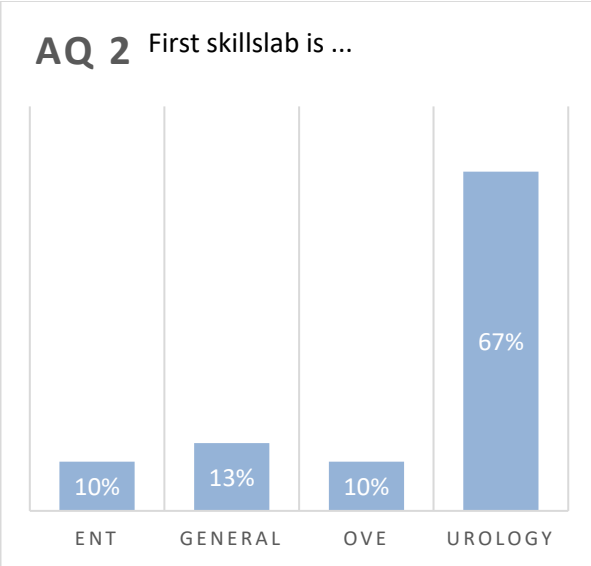

Figure 15 - After question 2

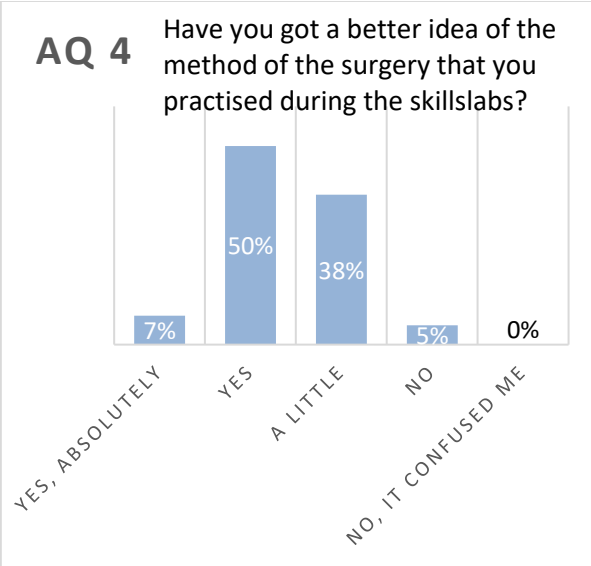

Figure 16 - After question 4

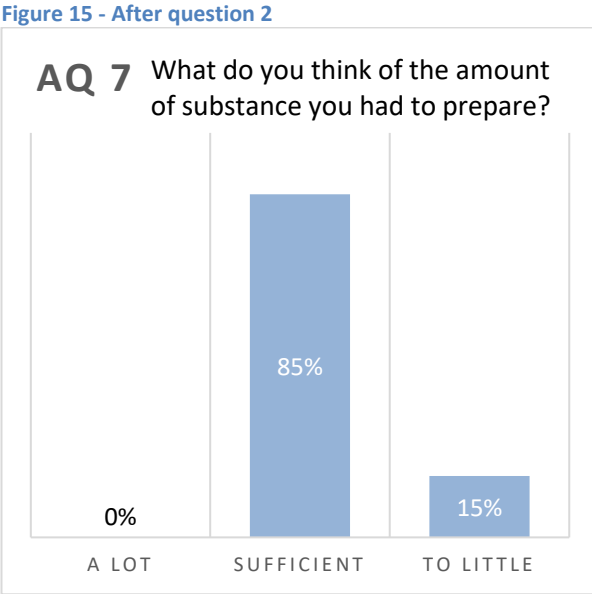

Figure 17 - After question 7

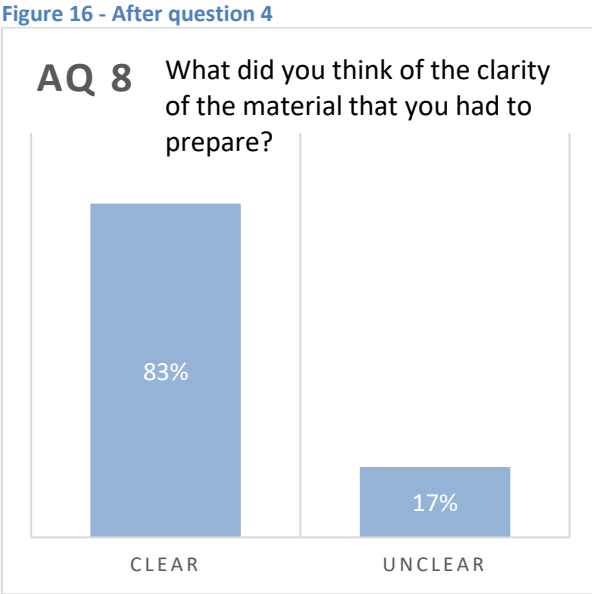

Figure 18 - After question 8

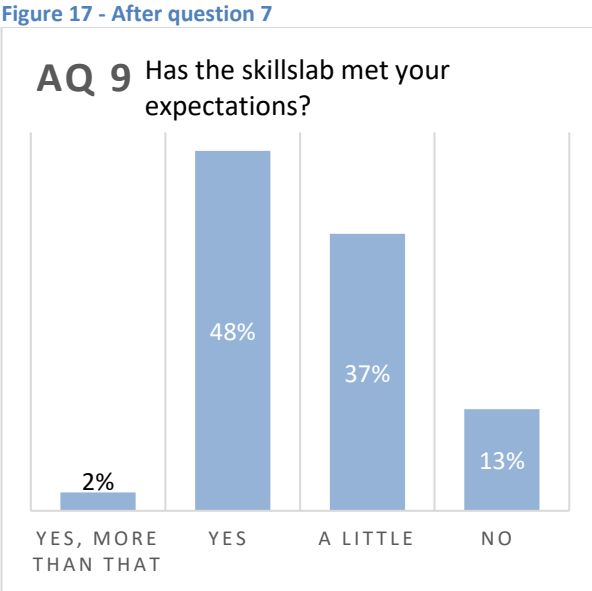

Figure 19 - After question 9

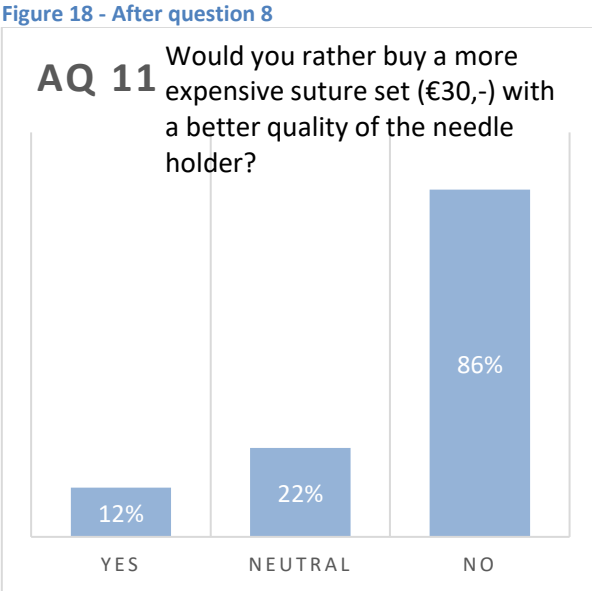

Figure 20 - After question 11

Table 1 - After question 16, 20-23, 25-30

After Question (AQ)	Agree	Disagree
Q 16 - Practicing with the models has given me more confidence about my surgical skills.	48 %	52 %
Q 20 - The skillslabs were a good reason to study the theory behind the surgical skills.	80 %	20 %
Q 21 - The skillslabs were fun to do.	95 %	5 %
Q 22 - Some parts of the skillslabs were unnecessary.	15 %	85 %
Q 23 - The instructions of the models were clear.	80 %	20 %
Q 25 - My suture technique has clearly improved by practicing in the skillslab.	66 %	34 %
Q 26 - I'm now better able to perform a castration on a dog.	71 %	29 %
Q 27 - I'm now better able to perform a castration on a cat.	75 %	25 %
Q 28 - I'm now better able to perform a tracheotomy.	75 %	25 %
Q 29 - I'm now better able to perform an othematoma.	89 %	11 %
Q 30 - I'm now better able to perform a bowel resection.	55 %	45 %

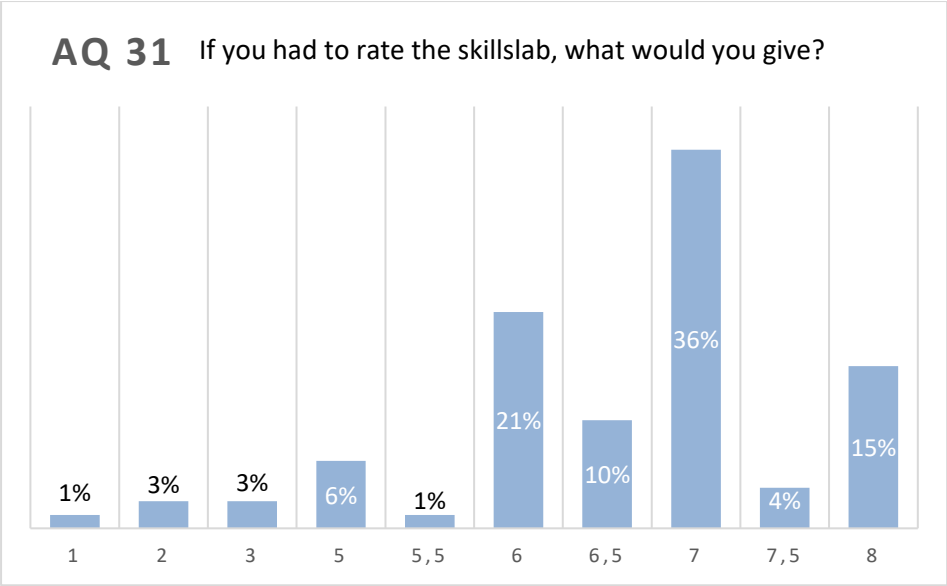

Figure 21 - After question 31

Discussion

In this chapter the following subjects will be discussed: expectations, schedule and usability of the skillslab, the research itself, improvements and the overall recommendations.

Expectations

When asked if the students liked having the opportunity to practise surgeries on models before start operating on real patients, almost all students (mean= 97,5%) agreed (figure 8). All 96% of the students liked having the opportunity to practise their sutures (figure 11), 95% of the students thought the skillslab was fun to do and only 15% of the students said there were some unnecessary components in the skillslabs (table 1 - AQ 21 and 22).

The students were asked if they thought practising during the skillslabs was useful for improving their surgical skills. Although fewer students scored this statement the highest compared to the BQ, overall the students agreed with this statement (figure 1). After participating in the skillslab, the students group who indicate that practicing on the models was childish was increased with 11%. However, the majority (86%) didn't find it childish (figure 5). The students were asked if they thought practising with the models seems boring to them. Although more students (increase of nearly 9%) agreed with this statement, overall nearly 88% didn't find the models boring (figure 4). Only 2% of the students said that the skillslab was more than they expected and 13% of the students said it didn't meet up their expectations. However, for the majority (51%) the skillslab did meet their expectations (figure 19).

