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"Evaluation of a video based exam for riding instructors in equestrian sports"

Student:
Mascha Assen

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Supervisors:

University of Twente, Enschede
Dr. H. van der Meij

KNHS, Educational Department
Mr. X. Noë

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Acknowledgement

When I started the master “Educational Science and Technology,” my plan was to try to connect educational science with my deepest passion in life, horses and equestrian sport. Little did I know of existing research in this field and I knew the path I was going to take would not be smooth and easy. Now that the work is (almost) done I would like to thank Mr. Noë and Mrs. Gotink from the KNHS, for providing me with the opportunity to perform my research in the setting I love most, namely equestrian sports and education.

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Everything in this study started with my passion for the four legged creatures named 'Equus' in Latin. A very warm and deeply felt "thank you" goes out to them, as they cannot speak, but are able to express themselves in so many heart-warming other ways. In this study, our horses 'Gloria-Fomia', 'Feloma', 'Berlina' and 'Donnie' participated as photo models and we had both funny and frustrating moments during the photo shoots with Jeffrey Nijhuis, whom I also want to thank for his help during my research.

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Summary

The Royal Dutch Equestrian Federation (KNHS) provides training and examination for riding instructors in equestrian sports. During their training program, instructors build a portfolio consisting of different exams. In one of these exams, the instructor needs to give an advice on the suitability of a horse for a certain discipline (E.g. dressage or show jumping). This exam used to take place in real life with different horses presented in the riding arena. In 2017, KNHS introduced a video exam, replacing the real life exam, to increase efficiency and reduce costs and planning of using real horses for the exam. Additionally, this new exam offers the possibility to test instructors' knowledge on video judgement of horses.

In order to pass the exam, instructors need to meet the criteria set by the KNHS on judging suitability of horses. A part of these criteria is making statements on the exterior of the horse. For exterior judgement, often the linear score form of the Royal Dutch Sport Horse Studbook (KWPN) is used, since this is an objective and measurable way to judge the exterior of the horse. In this study, the new KNHS video exam will be evaluated, using theory on educational design, exterior judgement of horses, stimulus material developed by the researcher, expert opinions on the quality of the KNHS videos and finally, the way experts scored the horses in the video's using the KWPN linear score form.

The results of this study provide important input for designing educational videos in the field of equestrian sports (and maybe also for education concerning horse-breeding purposes) and KNHS can use the outcome of this study to evaluate and further develop their training program for riding instructors or other professionals in the field of equestrian sports. Finally, this study contributes to the body of knowledge on usage of static and dynamic learning materials and addresses interrater reliability, as it demonstrates ways to increase interrater agreement.

Introduction

In the Netherlands, horseback riding is the seventh most popular sport (NOC-NSF, 2015). With almost 500.000 people riding horses, the economic impact surrounding equestrian sports in the Netherlands is second largest of all sports, after soccer (Sectorraad paarden, 2014). In 2015, KNHS had a total of 200.315 members (NOC-NSF, 2015) and Dutch riders and Dutch bred horses are often in the top of the world rankings of show jumping and dressage (The Rolex/WBFSH ranking (Nd.). The Dutch equestrian business thrives on a global scale and therefore, well-educated riders and riding instructors are becoming increasingly important to train, coach and ride horses throughout the world. The KNHS offers training programs in which riders and vocational scholars can develop themselves into instructors at different levels and disciplines. The NOC-NSF demands a certain level of quality in the educational programs for Dutch sport trainers and KNHS designed their programs according to NOC-NSF's KSS guidelines (NOC-NSF, 2015).

Development of learning materials in equestrian sports is important and theoretically underpinned educational material on judging the exterior of horses could be introduced and implemented in training programs for riding instructors. Svensson (2008) probably was one of the first researchers trying to apply different learning theories in an equestrian context, namely the exterior judgement of horses. She found that the theory on 'learning by doing' was the best fit in her research. Learners in her study needed to learn how to assess the exterior of a horse, using a web-based application. Svensson (2008) stresses that the learners in her study need to learn 'how to' and not only 'know that' to have the desired skills and knowledge on exterior assessment of horses."(P. 850). Within the KNHS training program, instructors get practical training and exams in which they need to demonstrate their skills, as well as theoretical, knowledge based exams. The exam on suitability advice of a horse is a mixture of both.