Schedule

The students find three mornings sufficient (figure 10). The students did know what they had to prepare (83%) and the amount was sufficient as well (85%) (figure 17 and 18). Overall, the students didn't mind that the skillslabs where unattended (figure 3).

Students do appreciate (77%) if the faculty would offer a simple suture set for €10,- (figure 14). However, 86% wouldn't buy the more expensive suture set of €30,- (figure 20). The students were also asked what they thought about the amount of time that was scheduled for each skillslab. Although the majority thought it sufficient (mean= 1,69; median=2), still 39% of the students thought the scheduled time after participating in the skillslab was too long (figure 9).

Usability

The students were asked if they would dare to perform one of the surgeries on a living animal. The majority answered that they would do it if continuous guidance is available. After the skillslabs, 5% of the students would do it unaccompanied and 10% wouldn't dare to do it at all (figure 2). Of the students, 80% agree that the skillslab was a good reason to study the theory behind surgical skills (table 1, AQ 20). The instructions on the models were clear (80%) (table 1, AQ 23). Only 66% agree that their suturing technique has improved because of the skillslab (table 1, AQ 25). The students feel that they are better able to perform an orchiectomy of a dog (71%) and cat (75%), a tracheotomy (75%) and an othematoma operation (89%) (table 1, AQ 26 – 29).

In comparison to the other surgeries, 55% of the students would dare to perform a bowel resection (table 1, AQ 30). With regards to the operation method, 50% of the students did have a better idea of the method of an operation that was practiced and 38% said they only know it a little better (figure 16). When asked if practising with the models has given the students more confidence about their surgical skills, 48% agreed with this statement (table 1, AQ 16). The students were asked if the skillslab was a good preparation for their surgical rotations. Although 89% of the students agreed by forehand, afterwards only 57% indicated to be ready for the surgical clinical rounds (figure 6).

There was also a question about the simplicity of the models. When the students had finished the skillslabs, nearly 70% of the students agreed that the models are too far simplified to form a good exercise for practical skills (figure 7). The students scored the skillslab with an average of 6,4 out of 10 (the median was 7 out of 10) (figure 21).

Research

The before and after questionnaires weren't fully compatible, meaning only a certain amount of questions was comparable. The question about the date when the students participated in the skillslabs and with which skillslab the students started with (BQ 0, AQ 1 and 2) were irrelevant for this survey and therefore hasn't been used.

For the statistics, a test of normality was used. Since the data weren't distributed normally, two kinds of tests were used (nonparametric test and a χ^2 test). When the sample size is small, it is possible to transform the data so it will distribute normally. In our case, we had a sample size of 204 questionnaires. According to the Central Limit theorem, when the sample size is large (above 30 samples), it is possible to assume that the data are distributed normally. Therefore it would have been possible to use different statistic test like a t-test [16].

Improvements

Another aim of the research was to update the surgical skillslab and when needed to improve the instructions of each component. Since the explanation of the skillslab scored pretty good, the instructions stayed the same. Depending on the outcome of the questionnaires, the content of different models of the skillslab had to be repaired, improved, removed and/or added. Much work is needed to get this skillslab to a professional level. In this era with all its technology, it might be possible to find a better product than modifying teddy bears. On the contrary, if the model itself is sufficient, it is possible that the packaging of the model doesn't really matter.

Recommendations

The skillslabs seems to be failing when only 57% of the students thought it was a good preparation for the surgical rounds. Therefore, the content of the skillslab as a whole should be improved.

The majority of the students (77%) appreciate that a cheap suture set is provided so that they have their own tools. However, it is not clear how often they are actually using the set. During the master program the only time a student can use the set at the faculty will be in the skillslab (approximately 5 times in the 3 master years). However, in the bachelor course Integration and multi-organ diseases (bachelor year 3, Course 24) students get a suture plank so they can practise their suture skills at home. To maximise usability, it might be possible to provide the suture set in the bachelor already. For the next survey, questions about the need and usability of a suture set would be a good addition.

Although there weren't any questions in the questionnaire about how to update/improve the skillslab, there are possibilities to professionalize the skillslab. Some students commented the use of deceased animals. Although this is a good suggestion, there are already several lessons with cadavers which are offered by the Animal Donor Codicil. A deceased animal is currently only used once and it can be said that the use of these deceased animals can be optimized by scheduling more lessons per deceased animal. When a student finishes the lesson early and there is enough time left, the student is however free to practise their surgical skills on these donor codicil cadavers. On the contrary, cadavers may also have a downside. There is in most places no guarantee that the use of cadavers is not associated with purpose-bred animals or lab animals. The higher the demand of cadavers, the less feasible it is to fulfil this demand with deceased donor codicil animals.

Another alternative could be veterinary dummies. There are several companies offering these veterinary dummies to practise different kind of proceedings. Therefore, the faculty could consider the possibility to look at these kinds of education. An overview of companies offering these services can be found in appendix V.

Another recommendation would be the use of E-modules or E-courses to maximise the theoretical part of a surgery. An online course could be used as a preparation for the skillslab since they provide a good combination of theory with actual film material of an activity or surgery. This could also be an opportunity for collaborations with other stakeholders in the Netherlands like VetVisuals or Vetclass or even stakeholders oversees as ESAVS or VIN. Most of them have already made several E-modules on surgical topics which could be used for students as well.

When the 'New Skillslab' is running, in consultation with a statistician a new questionnaire needs to be set. In this questionnaire good and reliable questions need to be formulated so they can be evaluated and interpreted in the best way possible. When asking students to rate the skillslab, it would be better to only use whole number (5, 6 or 7) instead of an open question. The students have to choose one rating, which will make more clear what their opinion will be. To really evaluate the effect of the skillslab on the surgical improvement of the students, a control group could be implemented. In order to evaluate each model individually, specific questions on the usage, effectiveness and usability per model could be added. For the next research and evaluation, a timeframe of 5 years would be sufficient.

Above all, it is important to keep maintaining the components of the skillslab over the years. In the last 2 to 3 years, the small student groups of 2 students (a student pair) are becoming a group of 3 students (triplets). Since the current skillslab is designed for only 2 students each time, the triplet groups had to deal with material shortage. Nearly 40% of the students thought the current scheduled time was too long. It could be considered to add extra exercises for these students. It would also be recommended to have a good look at the new organisation of the master program, to see where the surgical skillslab fits best.

Conclusion

The aim of this research was to evaluate and improve the surgical skillslab at the Department of Companion Animal medicine at the Veterinary Medicine faculty in Utrecht. The skillslab has been evaluated and the students rated the skillslab an average of a 6,4 out of 10 (the median was 7 out of 10).

Overall, the skills and knowledge of the students has improved due to the skillslab. The students liked having the opportunity to practise and it helped students to improve their surgical techniques. The majority said it was a good reason to study the theory behind the surgeries as well. Besides, they thought it was fun to do.

Although the majority didn't find the models of the skillslab childish (86%) or boring (88%), nearly 70% of the students did think that the models were too far simplified. Only half the students (48%) indicated that practising with the models has giving them more confidence about their surgical skills.

Despite the overall positive answers of the questionnaire, the average rating isn't optimal. Since only 57% of the students thought it was a good preparation for the surgical rounds, the initial goal of the skillslab should be improved by implementing several changes in the skillslab.

An overview of potential improvements and recommendations is given. New developments in veterinary dummies and the use of e-models should be considered. After improving the skillslab, an improved questionnaire should be designed to evaluate the skillslab in the future.

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Appendix

I. Questionnaire

Questionnaire – Before participating the skillslab

Enquête: 'Mening studenten over de Skillslab'
De skillslabs zijn in het nieuwe onderwijs van de master geïmpregneerd om studenten de mogelijkheid te geven chirurgische vaardigheden te oefenen waarvan later wordt verwacht dat de student deze zelfstandig kan uitvoeren.
De skillslabs zijn dus helemaal voor (en ook mede door!) studenten gemaakt om jullie extra voor te bereiden op de coschappen en natuurlijk het daarop volgende dierenartsschap! Om de functie van deze skillslabs optimaal te laten verlopen, willen wij graag voor en na het oefenen met de skillslabs jullie mening vragen.

Invullen a.u.b.:
Datum: __-__-____
Studentnr: (alleen voor statistiek, enquête wordt anoniem behandeld)
1e skillslab is: *(goede antwoord aankruisen)*

- ○ **KNO**
- ○ **Algemeen hechten + darmresectie**
- ○ **Urologie**

Enquête VOOR het beginnen aan de skillslabs:

De vragen gaan over de skillslabs algemeen hechten, urologie en KNO. De operaties die hierbij geoefend worden zijn:

- *Algmeen: hechten & darmresectie*
- *Urologie: castratie hond en kat & cystocenthese*
- *KNO: othematoom & tracheotomie*

1) Stelling: Ik denk dat het oefenen tijdens de skillslabs nuttig is voor het aanleren/ verbeteren van mijn chirurgische vaardigheden.
   a. Helemaal mee eens
   b. Mee eens
   c. Weet ik niet
   d. Niet mee eens
   e. Helemaal niet mee eens
2) Zou u al zelfstandig deze operaties durven uitvoeren op een levend dier?
   a. Ja, ik zou het zonder begeleiding uit durven voeren
   b. Ja, maar met begeleiding in de buurt voor als er iets mis gaat
   c. Ja, maar met voortdurend begeleiding
   d. Nee, dat durf ik nog niet
3) Voelt u zich onzeker over hoe u de operaties uit moet voeren?
   a. Ja
   b. Een beetje
   c. Nee
4) Stelt u het op prijs dat er een eenvoudige hechtset wordt aangeboden voor 10 euro zodat u zelf over instrumenten beschikt?
   a. Ja, heel erg

b. Ja
c. Neutraal
d. Nee

5) De skillslabs zijn zonder begeleiding, wat vindt u hiervan?
   a. Prettig, zo kan ik werken op mijn eigen tempo
   b. Maakt mij niet zoveel uit
   c. Vervelend, dan kan ik geen hulp vragen
   d. Anders, namelijk…

Hier volgen wat stellingen. Omcirkel het voor jou juiste antwoord.