The 'learning by doing' theory, as interpreted by Svensson (2008) departs at the point that "experiences are easier to learn than fragmented and isolated information." (Svensson, 2008, P 850) Therefore, she implemented training tasks in her application, which correspond to how learners will be using their skills and knowledge outside the application (Svensson, 2008). This point of view overlaps with the training program of KNHS, in which learners (instructors in this case) also learn by doing and versatile learning material is offered in an integrated, but well-structured manner. The video exam on suitability judgement of a horse is in line with the 'learning by doing' theory, as instructor and examiner are watching the videos and have a conversation about it. In the exam the instructor might even learn new skills on how to judge the suitability of a horse by the feedback the examiner provides during the exam.

KNHS instructors are offered a versatile training program existing of components like didactic skills, training and health of horses, planning and organization of activities, coaching during competitions and suitability analysis of horses (KNHS, 2017). Moreover, KNHS instructors need to be able to judge a horse’s potential and suitability for a certain discipline, E.g. dressage or show jumping. All KNHS instructors in the training program are familiar with the linear score form (Appendix I) that is used by the Royal Dutch Warmblood Studbook, KWPN. This form is designed to objectively score the exterior and movements of a horse. The linear score form is developed for different types of horses, E.g. show jumpers or dressage horses, as both need different physical traits to perform well in their discipline of sport.

Scoring the exterior of horses is part of the suitability advice instructors need to give during their exam. Traditionally, the exam on suitability advice took place with horses presented in real life (outside on a flat surface and inside the riding arena). The instructor had to provide a verbal suitability advice of the horse to the KNHS examiner on the spot. In the new situation, the KNHS uses a video exam in order to reduce time, costs, planning and logistics of having all the horses for the exams present in Ermelo, the Netherlands.

Incidentally, the video exam can also be used to test the ability of instructors to judge a horse from video. When searching a horse suitable for a certain client and/or a certain discipline in sports, videos of horses are often used by KNHS instructors to get a first impression of a horse and its exterior. Often, instructors and riders decide if they want to try a horse in real life, after evaluating the horse on video. One could state that being able to judge the quality and shortcomings of a horse from a video is a skill every equestrian professional, and especially a KNHS riding instructor should possess.

As the video exam is new to instructors, examiners and the educational staff of KNHS, more information is needed on the quality of the videos. Subsequently, there always is the challenge to keep all KNHS examiners "on the same page" when they are determining whether an instructor passed or failed the exam on suitability advice on the horse. This study aims at evaluating the quality of the videos and providing information on how the videos are viewed upon by subject matter experts (SME's). The outcome of this study will be used to provide KNHS with suggestions for improvement of the current videos and information on how examiners judge the videos themselves.

The structure of this paper is as follows; in chapter one, the problem analysis will be presented, based on the theory of Smith and Ragan (2005) in which context, learners and content will be analysed in further detail. The theoretical framework will be presented in chapter two, existing of two paragraphs; one on instructional video design and the second on video analysis. In chapter three, the research questions and research design are presented. Chapter four entails the research method and more detailed information on the participants. In chapter five the results are presented and finally, chapter six beholds the discussion and conclusions of this study and recommendations concerning the design of the videos will be made. For the final version of this thesis, appendix VII will be removed as it contains the statements of the examiners and SME's. The main reason for removing their statements is that of privacy, although the names are not real names, there are only ten respondents in this study, so quotes may be retraceable. Another reason is that future instructors that have to do the exam, may profit from the quotes of the SME's when taking their exam. For those who are interested in the content of the quotes (Appendix VII), they will be filed in the database of the researcher.