6) Het oefenen met de modellen lijkt mij saai. *EENS / ONEENS*
7) Het oefenen met de modellen vind ik kinderachtig. *EENS / ONEENS*
8) De skillslab is een goede voorbereiding voor het co-schap chirurgie. *EENS / ONEENS*
9) De modellen zijn te ver vereenvoudigd om een goede oefening te vormen voor praktische vaardigheden. *EENS / ONEENS*
10) Ik vind het prettig dat ik eerst de kans krijg om operaties op modellen te oefenen voordat ik echte patiënten ga opereren. *EENS / ONEENS*
11) Ik vind de tijd die is ingeroosterd is voor elk skillslab: *TE LANG / VOLDOENDE / TE KORT*
12) Ik vind 3 ochtenden skillslab: *TE WEINIG / VOLDOENDE / TE VEEL*
13) Ik vind het prettig dat ik eerst hechten op een model heb kan oefenen voordat ik dit ga uitvoeren op een levend dier. EENS / ONEENS
14) Hebt u nog suggesties/opmerkingen over de skillslabs? …

Questionnaire – After participating the skillslab

Enquête NA de skillslabs:

1) **Datum: __-__-____**
   Studentnr: (voor statistiek, enquête wordt anoniem behandeld)

2) 3de skillslab is: *(aankruisen wat van toepassing is)*
   a. KNO
   b. Algemeen hechten + darmresectie
   c. Urologie

➔ ***Omcirkel nu steeds het juiste antwoord:***

3) Stelling: Het oefenen tijdens de skillslabs was nuttig voor het aanleren/ verbeteren van mijn chirurgische vaardigheden.
   a. Helemaal mee eens
   b. Mee eens
   c. Weet ik nog niet
   d. Niet mee eens
   e. Helemaal niet mee eens
4) Heb je een beter beeld gekregen van de methode van uitvoering van de operatie die je hebt geoefend tijdens de skillslabs (castratie hond en kat, tracheotomie, darmresectie)?
   a. Ja absoluut
   b. Ja
   c. Een beetje
   d. Nee
   e. Nee, het heeft mij juist meer in de war gebracht
5) Zou u al zelfstandig deze operaties durven uitvoeren op een levend dier?
   a. Ja, ik zou het zonder begeleiding uit durven voeren

b. Ja, maar met begeleiding in de buurt voor als er iets mis gaat
c. Ja, maar met voortdurend begeleiding
d. Nee, dat durf ik nog niet

6) De skillslabs waren zonder begeleiding, wat vindt u hiervan?
   a. Prettig, zo kan ik werken op mijn eigen tempo
   b. Maakt mij niet zoveel uit
   c. Vervelend, dan kan ik geen hulp vragen
   d. Anders, namelijk……
7) Wat vind je van de hoeveelheid stof die je moest voorbereiden?
   a. Veel
   b. Voldoende
   c. Weinig
8) Wat vond je van de duidelijkheid van de stof die je moest voorbereiden?
   a. Duidelijk
   b. Onduidelijk, want……
9) Heeft de skillslab aan je verwachtingen voldaan?
   a. Ja, meer dan dat
   b. Ja
   c. Een beetje
   d. Nee
10) Als je 'een beetje' of 'nee' hebt ingevuld, wat had je anders verwacht?

……
……
……
……
……
……

11) Zou u liever een duurder hechtsetje (van ca. 30 euro) kopen met dan een betere kwaliteit naaldvoerder?
   a. Ja
   b. Neutraal
   c. Nee

<u>Hier volgen enkele stellingen. Omcirkel het voor jou juiste antwoord.</u>

12) Het oefenen met de modellen vond ik saai. *EENS / ONEENS*
13) Het oefenen met de modellen vond ik kinderachtig. *EENS / ONEENS*
14) De skillslabs zijn een goede voorbereiding voor de co-schap chirurgie. *EENS / ONEENS*
15) De modellen zijn te ver vereenvoudigd om een goede oefening te vormen voor praktische vaardigheden. *EENS / ONEENS*
16) Het oefenen met de modellen heeft mij meer zekerheid gegeven over mijn chirurgische vaardigheden. *EENS / ONEENS*
17) Ik vind het prettig dat ik eerst de kans krijg om op modellen te oefenen voordat ik echte patiënten ga opereren. *EENS / ONEENS*
18) Ik vind de tijd die ingeroosterd was voor de skillslabs: *TE LANG / VOLDOENDE / TE KORT*
19) Ik vond 3 ochtenden skillslabs: *TE WEINIG / VOLDOENDE / TE VEEL*
20) De skillslabs waren een goede aanleiding om de theorie achter de chirurgische vaardigheden te bestuderen. *EENS / ONEENS*
21) De skillslabs waren leuk om te doen. *EENS / ONEENS*
22) Sommige onderdelen van de skillslabs waren overbodig. *EENS / ONEENS*
    Als u in vraag 34 met EENS heeft beantwoord: welke onderdelen vindt u dan overbodig? …
23) De instructies bij de modellen waren duidelijk. *EENS / ONEENS*

24) Ik vind het prettig dat ik eerst hechten op een model heb kunnen oefenen voordat ik dit ga uitvoeren op een levend dier. EENS / ONEENS
25) Mijn hechttechniek is duidelijk verbeterd door te oefenen in de skillslab. *EENS / ONEENS*
26) Ik ben nu beter in staat een castratie bij de hond uit te voeren. *EENS / ONEENS*
27) Ik ben nu beter in staat een castratie bij de kat uit te voeren. *EENS / ONEENS*
28) Ik ben nu beter is staat een tracheotomie uit te voeren. *EENS / ONEENS*
29) Ik ben nu beter in staat een othematoom op te lossen. *EENS / ONEENS*
30) Ik ben nu beter in staat een darmresectie uit te voeren. *EENS / ONEENS*
31) Als je de skillslab in totaal een cijfer moest geven van 1 tot 10, wat zou je dan geven? (1= super slecht, 10= hartstikke goed):…
32) Hebt u nog suggesties/opmerkingen over de skillslabs? …

II. Scored questionnaires

Comparable questions

Table 2 - Comparable questions

	Year	Studentnr.	B (0)* A (1) *	Pairs										
				1	2	3	4	5	6	7	8	9	10	11
1	2015		0	2	4	1	2	2	2	2	1	2		1
2	2015	3616991	0	2	4	2	2	2	1	2	1	1	2	1
3	2015	3574849	0	1	2	2	2	2	1	1		1	2	1
4	2015	3577775	0	2	4	2	2	2	1	1	1	1	2	1
5	2015	3501620	0	1	3	1	2	2		1	1	2	2	1
6	2015	3642038	0	1	3	2	2	2	1	2	1	1	2	1
7	2015	3588254	0	2	3	2	2	2	1	2	1	2	2	1
8	2015	3515664	0	2	3	1	2	1	2	1	1	2	2	1
9	2015	3546160	0	2	2	3	2	2	1	1	1	1	2	1
10	2015	3631117	0	2	3	4	2	2	1	2	1	2	2	1
11	2015	3586049	0	2	3	2	2	2	1	1	1	2	2	1
12	2015		0	2	4	1	2	2	1	1	1	2	2	1
13	2015		0	2	4	3	2	2	1	1	1	2	1	1
14	2015	3781895	0	2	3	3	2	2	1	1	1	2	2	1
15	2015	3516296	0	2	3	1	2	2	1	2	1	1	2	1
16	2015	3630862	0	2	3	2	2	2	1	2	1	2	1	1
17	2015	3662187	0	2	4	1	2	2	1	1	1		2	1
18	2015	3653269	0	2	4	1	2	2	1	1	1		2	1
19	2014		0	1	3	4	2	2	1	1	1	1	1	1
20	2014		0	3	3	1	1	1	2	1	1	1	2	1
21	2014		0	4	4	1	2	2	2	1	1	1	2	1
22	2014	3796620	0	1	4	1	2	2	1	2	1	2	1	1
23	2014		0	2	4	4	2	2	1	1	1	2	1	1
24	2014		0	4	4	3	2	2	2	1	1	1	2	1
25	2014		0	4	4	3	2	2	2	1	1	1	2	1
26	2014	3572692	0	2	3	3	2	2	1	1	1	2	1	1
27	2014	3575047	0	2	2	3	2	2	1	1	1	2	2	1
28	2014		0	2	4	4	2	2	1	1	1	2	1	1
29	2014	3575985	0	2	4	4	2	2	1	1	1	2	1	1
30	2014	3381927	0	1	4	1	2	2	1	2	1	2	2	1
31	2014	3259978	0	1	4	1	2	2	1	2	1	2	1	1
32	2014	3582078	0	4	4	3	1	2	2	1	1	1	2	1
33	2014	3545237	0	3	3	3	1	2	2	1	1	2	1	1
34	2014	3516695	0	3	3	1	2	2	1	1	1	2	2	1
35	2013	3259919	0	2	3	1	2	2	1	2	1	2	1	1

36	2013	3382060	0	1	3	1	2	2	1	2	1	2	1	1
37	2013	3501647	0	2	4	1	2	2	1	1	1	2	2	1
38	2013	3383032	0	3	4	1	2	2	1	2	1	2	2	1
39	2013	3381803	0	1	3	1	2	2	1		1	2	2	1
40	2013	3383067	0	1	3	1	2	2	1	2	1	2	2	
41	2013	3515834	0	2	3	2	2	2	1	1	1	2	2	1
42	2013	3346366	0	1	2	1	2	2	1	1	1	2	1	1
43	2013	3382303	0	1	4	1	2	2	1	1	1	2	1	1
44	2013	2282842	0	1	2	1	2	2	1	2	1	1	1	1
45	2013	3155358	0	1	4	2	2	2	1	2	1	1	1	1
46	2013	3383458	0	2	3	1	2	2	1	1	1	2	1	1
47	2013	3516520	0	2	3	2	2	2	1	1	2	1	2	1
48	2013	3382990	0	2	3	1	2	2		2	1	2	2	1
49	2013	3516091	0	2	3	2	2	2	1	1	1	2	1	1
50	2013		0	1	2	1	2	2	1	2	1	1	2	1
51	2012	3515788	0	1	2	2	2	2	1	1	1	2	2	1
52	2012	3544796	0	1	3	2	2	2	1	1	1	2	2	1
53	2012		0	4	3	2	2	2	2	1	1	1	2	1
54	2012	3516202	0	1	2	1	2	2	1	1	1	2	2	1
55	2012	3538095	0	1	3		2	2	1	1	1	1	1	1
56	2012	3547442	0	3	3	3	2	2	1	1	1	1	3	2
57	2012	3516636	0	1	4	3	2	2	1	2	1	2	2	1
58	2012	3516598	0	1	4	3	2	2	1	2	1			1
59	2012	3515206	0	2	3	1	2	2	1	1	1	2	2	1
60	2012	3155846	0	1	3	3	2	2	1	2	1	2	2	1
61	2012	3259862	0	2	3	2	2	2	1	2	1	2	2	1
62	2012	3259080	0	1	3	1	2	2	1	1	1	1	2	1
63	2012	3258807	0	1	3	2	2	2	1	2	1	2		1
64	2012	3051552	0	2	4	1	2	2	1	2	1	2	2	1
65	2012	3067904	0	1	4	1	2	2	1		1	2	1	1
66	2012	3382613	0	2	4	3	2	2	1	1	1	1	2	1
67	2012	3383237	0	2	3	1	2	2	1	1	1	2	1	1
68	2012	3259552	0	2	3	1	2	2	1	1	1	2	1	1
69	2012	3292029	0	1	4	1	2	2	1	2	1	2	2	1
70	2012	3258718	0	1	4	1	2	2	1	2	1	2	2	1
71	2012		0	2	3	4	2	2	1	1	1	1	2	1
72	2012		0	2	3	1	2	2	1	2	1	2	2	1
73	2012	3180956	0	2	3	1	2	2	1	2	1	2	2	1
74	2012	3415426	0	2	4	3	2	2	1	1	1	1	1	1
75	2012	3259498	0	2	3	1	2	2	1	2	1	1	2	1
76	2012		0	2	2	2	2	2	1	2	1	2	2	1
77	2012	3155137	0	1	3	3	2	2	1	2	1	2	1	1