Chapter 1, Problem analysis

In educational design, many models are known and used to build new educational material. Most of them are based on three main steps; analysis, strategy and evaluation (Smith and Ragan, 2005). Also PDCA (Plan-Do-Check-Act) cycles are used in which learning activities are planned, performed, evaluated and implemented again. This study is an evaluative study, which implies the design is already present, and the aim is to analyse and evaluate existing material and provide suggestions for improving the design. In order to do so this research starts with an analysis of content, context and learners, based on the theory by Smith and Ragan (2005).

1.1 The learning Context

Smith and Ragan (2005) reflect on the learning context as: "a school, a place of business, a home or elsewhere" (P43). Context however, is "not just a place, but also temporal and a social environment that is part of the learning process itself." (Richey and Tessmer, 1995, Retrieved in Smith and Ragan, 2005, P43). Analysing the context involves two major components, namely "(1) the substantiation of a need for instruction to help learners reach learning goals and (2) a description of the learning environment in which the instruction will be used" (Smith and Ragan, 2005, P43). To determine whether there is a need for new instructions, often a 'needs assessment' is performed (Smith and Ragan, 2005).

In this study, it is assumed that KNHS already performed a needs assessment which confirmed the need for a video based exam. The head of the educational department of KNHS stated that the need for the video based exam is indicated by the time-consuming way the real life exam used to take place. Getting a broad variety of horses on the same location for one day involves extensive planning and logistics and also puts (unnecessary) pressure on the instructors, as they need to provide both horses and riders for the exam.
Whereas the video exam can be taken at any time and any place during the year, as long as both examiner and instructor are present and a computer with the possibility of playing the videos is available. Hence, two different contexts are recognized for respectively the real life exam and the video-based exam which will be elaborated on in the next two paragraphs.

1.1.1 The real life exam

The real life exam used to take place at a central location in the country (for the most part in Ermelo). To be able to provide a suitability advice for a horse, KNHS instructors had to judge the horses in real life on the street in front of the (indoor) riding arena. The horses were presented in walk and trot on both straight line and circle, with the riders walking next to them. To be able to provide a suitability advice on the exterior of the horse, the horse would be presented standing still on a flat surface.

After this first impression without the riders, horses would be shown under the saddle with the rider presenting them in walk, trot and gallop. Depending on the discipline, horse and rider would also perform some jumps or advanced dressage exercises. During the whole exam the KNHS instructor would be standing next to the examiner to provide him with a verbal suitability advice on the horse. After completing the exam, the examiner would fill out a scoring form (PVB 3.7, Appendix II) with the criteria that the KNHS instructor needs to pass in order to pass the exam. The KNHS instructor would be informed by the examiner

whether he failed or passed the exam immediately after the scoring process.

1.1.2 The video based exam

The video based exam is more flexible and only requires a small indoor place (like an office or a classroom) with a table, two chairs and a computer (with internet connectivity and access to the online learning environment 'Moodle'), on which the videos can be displayed. During the exam, which takes up about 45 minutes, two videos will be watched by the KNHS instructor and examiner. To increase the user possibilities of the exam, KNHS chose to make approximately 10-minute videos of the horses, providing the KNHS instructors with the possibilities to pause, rewind and fast forward the video, as long as the examiner allows to do this during the exam.

The video material for the exam does not contain any spoken or written text, nor music. The content of each video consists of horse and handler (mostly the rider), presenting the horse on the flat, without a saddle and the handler walking next to the horse in walk and trot on a straight line and on a circle. Also the handler presents the horse standing still on a flat surface, allowing the KNHS instructor to judge the conformation and exterior of the horse. After presenting the horse on the flat, the video shows the same horse “under the saddle,” ridden by the rider and presented in walk, trot and gallop. Subsequently, depending on the discipline, horse and rider perform some jumps or advanced dressage exercises. All videos are numbered and there is a set of background information on the horses available for the examiners, as the KNHS instructor is free to ask questions about the horse, E.g. about age, medical condition, training level, feeding habits etc.