78	2012	3177769	0	2	4	3	2	2	1	1	1	2	2	1
79	2012	3277178	0	3	3	1	2	2	2	1	1	2	2	1
80	2012	3274683	0	2	2	1	2	2	1	2	1	2	2	1
81	2012	3258599	0	2	2	1	2	2	1	2	1	2	2	1
82	2012	3258734	0	2	2	1	2	2	2	2	2	2		2
83	2012	3259811	0	3	3	3	2	1	1	1	1	2	2	1
84	2012	3259935	0	2	3	3	2	2	1	1	1	2	2	1
85	2012	3259242	0	2	3	3	2	2	1	2	1	2	2	1
86	2012	3419169	0	2	3	3	2	2	1	2	1	2	2	1
87	2012	3383040	0	2	3	3	2	2	1	2	1	2	2	1
88	2012		0	1	3	1	2	2	1	1	1	2	2	1
89	2012	3258645	0	2	2	1	2	2	1			1		
90	2012	3382168	0	1	3	1	2	2	1	1	1	2	2	1
91	2012	3382737	0	2	3	3	2	2	1	2	1	2	2	1
92	2012	3258890	0	1	3	1	2	2	1	2	1	2	1	1
93	2012	3382494	0	1	4	2	2	2	1	1	1	2	2	1
94	2012		0	1	3	1	2	2	1	2	1	1	2	1
95	2012		0	2	3	2	2	2	1	1	1	2		1
96	2012	3260119	0	2	2	2	2	2	1	1	1	2		1
97	2012	3383075	0	2	3	2	2	2	1	2	1	2	1	1
98	2012	3258866	0	2	3	1	2	2	1	2	1	2	2	1
99	2011	3382583	0	1	2	4	2	2	2	1	1	2	1	1
100	2011	3382427	0	2	4	1	2	2	1	1	1	2	2	1
101	2011	3383024	0	1	3	4	2	2	1	1	1	1	1	1
102	2011	3382591	0	1	3	2	2	2	1	2	1	2	1	1
103	2011	3259439	0	2	3	2	2	2	1	2	1	2	2	1
104	2011	3258459	0	2	3	1	2	2	1	2	1	2	1	1
105	2011		0	1	2	1	2	2	1	2	1	2	2	1
106	2011		0	2	3	1	2	2	1	1	1	2	2	
107	2011	3258556	0	2	3	1	2	2	1	1	1	2	1	1
108	2011	3260178	0	2	4	3	2	2	1	1	1	2	2	1
109	2011	3277151	0	2	4	3	2	2	1	1	1	2	2	1
110	2011	3258610	0	1	3	1	2	2	1	2	1	1	2	1
111	2011	3260283	0	2	3	2	2	2	1	1	1	2	1	1
112	2011	3258858	0	2	3	1	2	2	2	2	1	1	2	2
113	2011	9468290	0	1	3	2	2	2	1	2	1	2	2	1
114	2011	3258793	0	2	4	2	2	2	1	2	1	2	2	1
115	2011	3258378	0	3	2	2	2	2	1	1	1	2	2	1
116	2011	3155102	0	1	4	1	2	2	1	2	1	2	2	1
117	2011		0	1	4	1	2	2	1	2	1	2	2	1
118	2011	3154467	0	1	3	1	2	2	1	2	1		1	1
119	2011	3159102	0	2	3	2	1	2	1	2	1	2	2	

120	2011	3258823	0	1	3	1	2	2	1	1	1	2	2	1
121	2011	3346749	0	2	3	1	2	2	1	1	1	1	2	1
122	2015		1	2	3	1	2	2	2	1	1	1	3	1
123	2015	3501620	1	2	2	1	2	2	1	1	1	2	2	1
124	2015	3642038	1	2	2	1	2	2	2	1	1	2	2	1
125	2015		1	2	3	1	2	2	1	2	1	2	2	1
126	2015		1	4	3	4	2	1	2	1	1	1	2	1
127	2015		1	2	2	1	2	1	2	1	1	1	2	1
128	2015	3572854	1	2	3	1	2	1	2	1	1	1	2	1
129	2015	3588254	1	2	3	1	2	1	2	1	1	1	2	1
130	2015	3630862	1	2	3	2	2	2	1	1	1	2	1	1
131	2015	3516296	1	2	3	1	1	2	1	1	1	1	2	1
132	2015		1	4	4	2	2	1	2	1	1	1	2	1
133	2015	3796620	1	2	3	1	2	2	1	1	1	1	1	1
134	2015		1	2	3	1	2	2	1	1	1	2	1	1
135	2014		1	2	3	4	2	2	1	1	1	1	1	1
136	2014		1	3	3	1	1	1	2	1	1	1	2	1
137	2014		1	3	4	1	2	2	2	1	1	2	2	1
138	2014	3575047	1	2	3	4	1	2	2	1	1	2	2	1
139	2014		1	3	3	3	2	2	2	1	1	2	2	1
140	2014	3381927	1	1	3	1	2	2	1	2	1	2	2	1
141	2014	3259978	1	2	4	1	2	2	1	2	1	2	1	1
142	2014	3516121	1	2	3	4	2	2	1	1	1	1	1	1
143	2014	3516032	1	2	2	3	2	2	2	1	1	1		1
144	2014	3346382	1	2	3	1	2	2	2	1	1	1	3	1
145	2014	3545245	1	2	3	1	2	2	2	1	1	2	2	1
146	2014	3516431	1	3	3	2	2	2	1	1	1	2	2	1
147	2014	3515052	1	2	3	4	2	2	1	2	1	2	2	1
148	2014	3155307	1	5	2	3	1	2	2	1	2	1	3	2
149	2014	3662667	1	1	3	4	2	2	1	1	1	2	1	1
150	2014		1	2	1	3	2	2	2	1	1	1	2	2
151	2014	3516172	1	2	3	1	2	2	1	2	1	2	1	1
152	2013	3410595	1	2	3	1	2	2	2	2	1	1	2	1
153	2013	3180065	1	2	4	2	2	2	1	1	1	1	2	1
154	2013	3346366	1	2	2	4	2	2	1	2	1	2	2	1
155	2013	3501647	1	3	3	1	2	2	2	2	1	2	2	1
156	2013	3516520	1	2	3	2	1	2	2	2	1	2	1	1
157	2013	3383458	1	2	2	1	2	2	1	1	1	2	1	1
158	2013	3382990	1	2	2	1	2	2	1	2	1	2	1	1
159	2013	3538095	1	2	3	2	2	2	1	1	1	1	2	1
160	2013	3547442	1	3	3	1	1		2	1	1	1	2	2
161	2013	3582264	1	1	3	1	2	2	1	2	1	2	1	

162	2013	3516025	1	2	2	1	2	2	1	2	1	1	2	1
163	2013		1	5	3	2	1	2	2	1	1	2	2	1
164	2012	3067904	1	2	3	1	2	2	1	2	1	2	1	1
165	2012	3051552	1	2	3	1	2	2	1	2	1	2	2	1
166	2012	3258947	1	3	2	2	2	2	1	1	1	1	2	1
167	2012		1	2	4	1	2	2	1	1	1	1	1	1
168	2012	3382613	1	2	3	2	1	1	2	1	1	2	1	1
169	2012	3260194	1	2	3	1	2	2	2	1	1	2	1	1
170	2012	3292029	1	1	3	1	2	2	1	2	1	2	2	2
171	2012	3258718	1	1	3	1	2	2	1	2	1	2	2	2
172	2012		1	2	3	4	2	2	1	1	1	1	2	1
173	2012	3177769	1	1	2	3	2	2	1	1	1	2	2	1
174	2012	3383105	1	1	4	1	2	2	1	2	1	2	2	1
175	2012	3419169	1	2	3	1	2	1	1	1	1	2	2	1
176	2012	3383040	1	2	3	1	2	1	1	1	1	2	2	1
177	2012	3259814	1	3	3	2	1	1	2	1	1	2	2	1
178	2012	3246557	1	2	2	1	2	2	1	1	2	2		
179	2012	3274683	1	2	2	1	2	2	1	2	1	2	2	1
180	2012	3258599	1	2	2	1	2	2	2	2	1	2	2	1
181	2012	3258734	1	2	2	1	2	2	2	2	2	2		1
182	2012		1	2	2	1	2	2	2	1	1	1	2	1
183	2012	3382737	1	2	3	2	2	2	1	2	1	2	2	1
184	2012		1	2	1	2	2	2	1	1	1	2		1
185	2012		1	2	2	1	2	2	1	1	1	1	2	2
186	2012	3383075	1	2	3	2	2	2	1	2	1	1	1	1
187	2012	3258866	1	2	3	1	2	2	1	1	1	2	2	1
188	2012	3154513	1	3	2	3	2	2	1	1	1	2	2	1
189	2012		1	4	2	2	2	2	2	1	1	2		1
190	2012	3382477	1	1	4	1	2	2	1	1	1	2	2	1
191	2012	3382591	1	2	3	2	2	2	1	1	1	2	2	1
192	2012	3383024	1	2	3	1	2	2	2	1	1	2	2	1
193	2012		1	2	4	2	1	1	2	1	1	2	2	1
194	2012	3346749	1	2	3	4	2	2	2	1	1	1	2	1
195	2012	3382583	1	2	3	4	2	2	2	1	1	1	2	1
196	2011	3258432	1	3	1	1	2	2	2	1	1	1	2	1
197	2011	3060152	1	2	1	1	2	2	2	1	1	2	2	1
198	2011	3258378	1	2	2	1	2	2	1	1	1	1	2	1
199	2011	3258793	1	2	2	2	2	2	1	2	1	1	2	1
200	2011	9468390	1	1	3	4	2	2	1	2	1	2	2	1
201	2011	3258858	1	2	2	1	2	2	2	1	1	1	2	1
202	2011	3259102	1	2	3	1	2	2	1	2	1	2	2	1
203	2011	3154467	1	1	3	1	2	2	1	1	1	2	2	1

Non-comparable questions

Table 3 - Before questionnaire

	Studentnr.	Year	Before (0)	Question		
				0	3	4
1		2015	0	2	1	2
2	3616991	2015	0	6	1	3
3	3574849	2015	0	1	3	2
4	3577775	2015	0	1	2	2
5	3501620	2015	0		2	3
6	3642038	2015	0	2	1	2
7	3588254	2015	0	2	2	2
8	3515664	2015	0	2	2	2
9	3546160	2015	0	1	2	1
10	3631117	2015	0	1	2	2
11	3586049	2015	0	2	2	2
12		2015	0	2	2	3
13		2015	0	1	2	1
14	3781895	2015	0	1	2	2
15	3516296	2015	0	2	2	3
16	3630862	2015	0	2	2	2
17	3662187	2015	0	1	1	2
18	3653269	2015	0	1	1	2
19		2014	0	6	2	1
20		2014	0	6	3	2
21		2014	0	6	1	2
22	3796620	2014	0	2	2	2
23		2014	0	2	1	1
24		2014	0	6	1	3
25		2014	0	6	1	2
26	3572692	2014	0	6	2	3
27	3575047	2014	0	6	2	2
28		2014	0	1	1	2
29	3575985	2014	0	1	1	2
30	3381927	2014	0	1	1	3
31	3259978	2014	0	1	1	3
32	3582078	2014	0	2	1	3
33	3545237	2014	0	2	2	2
34	3516695	2014	0	2	2	2
35	3259919	2013	0	2	2	2
36	3382060	2013	0	2	2	2
37	3501647	2013	0	2	1	1
38	3383032	2013	0	1	1	2

39	3381803	2013	0		1	1
40	3383067	2013	0	2	2	1
41	3515834	2013	0	2	1	2
42	3346366	2013	0	3	2	2
43	3382303	2013	0	3	1	1
44	2282842	2013	0	6	2	1
45	3155358	2013	0	6	1	4
46	3383458	2013	0	1	1	2
47	3516520	2013	0	1	2	2
48	3382990	2013	0	1	1	2
49	3516091	2013	0		2	3
50		2013	0	2	2	2
51	3515788	2012	0	1	2	4
52	3544796	2012	0	1	2	2
53		2012	0	6	3	3
54	3516202	2012	0	2	2	2
55	3538095	2012	0	6	2	2
56	3547442	2012	0	6	2	1
57	3516636	2012	0	1	2	2
58	3516598	2012	0	1	1	2
59	3515206	2012	0	1	2	1
60	3155846	2012	0	6	2	2
61	3259862	2012	0	1	2	3
62	3259080	2012	0	1	2	2
63	3258807	2012	0	2	1	3
64	3051552	2012	0	1	2	1
65	3067904	2012	0	1	2	2
66	3382613	2012	0	1	1	2
67	3383237	2012	0	2	2	2
68	3259552	2012	0	2	2	2
69	3292029	2012	0	2	2	1
70	3258718	2012	0	2	2	1
71		2012	0	1	2	2
72		2012	0	2	1	2
73	3180956	2012	0	2	2	2
74	3415426	2012	0	1	1	1
75	3259498	2012	0	5	2	3
76		2012	0	1	2	2
77	3155137	2012	0	6	1	2
78	3177769	2012	0	6	1	2
79	3277178	2012	0	1	2	2
80	3274683	2012	0	4	3	3

81	3258599	2012	0	4	2	2
82	3258734	2012	0	1	3	2
83	3259811	2012	0	6	1	1
84	3259935	2012	0	6	3	2
85	3259242	2012	0	6	2	4
86	3419169	2012	0	6	2	4
87	3383040	2012	0	6	2	4
88		2012	0	1	2	3
89	3258645	2012	0	4	2	3
90	3382168	2012	0	2	1	3
91	3382737	2012	0	2	1	2
92	3258890	2012	0	1	2	2
93	3382494	2012	0	2	1	1
94		2012	0	2	2	1
95		2012	0	4	2	3
96	3260119	2012	0	4	2	3
97	3383075	2012	0	1	2	3
98	3258866	2012	0	1	2	2
99	3382583	2011	0	1	2	2
100	3382427	2011	0	2	2	1
101	3383024	2011	0	2	2	1
102	3382591	2011	0	2	2	1
103	3259439	2011	0	4	1	2
104	3258459	2011	0	4	2	2
105		2011	0	6	2	1
106		2011	0	6	2	2
107	3258556	2011	0	6	2	2
108	3260178	2011	0	1	1	2
109	3277151	2011	0	1	1	2
110	3258610	2011	0	6	2	2
111	3260283	2011	0	6	2	2
112	3258858	2011	0	1	2	3
113	9468290	2011	0	1	1	2
114	3258793	2011	0	2	2	2
115	3258378	2011	0	2	2	2
116	3155102	2011	0	6	1	2
117		2011	0	6	2	1
118	3154467	2011	0	2	1	2
119	3159102	2011	0	2	2	2
120	3258823	2011	0	6	1	3
121	3346749	2011	0	1	2	2

Table 4 – After questionnaire

	Studentnr.	Year	After (1)	Question																	
				2	4	7	8	9 + 10	11	16	20	21	22	23	25	26	27	28	29	30	31
1		2015	1	6	2	2	2	3	3	2	1	1	2	1	1	1	1	1	1	1	6,5
2	3501620	2015	1	1	2	2		2	3	1	1	1	2	1	1	1	1	1		1	8
3	3642038	2015	1	6	2			2	3	1	1	1	2	1	1	1	1	1	2	2	7
4		2015	1	6	2	3	2	2	3	1	1	1	2	1	1	1	1	1	1	1	7,5
5		2015	1	1	3	2	1	4	2	2	2	1	2	1	1	2	2	1	1	2	6
6		2015	1	6	3	2	1	3	3	2	2	1	2	1	1	2	2	1	1	2	6
7	3572854	2015	1	6	3	2	1	3	3	2	1	1	2	1	1	1	1	2	1	2	6
8	3588254	2015	1	6	3	2	1	4	2	2	2	1	2	1	1	2	2	1	1	2	5
9	3630862	2015	1	6	2	3	2	3	3	1	1	1	2	2	1	1	1	1	1	1	6,5
10	3516296	2015	1	6	2	3	1	3	3	1	1	1	2	1	1	1	1	2	1	2	6,5
11		2015	1	2	4	3	1	4	3	2	2	1	1	1	1	2	2	2	1	2	3
12	3796620	2015	1	6	2	2	1	2	3	2	1	1	2	2	1	1	1	1	1	1	8
13		2015	1	6	3	3	1	3	2	1	1	1	2	1	1	1	1	1	1	2	7
14		2014	1	6	3	2	1	3	2	1	1	1	2	2	1	1	1				6
15		2014	1	6	2	2	1	3	3	2	1	2	1	1	2	1	1	1	1	1	6
16		2014	1	6	3	2	1	3	3	2	1	1	2	1	2	2	2	2	2	2	5
17	3575047	2014	1	1	2	2	2	3	3	2	2	1	2	2	2	1	1	1	1	1	7
18		2014	1	1	2	2	2	3	3	2	2	1	2	2	1	1	1	1	1	1	7
19	3381927	2014	1	6	1	2	1	1	3	1	1	1	2	1	1	1	1	1	1	1	7
20	3259978	2014	1	6	2	2	1	3	3	1	1	1	2	1	2	1	1	2	1	2	7
21	3516121	2014	1	6	3	2	1	3	2	2	1	1	2	2	2	1	1				7
22	3516032	2014	1	6	3	2	1	3	3	2	1	1	2	2	2	1	1	1	1	1	6
23	3346382	2014	1	6	3	3	2	3	3	2	1	1	2	2	2	1	1	1	1	1	6
24	3545245	2014	1	1	2	2	1	2	3	2	1	1	2	2	1	2	2	1	1	1	0

25	3516431	2014	1	6	3	2	1	3	3	2	1	1	2	1	1	2	1			2	6
26	3515052	2014	1	2	2	3	2	2	3	1	1	1	2	1	1	2	2	1	1	1	7
27	3155307	2014	1	6	4	2	1	4	3	2	2	2	1	2	2	2	2	2	2	2	1
28	3662667	2014	1	6	2	3	1	3	2	1	1	1	2	1	2	2	1	2	1	2	6
29		2014	1	6	2	3	1	4	2	2	1	1	2	2	1	1	2	2	2	2	6
30	3516172	2014	1	1	2	2	1	2	3	1	1	1	2	1	1	1	1	1	1	2	8
31	3410595	2013	1	2	3	2	2	3	3	1	2	1	2	1	1	1	1	1	1	1	6,5
32	3180065	2013	1	2	2	2	1	3	3	2	1		2	1	1	1	1	1	1	1	6
33	3346366	2013	1	1	2	2	1	2	3	1	1	1	2	1	1	1	1	1	1	1	8
34	3501647	2013	1	6	3	2	1	2	3	2	1	1	2	1	1	1	1	1	1	2	7
35	3516520	2013	1	6	2	2	1	2	3	2	2	1	2	1	2	1	1	1	1	1	7
36	3383458	2013	1	6	2	2	1	2	3	2	1	1	2	1	2	1	1	1	1	2	7
37	3382990	2013	1	6	2	2	1	2	3	1	1	1	2	1	1	1	1	1	1	1	8
38	3538095	2013	1	2	3	2	2	2	3	1	1	1	2	1	1	2	2	1	1	2	7
39	3547442	2013	1	2	3	2	1	4	2	2	1	2	1	1	2	1	1	1	1	1	3
40	3582264	2013	1	1	2	2	1	2	3	1											
41	3516025	2013	1	6	3	2	1	3	2	1	1	1	1	1	2	1	1	1	1	1	7
42		2013	1	6	3	2	1	3	3	2	1	1	1	1	2	1	1	1	1	1	5
43	3067904	2012	1	6	2	2	1	2	1	1		1	2	1	1	1	1	1	1	1	7,5
44	3051552	2012	1	6	2	2	1	2	1	1	1	1	2	1	1	1	1	1	1	1	8
45	3258947	2012	1	6	2	2	2	2	1	2	2	1	2	1	2	1	1	1	1	1	7
46		2012	1	6	2	2	1	3	3	1	1	1	2	1	1	1	1	1	1	2	5,5
47	3382613	2012	1	6	3	2	1	4	3	2	1	1	2	1	1	1	1	2	1	2	5
48	3260194	2012	1	2	3	3	2	3	3	2	2	1	2	1	2	2	2	2	1	2	7
49	3292029	2012	1	6	2	2	1	2	3	1	1	1	2	2	2	2	2	2	2	1	7
50	3258718	2012	1	6	2	2	1	2	3	1	1	1	2	2	2	2	2	2	2	1	7
51		2012	1	6	2	2	1	4	3	1	1	1	2	1	2	1	1	1	1	1	5