While watching the videos together, the KNHS instructor provides the examiner with a verbal suitability advice of the horse on the videos. After watching the two videos, the examiner fills out a scoring form (PVB 3.7) with the criteria that the instructor needs to pass in order to pass the exam. The KNHS instructor will be informed by the examiner about the outcome of the exam immediately after the scoring is done. The video based exam makes it easier to retake the exam and increases flexibility of planning and logistics surrounding the exam, as there are no real horses involved anymore. Since there are over 30 videos of horses in the online learning environment, for different disciplines, cheating will be minimized as it is not likely that KNHS instructors get to judge the same horse twice.

1.2 Analysis of the learners

In order to create instruction that is both effective and interesting to learners, it is important to analyse the target audience, also known as 'the learners that are involved' (Smith and Ragan, 2005). In this case, the primary learners are the KNHS riding instructors, participating in the KNHS training program. To be more specific, the learners are riding instructors participating in the video based exam on providing a suitability advice of a horse. This exam, called PVB 3.7 is one part of their total exam for being a certified KNHS riding instructor.

Many KNHS riding instructors in the Netherlands are female. They are all above 18 years of age, as this is a criterion to start the KNHS training program and they all live in the Netherlands. Furthermore, every instructor has to have a certain ranking in their discipline of equine sports, which is used as an admission criterion for the KNHS training program. E.g. a KNHS show jumping instructor for the show jumping competition training has to be able to ride a horse up to 1.35 meter classes, as for the basic instructor training, they do not have to jump higher than 1.00 meter.

The prior education of instructors varies, because of their different backgrounds, age and experience. It is assumed that all instructors are capable of reading and writing basic Dutch language, as all study material is offered in Dutch. Therefore, we assume that instructors understand what will be asked of them in the video exam. Furthermore, it is assumed that all instructors are familiar with the vocabulary and terms specific for their discipline and for assessing the exterior of a horse. The jargon used in the equestrian world is very specific and it is assumed that both instructors and examiners know this jargon, as it is essential to provide a good suitability advice of a horse.

The criteria that KNHS instructors need to meet in order to be able to participate in the exam on suitability advice of the horse are provided in the online learning environment 'Moodle'. Instructors can also find a form there that can help them practice judging the suitability of horses. This form will be presented (in Dutch) in appendix III. KNHS instructors can register themselves for the exam and the exam is planned three times a year, allowing the instructors three opportunities to pass.

The secondary learners are the KNHS examiners, as they need to be able to work with the video exam and need to be able to test the instructors' knowledge based on what is represented in the videos. KNHS examiners are therefore considered to be subject matter experts (SME's) in this research. In this study, only the examiners will play a role. As they are subject matter experts and have rich experience in the field of assessing the suitability of horses. In the research design and method section, their role will be explained in more detail.

1.3 Analysis of the content

This paragraph consists of two sub paragraphs. The first is on the content within the KNHS en describes the content of the video exam. The second is about the exterior of the horse in a broader context.

1.3.1 The KNHS video exam

The overall examination for KNHS riding instructors consists of different PVB's, which are segments of the total exam. In this way, riding instructors gradually get their KNHS riding instructors' degree. This research is limited to the PVB aimed at judging the suitability of a horse for a certain discipline (PVB 3.7). The videos used for PVB 3.7 consist material of horses representing different disciplines and these correspond with the discipline the instructor is trained for, E.g. show jumping, western riding or dressage.

During the video exam, the KNHS instructor needs to demonstrate adequate knowledge on whether the horse suits a certain rider (or not) and must be able to underpin his advice with content knowledge on exterior, conformation, movements and behaviour of the horse. After testing the video exam in 2017, it was implemented for all disciplines in which instructors are trained within KNHS.