52	3177769	2012	1	6	3	2	2	2	2	1	1	1	2	2	1	1					6
53	3383105	2012	1	6	2	2	1	2	3	2	1	1	2	1	1	1	1	1	1	1	8
54	3419169	2012	1	2	3	2	1	3	3	2	1	1	2	1	2	2	2	1	1	2	6,5
55	3383040	2012	1	2	3	2	1	3	3	2	1	1	2	1	2	2	2	1	1	2	6,5
56	3259814	2012	1	2	4	2	1	4	3	2	1	2	2	1	2	2	2	2	2	2	2
57	246557	2012	1	4	3		1	3	2		1	1	2	1							
58	3274683	2012	1	4	3	2	1	2	2	1	1	1	2	1	1	1	1	1	1	1	8
59	3258599	2012	1	4	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	7
60	3258734	2012	1	4	1	2	1	3	3	2	2	1	1	1	1	1	1	1	1	1	7
61		2012	1	6	2	2	1	2	1	2	1	1	2	1	1	1	1	1	1	1	7,5
62	3382737	2012	1	6	3	2	1	3	2	2		1	2	2	1	1	1	1	1	1	6
63		2012	1	4	2	2	1	2	1	1	1	1	2	1	1	1	1	1	1	1	8
64		2012	1	4	3	2	1	2	1	2	1	1	1	1	1	1	1	1	2	1	7
65	3383075	2012	1	6	2	2	1	2	2	1	1	1	2	1	2	2	2	1	1	2	7
66	3258866	2012	1	6	3	2	1	2	3	2	1	1	2	1	1	2	2	1	1	2	6
67	3154513	2012	1	4	3	2	1	3	2	1	1	1	1	1	1						6
68		2012	1	4	4	2	2	4	1	2	1	1	2	1	1						
69	3382477	2012	1	6	2	2	1	2	1	1	1	1	2	1	1	1	1	1	1	1	7
70	3382591	2012	1	6	2	2	1	2	3	2	1	1	2	1	2	1	1	1	1	1	8
71	3383024	2012	1	6	2	3	1	2	3	1	1	1	2	1	1	1	1	1		1	7
72		2012	1	2	2	2	1	4	1	2	1	1	1	1	2						2
73	3346749	2012	1	6	2	3	1	2	3	1	1	1	2	1	2	1	1	2	1	2	7
74	3382583	2012	1	6	3	2	1	2	3	1	1	1	2	1	2	1	1	2	1	2	6
75	3258432	2011	1	6	1		1	2	3	2	1	1	2	1	1	1	2	1	1	1	6,5
76	3060152	2011	1	6	3	2	1	3	3	2	1	1	2	1	1	2		2	1	2	6,5
77	3258378	2011	1	6	1	2	1	2	3	1	1	1	2	1	1	1	1	2	1	2	8
78	3258793	2011	1	6	1	2	1	1	3	1	1	1	2	1	1	1	1	2	1	2	7

79	9468390	2011	1	6	3	2	2	2	3	1	2	1	2	2	1	1	1	1	1	1	7
80	3258858	2011	1	6	2	2	1	2	2	2	2	1	1	1	1	1	1	1	1	1	7
81	3259102	2011	1	6	2	2	1	2	1	1	2	1	2	1	1	2	1	1	1	2	7
82	3154467	2011	1	6	1	2	1	2	2	1	2	1	2	1	1	2	1	1	1	2	8

III. Questions

Non-comparable questions
The following questions (Q) from the before and after questionnaire where not comparable (the questions are in Dutch):

- Before questionnaire: Q 0, 3, 4 and 14
- After questionnaire : Q 1, 2, 4, 7, 8, 9, 10, 11, 16, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31 and 32.

Comparable questions
The following questions (Q) from the before and after questionnaire are comparable and will form a pair (P) (the questions are in Dutch):

Pair	Q	Question from the before questionnaire	Q	Question from the after questionnaire.
1	1.	Stelling: Ik denk dat het oefenen tijdens de skillslabs nuttig is voor het aanleren/ verbeteren van mijn chirurgische vaardigheden. a. Helemaal mee eens b. Mee eens c. Weet ik niet d. Niet mee eens e. Helemaal niet mee eens	3	Stelling: Het oefenen tijdens de skillslabs was nuttig voor het aanleren/ verbeteren van mijn chirurgische vaardigheden. a. Helemaal mee eens b. Mee eens c. Weet ik nog niet d. Niet mee eens e. Helemaal niet mee eens
2	2	Zou u al zelfstandig deze operaties durven uitvoeren op een levend dier? a. Ja, ik zou het zonder begeleiding uit durven voeren b. Ja, maar met begeleiding in de buurt voor als er iets mis gaat c. Ja, maar met voortdurend begeleiding d. Nee, dat durf ik nog niet	5	Zou u al zelfstandig deze operaties durven uitvoeren op een levend dier? a. Ja, ik zou het zonder begeleiding uit durven voeren b. Ja, maar met begeleiding in de buurt voor als er iets mis gaat c. Ja, maar met voortdurend begeleiding d. Nee, dat durf ik nog niet
3	5	De skillslabs zijn zonder begeleiding, wat vindt u hiervan? a. Prettig, zo kan ik werken op mijn eigen tempo b. Maakt mij niet zoveel uit c. Vervelend, dan kan ik geen hulp vragen d. Anders, namelijk……	6	De skillslabs waren zonder begeleiding, wat vindt u hiervan? a. Prettig, zo kan ik werken op mijn eigen tempo b. Maakt mij niet zoveel uit c. Vervelend, dan kan ik geen hulp vragen d. Anders, namelijk……
4	6	Het oefenen met de modellen lijkt mij saai. a. Eens b. Oneens	12	Het oefenen met de modellen vond ik saai. a. Eens b. Oneens
5	7	Het oefenen met de modellen vind ik kinderachtig a. Eens b. Oneens	13	Het oefenen met de modellen vond ik kinderachtig. a. Eens b. Oneens
6	8	De skillslab is een goede voorbereiding voor het co-schap chirurgie a. Eens b. Oneens	14	De skillslabs zijn een goede voorbereiding voor de co-schap chirurgie. a. Eens b. Oneens
7	9	De modellen zijn te ver vereenvoudigd om een goede oefening te vormen voor praktische vaardigheden. a. Eens b. Oneens	15	De modellen zijn te ver vereenvoudigd om een goede oefening te vormen voor praktische vaardigheden. a. Eens b. Oneens

8	10	Ik vind het prettig dat ik eerst de kans krijg om operaties op modellen te oefenen voordat ik echte patiënten ga opereren a. Eens b. Oneens	17	Ik vind het prettig dat ik eerst de kans krijg om op modellen te oefenen voordat ik echte patiënten ga opereren. a. Eens b. Oneens
9	11	Ik vind de tijd die is ingeroosterd is voor elk skillslab a. te lang b. voldoende c. te kort	18	Ik vind de tijd die ingeroosterd was voor de skillslabs: a. Te lang b. Voldoende c. Te kort
10	12	Ik vind 3 ochtenden skillslab a. te weinig b. voldoende c. te veel	19	Ik vond 3 ochtenden skillslabs: a. Te weinig b. Voldoende c. Te veel
11	13	Ik vind het prettig dat ik eerst hechten op een model heb kan oefenen voordat ik dit ga uitvoeren op een levend dier a. Eens b. Oneens	24	Ik vind het prettig dat ik eerst hechten op een model heb kunnen oefenen voordat ik dit ga uitvoeren op een levend dier. a. Eens b. Oneens

IV. Statistics

Test of normality

Table 5 - Case Processing Summary

		Cases					
		Valid		Missing		Total	
	Before(0) or after(1)	N	Percent	N	Percent	N	Percent
Pair1	Before	102	84,3%	19	15,7%	121	100,0%
	After	75	91,5%	7	8,5%	82	100,0%
Pair2	Before	102	84,3%	19	15,7%	121	100,0%
	After	75	91,5%	7	8,5%	82	100,0%
Pair3	Before	102	84,3%	19	15,7%	121	100,0%
	After	75	91,5%	7	8,5%	82	100,0%
Pair4	Before	102	84,3%	19	15,7%	121	100,0%
	After	75	91,5%	7	8,5%	82	100,0%
Pair5	Before	102	84,3%	19	15,7%	121	100,0%
	After	75	91,5%	7	8,5%	82	100,0%
Pair6	Before	102	84,3%	19	15,7%	121	100,0%
	After	75	91,5%	7	8,5%	82	100,0%
Pair7	Before	102	84,3%	19	15,7%	121	100,0%
	After	75	91,5%	7	8,5%	82	100,0%
Pair8	Before	102	84,3%	19	15,7%	121	100,0%
	After	75	91,5%	7	8,5%	82	100,0%
Pair9	Before	102	84,3%	19	15,7%	121	100,0%
	After	75	91,5%	7	8,5%	82	100,0%
Pair10	Before	102	84,3%	19	15,7%	121	100,0%
	After	75	91,5%	7	8,5%	82	100,0%
Pair11	Before	102	84,3%	19	15,7%	121	100,0%
	After	75	91,5%	7	8,5%	82	100,0%

Table 6 - Descriptives

Descriptives

	Before(0) or after(1)			Statistic	Std. Error
Pair1	Before	Mean		1,84	,076
		95% Confidence Interval for Mean	Lower Bound	1,69	
			Upper Bound	1,99	
		5% Trimmed Mean		1,77	
		Median		2,00	
		Variance		,589	
		Std. Deviation		,767	
		Minimum		1	
		Maximum		4	
		Range		3	
		Interquartile Range		1	
		Skewness		,947	,239
		Kurtosis		1,141	,474
	After	Mean		2,13	,088
		95% Confidence Interval for Mean	Lower Bound	1,96	
			Upper Bound	2,31	
		5% Trimmed Mean		2,06	
		Median		2,00	
		Variance		,577	

		Std. Deviation		,759	
		Minimum		1	
		Maximum		5	
		Range		4	
		Interquartile Range		0	
		Skewness		1,673	,277
		Kurtosis		4,778	,548
Pair2	Before	Mean		3,19	,063
		95% Confidence Interval for Mean	Lower Bound	3,06	
			Upper Bound	3,31	
		5% Trimmed Mean		3,21	
		Median		3,00	
		Variance		,411	
		Std. Deviation		,641	
		Minimum		2	
		Maximum		4	
		Range		2	
		Interquartile Range		1	
		Skewness		-,185	,239
		Kurtosis		-,607	,474
	After	Mean		2,79	,079
		95% Confidence Interval for Mean	Lower Bound	2,63	
			Upper Bound	2,94	
		5% Trimmed Mean		2,81	
		Median		3,00	
		Variance		,467	
		Std. Deviation		,684	
		Minimum		1	
		Maximum		4	
		Range		3	
		Interquartile Range		1	
		Skewness		-,484	,277
		Kurtosis		,557	,548
Pair3	Before	Mean		1,93	,100
		95% Confidence Interval for Mean	Lower Bound	1,73	
			Upper Bound	2,13	
		5% Trimmed Mean		1,87	
		Median		2,00	
		Variance		1,015	
		Std. Deviation		1,007	
		Minimum		1	
		Maximum		4	
		Range		3	
		Interquartile Range		2	
		Skewness		,614	,239
		Kurtosis		-,917	,474
	After	Mean		1,77	,127
		95% Confidence Interval for Mean	Lower Bound	1,52	
			Upper Bound	2,03	
		5% Trimmed Mean		1,69	
		Median		1,00	
		Variance		1,205	
		Std. Deviation		1,098	
		Minimum		1	

		Maximum		4	
		Range		3	
		Interquartile Range		1	
		Skewness		1,160	,277
		Kurtosis		-,121	,548
Pair4	Before	Mean		1,97	,017
		95% Confidence Interval for Mean	Lower Bound	1,94	
			Upper Bound	2,00	
		5% Trimmed Mean		2,00	
		Median		2,00	
		Variance		,029	
		Std. Deviation		,170	
		Minimum		1	
		Maximum		2	
		Range		1	
		Interquartile Range		0	
		Skewness		-5,654	,239
		Kurtosis		30,566	,474
	After	Mean		1,88	,038
		95% Confidence Interval for Mean	Lower Bound	1,80	
			Upper Bound	1,96	
		5% Trimmed Mean		1,92	
		Median		2,00	
		Variance		,107	
		Std. Deviation		,327	
		Minimum		1	
		Maximum		2	
		Range		1	
		Interquartile Range		0	
		Skewness		-2,387	,277
		Kurtosis		3,797	,548
Pair5	Before	Mean		1,97	,017
		95% Confidence Interval for Mean	Lower Bound	1,94	
			Upper Bound	2,00	
		5% Trimmed Mean		2,00	
		Median		2,00	
		Variance		,029	
		Std. Deviation		,170	
		Minimum		1	
		Maximum		2	
		Range		1	
		Interquartile Range		0	
		Skewness		-5,654	,239
		Kurtosis		30,566	,474
	After	Mean		1,85	,041
		95% Confidence Interval for Mean	Lower Bound	1,77	
			Upper Bound	1,94	
		5% Trimmed Mean		1,89	
		Median		2,00	
		Variance		,127	
		Std. Deviation		,356	
		Minimum		1	
		Maximum		2	
		Range		1	

		Interquartile Range		0	
		Skewness		-2,039	,277
		Kurtosis		2,214	,548
Pair6	Before	Mean		1,11	,031
		95% Confidence Interval for Mean	Lower Bound	1,05	
			Upper Bound	1,17	
		5% Trimmed Mean		1,06	
		Median		1,00	
		Variance		,097	
		Std. Deviation		,312	
		Minimum		1	
		Maximum		2	
		Range		1	
		Interquartile Range		0	
		Skewness		2,566	,239
		Kurtosis		4,678	,474
	After	Mean		1,41	,057
		95% Confidence Interval for Mean	Lower Bound	1,30	
			Upper Bound	1,53	
		5% Trimmed Mean		1,40	
		Median		1,00	
		Variance		,246	
		Std. Deviation		,496	
		Minimum		1	
		Maximum		2	
		Range		1	
		Interquartile Range		1	
		Skewness		,359	,277
		Kurtosis		-1,923	,548
Pair7	Before	Mean		1,45	,050
		95% Confidence Interval for Mean	Lower Bound	1,35	
			Upper Bound	1,55	
		5% Trimmed Mean		1,45	
		Median		1,00	
		Variance		,250	
		Std. Deviation		,500	
		Minimum		1	
		Maximum		2	
		Range		1	
		Interquartile Range		1	
		Skewness		,200	,239
		Kurtosis		-2,000	,474
	After	Mean		1,31	,054
		95% Confidence Interval for Mean	Lower Bound	1,20	
			Upper Bound	1,41	
		5% Trimmed Mean		1,29	
		Median		1,00	
		Variance		,215	
		Std. Deviation		,464	
		Minimum		1	
		Maximum		2	
		Range		1	
		Interquartile Range		1	
		Skewness		,856	,277

		Kurtosis		-1,303	,548
Pair8	Before	Mean		1,01	,010
		95% Confidence Interval for Mean	Lower Bound	,99	
			Upper Bound	1,03	
		5% Trimmed Mean		1,00	
		Median		1,00	
		Variance		,010	
		Std. Deviation		,099	
		Minimum		1	
		Maximum		2	
		Range		1	
		Interquartile Range		0	
		Skewness		10,100	,239
		Kurtosis		102,000	,474
	After	Mean		1,01	,013
		95% Confidence Interval for Mean	Lower Bound	,99	
			Upper Bound	1,04	
		5% Trimmed Mean		1,00	
		Median		1,00	
		Variance		,013	
		Std. Deviation		,115	
		Minimum		1	
		Maximum		2	
		Range		1	
		Interquartile Range		0	
		Skewness		8,660	,277
		Kurtosis		75,000	,548
Pair9	Before	Mean		1,74	,044
		95% Confidence Interval for Mean	Lower Bound	1,65	
			Upper Bound	1,82	
		5% Trimmed Mean		1,76	
		Median		2,00	
		Variance		,197	
		Std. Deviation		,443	
		Minimum		1	
		Maximum		2	
		Range		1	
		Interquartile Range		1	
		Skewness		-1,083	,239
		Kurtosis		-,845	,474
	After	Mean		1,60	,057
		95% Confidence Interval for Mean	Lower Bound	1,49	
			Upper Bound	1,71	
		5% Trimmed Mean		1,61	
		Median		2,00	
		Variance		,243	
		Std. Deviation		,493	
		Minimum		1	
		Maximum		2	
		Range		1	
		Interquartile Range		1	
		Skewness		-,417	,277
		Kurtosis		-1,877	,548
Pair10	Before	Mean		1,72	,047

		95% Confidence Interval for Mean	Lower Bound	1,62	
			Upper Bound	1,81	
		5% Trimmed Mean		1,73	
		Median		2,00	
		Variance		,225	
		Std. Deviation		,475	
		Minimum		1	
		Maximum		3	
		Range		2	
		Interquartile Range		1	
		Skewness		-,684	,239
		Kurtosis		-,803	,474
	After	Mean		1,83	,055
		95% Confidence Interval for Mean	Lower Bound	1,72	
			Upper Bound	1,94	
		5% Trimmed Mean		1,82	
		Median		2,00	
		Variance		,226	
		Std. Deviation		,476	
		Minimum		1	
		Maximum		3	
		Range		2	
		Interquartile Range		0	
		Skewness		-,503	,277
		Kurtosis		,654	,548
Pair11	Before	Mean		1,02	,014
		95% Confidence Interval for Mean	Lower Bound	,99	
			Upper Bound	1,05	
		5% Trimmed Mean		1,00	
		Median		1,00	
		Variance		,019	
		Std. Deviation		,139	
		Minimum		1	
		Maximum		2	
		Range		1	
		Interquartile Range		0	
		Skewness		7,034	,239
		Kurtosis		48,419	,474
	After	Mean		1,07	,029
		95% Confidence Interval for Mean	Lower Bound	1,01	
			Upper Bound	1,12	
		5% Trimmed Mean		1,02	
		Median		1,00	
		Variance		,063	
		Std. Deviation		,251	
		Minimum		1	
		Maximum		2	
		Range		1	
		Interquartile Range		0	
		Skewness		3,546	,277
		Kurtosis		10,861	,548

Table 7 - Tests of normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Before(0) or after(1)	Statistic	df	Sig.	Statistic	df	Sig.
Pair1	Before	,292	102	,000	,779	102	,000
	After	,396	75	,000	,693	75	,000
Pair2	Before	,301	102	,000	,780	102	,000
	After	,342	75	,000	,800	75	,000
Pair3	Before	,283	102	,000	,802	102	,000
	After	,346	75	,000	,697	75	,000
Pair4	Before	,539	102	,000	,159	102	,000
	After	,523	75	,000	,379	75	,000
Pair5	Before	,539	102	,000	,159	102	,000
	After	,513	75	,000	,422	75	,000
Pair6	Before	,527	102	,000	,357	102	,000
	After	,384	75	,000	,625	75	,000
Pair7	Before	,365	102	,000	,633	102	,000
	After	,439	75	,000	,580	75	,000
Pair8	Before	,530	102	,000	,074	102	,000
	After	,533	75	,000	,093	75	,000
Pair9	Before	,460	102	,000	,550	102	,000
	After	,391	75	,000	,622	75	,000
Pair10	Before	,431	102	,000	,618	102	,000
	After	,429	75	,000	,638	75	,000
Pair11	Before	,536	102	,000	,121	102	,000
	After	,538	75	,000	,270	75	,000

Nonparametric test

Table 8 – Nonparametric test

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Pair1	203	1,94	,771	1	5
Pair2	203	2,99	,704	1	4
Pair3	202	1,81	1,014	1	4
Pair9	199	1,69	,464	1	2
Pair10	191	1,76	,475	1	3
Before(0) or after(1)	203	,40	,492	0	1

Test Statistics[a]

	Pair1	Pair2	Pair3	Pair9	Pair10
Mann-Whitney U	3686,000	3431,000	4530,000	4155,000	3996,000
Wilcoxon W	11067,000	6834,000	7933,000	7558,000	10551,000
Z	-3,551	-4,164	-1,046	-2,001	-1,339
Asymp. Sig. (2-tailed)	,000	,000	,296	,045	,180

a. Grouping Variable: Before(0) or after(1)

χ^2 Tests

Table 9- Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Pair4 * Before(0) or after(1)	203	100,0%	0	0,0%	203	100,0%
Pair5 * Before(0) or after(1)	202	99,5%	1	0,5%	203	100,0%
Pair6 * Before(0) or after(1)	201	99,0%	2	1,0%	203	100,0%
Pair7 * Before(0) or after(1)	200	98,5%	3	1,5%	203	100,0%
Pair8 * Before(0) or after(1)	201	99,0%	2	1,0%	203	100,0%
Pair11 * Before(0) or after(1)	197	97,0%	6	3,0%	203	100,0%

Table 10 - χ^2 Tests Pair 4

			Before(0) or after(1)		
			Before	After	Total
Pair4	agree	Count	4	10	14
		% within Before(0) or after(1)	3,3%	12,2%	6,9%
	disagree	Count	117	72	189
		% within Before(0) or after(1)	96,7%	87,8%	93,1%
Total		Count	121	82	203
		% within Before(0) or after(1)	100,0%	100,0%	100,0%

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6,015[a]	1	,014		
Continuity Correction[b]	4,710	1	,030		
Likelihood Ratio	5,935	1	,015		
Fisher's Exact Test				,022	,016
Linear-by-Linear Association	5,985	1	,014		
N of Valid Cases	203				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 5,66.
b. Computed only for a 2x2 table

Table 11 - χ^2 Tests Pair 5

			Before(0) or after(1)		
			Before	After	Total
Pair5	agree	Count	3	11	14
		% within Before(0) or after(1)	2,5%	13,6%	6,9%
	disagree	Count	118	70	188
		% within Before(0) or after(1)	97,5%	86,4%	93,1%
Total		Count	121	81	202
		% within Before(0) or after(1)	100,0%	100,0%	100,0%

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	9,269[a]	1	,002		
Continuity Correction[b]	7,628	1	,006		
Likelihood Ratio	9,279	1	,002		
Fisher's Exact Test				,004	,003

Linear-by-Linear Association	9,224	1	,002		
N of Valid Cases	202				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 5,61.
b. Computed only for a 2x2 table

Table 12 - χ^2 Tests Pair 6

			Before(0) or after(1) Before	After	Total
Pair6	agree	Count	106	47	153
		% within Before(0) or after(1)	89,1%	57,3%	76,1%
	disagree	Count	13	35	48
		% within Before(0) or after(1)	10,9%	42,7%	23,9%
Total		Count	119	82	201
		% within Before(0) or after(1)	100,0%	100,0%	100,0%

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	26,937[a]	1	,000		
Continuity Correction[b]	25,218	1	,000		
Likelihood Ratio	26,972	1	,000		
Fisher's Exact Test				,000	,000
Linear-by-Linear Association	26,803	1	,000		
N of Valid Cases	201				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 19,58.
b. Computed only for a 2x2 table

Table 13 - χ^2 Tests Pair 7

			Before(0) or after(1) Before	After	Total
Pair7	agree	Count	64	57	121
		% within Before(0) or after(1)	54,2%	69,5%	60,5%
	disagree	Count	54	25	79
		% within Before(0) or after(1)	45,8%	30,5%	39,5%
Total		Count	118	82	200
		% within Before(0) or after(1)	100,0%	100,0%	100,0%

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4,724[a]	1	,030		
Continuity Correction[b]	4,106	1	,043		
Likelihood Ratio	4,788	1	,029		
Fisher's Exact Test				,039	,021
Linear-by-Linear Association	4,700	1	,030		
N of Valid Cases	200				

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 32,39.
b. Computed only for a 2x2 table

Table 14 - χ^2 Tests Pair 8

			Before(0) or after(1) Before	After	Total
Pair8	agree	Count	117	79	196
		% within Before(0) or after(1)	98,3%	96,3%	97,5%
	disagree	Count	2	3	5
		% within Before(0) or after(1)	1,7%	3,7%	2,5%
Total		Count	119	82	201
		% within Before(0) or after(1)	100,0%	100,0%	100,0%

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,783[a]	1	,376		
Continuity Correction[b]	,180	1	,672		
Likelihood Ratio	,766	1	,382		
Fisher's Exact Test				,400	,330
Linear-by-Linear Association	,779	1	,377		
N of Valid Cases	201				

a. 2 cells (50,0%) have expected count less than 5. The minimum expected count is 2,04.
b. Computed only for a 2x2 table

Table 15 - χ^2 Tests Pair 11

			Before(0) or after(1) Before	After	Total
Pair11	agree	Count	114	74	188
		% within Before(0) or after(1)	97,4%	92,5%	95,4%
	disagree	Count	3	6	9
		% within Before(0) or after(1)	2,6%	7,5%	4,6%
Total		Count	117	80	197
		% within Before(0) or after(1)	100,0%	100,0%	100,0%

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2,655[a]	1	,103		
Continuity Correction[b]	1,644	1	,200		
Likelihood Ratio	2,605	1	,107		
Fisher's Exact Test				,162	,101
Linear-by-Linear Association	2,642	1	,104		
N of Valid Cases	197				

a. 1 cells (25,0%) have expected count less than 5. The minimum expected count is 3,65.
b. Computed only for a 2x2 table

Descriptives

The following questions (Q) from the before and after questionnaire are not comparable.

Table 16 - Before questionnaire

		Question0	Question3	Question4
N	Valid	118	121	121
	Missing	3	0	0
Mean		2,80	1,72	2,08
Std. Deviation		2,002	,551	,737
Minimum		1	1	1
Maximum		6	3	4

Question 0

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ENT	41	33,9	34,7	34,7
	General	38	31,4	32,2	66,9
	Anaesthesia	2	1,7	1,7	68,6
	OVE	7	5,8	5,9	74,6
	Ophthalmology	1	,8	,8	75,4
	Urology	29	24,0	24,6	100,0
	Total	118	97,5	100,0	
Missing	System	3	2,5		
Total		121	100,0		

Question 3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	40	33,1	33,1	33,1
	A little	75	62,0	62,0	95,0
	No	6	5,0	5,0	100,0
	Total	121	100,0	100,0	

Question 4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, very much	23	19,0	19,0	19,0
	Yes	70	57,9	57,9	76,9
	Neutral	23	19,0	19,0	95,9
	No	5	4,1	4,1	100,0
	Total	121	100,0	100,0	

Table 17 - After questionnaire

		Q2	Q4	Q7	Q8	Q9	Q11	Q16	Q20	Q21
N	Valid	82	82	79	80	82	82	81	79	80
	Missing	39	39	42	41	39	39	40	42	41
Mean		4,7805	2,4024	2,1519	1,1750	2,6098	2,5366	1,5185	1,2025	1,0500
Std. Error of Mean		,20753	,07733	,04064	,04275	,08278	,07798	,05586	,04550	,02452
Std. Deviation		1,87922	,70026	,36122	,38236	,74959	,70615	,50277	,40445	,21932
Variance		3,531	,490	,130	,146	,562	,499	,253	,164	,048

		Q22	Q23	Q25	Q26	Q27	Q28	Q29	Q30	Q31
N	Valid	81	81	80	77	75	73	71	74	79
	Missing	40	40	41	44	46	48	50	47	42
Mean		1,8519	1,1975	1,3375	1,2857	1,2533	1,2466	1,1127	1,4459	6,3797
Std. Error of Mean		,03972	,04451	,05320	,05182	,05056	,05080	,03779	,05818	,17542
Std. Deviation		,35746	,40062	,47584	,45472	,43785	,43400	,31845	,50046	1,55912
Variance		,128	,160	,226	,207	,192	,188	,101	,250	2,431

Question 2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ENT	8	6,6	9,8	9,8
	General	11	9,1	13,4	23,2
	OVE	8	6,6	9,8	32,9
	Urology	55	45,5	67,1	100,0
	Total	82	67,8	100,0	
Missing	System	39	32,2		
Total		121	100,0		

Question 4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, absolutely	6	5,0	7,3	7,3
	Yes	41	33,9	50,0	57,3
	A little	31	25,6	37,8	95,1
	No	4	3,3	4,9	100,0
	Total	82	67,8	100,0	
Missing	System	39	32,2		
Total		121	100,0		

Question 7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	sufficient	67	55,4	84,8	84,8
	little	12	9,9	15,2	100,0
	Total	79	65,3	100,0	
Missing	System	42	34,7		
Total		121	100,0		

Question 8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Clear	66	54,5	82,5	82,5
	Unclear	14	11,6	17,5	100,0
	Total	80	66,1	100,0	
Missing	System	41	33,9		
Total		121	100,0		

Question 9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, more than this	2	1,7	2,4	2,4
	Yes	39	32,2	47,6	50,0
	A bit	30	24,8	36,6	86,6

	No	11	9,1	13,4	100,0
	Total	82	67,8	100,0	
Missing	System	39	32,2		
Total		121	100,0		

Question 11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	10	8,3	12,2	12,2
	Neutral	18	14,9	22,0	34,1
	No	54	44,6	65,9	100,0
	Total	82	67,8	100,0	
Missing	System	39	32,2		
Total		121	100,0		

Question 16

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	39	32,2	48,1	48,1
	Disagree	42	34,7	51,9	100,0
	Total	81	66,9	100,0	
Missing	System	40	33,1		
Total		121	100,0		

Question 20

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	63	52,1	79,7	79,7
	Disagree	16	13,2	20,3	100,0
	Total	79	65,3	100,0	
Missing	System	42	34,7		
Total		121	100,0		

Question 21

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	76	62,8	95,0	95,0
	Disagree	4	3,3	5,0	100,0
	Total	80	66,1	100,0	
Missing	System	41	33,9		
Total		121	100,0		

Question 22

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	12	9,9	14,8	14,8
	Disagree	69	57,0	85,2	100,0
	Total	81	66,9	100,0	
Missing	System	40	33,1		
Total		121	100,0		

Question 23

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	65	53,7	80,2	80,2

	Disagree	16	13,2	19,8	100,0
	Total	81	66,9	100,0	
Missing	System	40	33,1		
Total		121	100,0		

Question 25

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	53	43,8	66,3	66,3
	Disagree	27	22,3	33,8	100,0
	Total	80	66,1	100,0	
Missing	System	41	33,9		
Total		121	100,0		

Question 26

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	55	45,5	71,4	71,4
	Disagree	22	18,2	28,6	100,0
	Total	77	63,6	100,0	
Missing	System	44	36,4		
Total		121	100,0		

Question 27

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	56	46,3	74,7	74,7
	Disagree	19	15,7	25,3	100,0
	Total	75	62,0	100,0	
Missing	System	46	38,0		
Total		121	100,0		

Question 28

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	55	45,5	75,3	75,3
	Disagree	18	14,9	24,7	100,0
	Total	73	60,3	100,0	
Missing	System	48	39,7		
Total		121	100,0		

Question 29

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	63	52,1	88,7	88,7
	Disagree	8	6,6	11,3	100,0
	Total	71	58,7	100,0	
Missing	System	50	41,3		
Total		121	100,0		

Question 30

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	41	33,9	55,4	55,4
	Disagree	33	27,3	44,6	100,0

	Total	74	61,2	100,0	
Missing	System	47	38,8		
Total		121	100,0		

Question 31

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	1	,8	1,3	1,3
	1	1	,8	1,3	2,5
	2	2	1,7	2,5	5,1
	3	2	1,7	2,5	7,6
	5	5	4,1	6,3	13,9
	5,50	1	,8	1,3	15,2
	6	16	13,2	20,3	35,4
	6,50	8	6,6	10,1	45,6
	7	28	23,1	35,4	81,0
	7,50	3	2,5	3,8	84,8
	8	12	9,9	15,2	100,0
	Total	79	65,3	100,0	
Missing	System	42	34,7		
Total		121	100,0		

V. Veterinary dummies

An overview of companies offering veterinary dummies.

Table 18 - Overview

Company	Kind of dummies	Costs
SurgiReal ®	Canine Leg Vascular Access Simulator Replacement bundle with skin	$464.99 $99.99
	Cystocentesis Simulator Replacement bladders Replacement skin	$99.99 $39.99 $39.99
	SurgiReal suture pads	$19.99 - $109.99
	Replacement IV bag	$14.99
	Replacement powdered artificial blood	$19.99
SynDaver Labs ®	true-to-life synthetic canine cadavers	Unknown
	Canine abdominal surgical trainer	Unknown
	SynDaver surgical canine	Unknown
Rescue critters ®	K-9 Front/Hind Leg IV Trainer	$525.00
	K9 Orchiectomy (Neuter) Model Replacements (100 pieces)	$165.00 $9,660.00
	K9 Ovariohysterectomy (Spay) Model Replacements (100 pieces)	$165.00 $9,660.00
	PREMIUM 3-Layer Suture Patch	$72.00