The designed video material for the exam does not contain any spoken text or music. There is approximately 10 minutes of video material of each horse, consisting of material of horse and rider, riding in the indoor arena, and of the horse with only the bridle and the handler presenting it on the flat (outdoor). Furthermore, close-up material of different body parts of the horse is presented and the videos can be paused at any given time.
The list of content (in Dutch) of one of the videos is provided in appendix IV. This list represents the content of a video used for the competition sport all-round training (1.35 m.

show jumping) To narrow this research down, the researcher chose to only have a closer look at the videos for KNHS instructors in the show jumping discipline.
Prior to the exam, KNHS instructors are informed by KNHS with the criteria and dimensions on which the scoring of the PVB 3.7 exam is based (Appendix II). The criteria are also designed to help examiners to determine whether or not an instructor is capable of providing a sufficient suitability advice of a horse. In total, the exam consists of 12 criteria, divided in three categories. During the exam, videos of two different horses are watched. While watching the horses in motion on the video, the instructor should make statements on the horses' exterior, conformational traits, movements, scope in jumping, constitution of the horse's legs and leg deficits. Furthermore, the KNHS instructor has to state her opinion on the suitability of the horse for show-jumping purposes and estimates the competition level the horse could achieve.

Different health aspects recognized in the horse should also be mentioned by the KNHS instructor, E.g. leg deficits, overall condition and shape/fitness of the horse. Finally, the KNHS instructor should be able to make statements on which type of rider would suit the horse represented in the video, E.g. when a horse is very difficult to ride, instructors should not match this horse to an inexperienced rider. During the exam, the examiner asks in depth questions about the findings and statements of the KNHS instructor, based on appendix II, the KNHS PVB 3.7 scoring form. In the theoretical framework, one of the main criteria, the exterior of the horse, will be elaborated on in further detail. The exterior of the horse is measured through the linear score form designed by the KWPN, which will also be stressed in the next chapter.

1.3.2 The exterior of the horse

Already in the early 1900's, the Frenchmen Goubaux and Barrier (1904) wrote a standard work in English on 'the exterior of the horse', carrying the aforementioned title, in which the term 'exterior' was used for the first time to make statements on the physical appearance of a horse. This early study contained 346 figures and 34 plates, which already indicates the importance of visual material when having to assess or judge the exterior of a horse.

The Royal Dutch studbook KWPN introduced a linear descriptive scoring system for horse breeding in 1989 (Koenen, van Veldhuizen and Brascamp, 1995) which then consisted of 26 traits. The study by Koenen, van Veldhuizen and Brascamp (1995), which included data of 10.665 mare aimed at describing "genetic parameters of linear scored conformation traits and their relation to dressage and show-jumping performance in the Dutch Warmblood Riding Horse population" (Koenen, van Veldhuizen and Brascamp, 1995, P 85) So, already in the 1990's of the last century, scientists were trying to find whether the conformation traits of a horse could influence its performance in sports. Therefore, linear scoring of horses in sport and breeding became increasingly important.
Mawdsley, Kelly, Smith & Brophy (1996) also mentioned a linear measurement system for horses in their study, which was used to measure 27 physical traits of thoroughbred horses in the UK. Mawdsley et al. (1996) also mentioned the possibility of both static and dynamic linear conformation assessment of horses, which forms the baseline of the linear score form used today by the KWPN. Van der Veen and van Andel (1996) wrote a book for the KWPN on the exterior of the horse, which also has many photos to illustrate where certain measures of the exterior of the horse should be taken. It can be concluded that the aim of Koenen, van Veldhuizen and Brascamp, (1995), Mawdsley et al. (1996) and van der Veen and van Andel (1996) is to provide useful quantitative selection criteria that can be used to describe and

breed horses. Van der Veen and van Andel (1996) stated that the exterior of a horse can provide a lot of information on the functionality of the horse in equestrian sports. KNHS instructors should therefore be able to make statements on the horses' exterior, as this is of great importance on the usability of horses in equestrian sports. The linear score form divides the horse into measurable 'segments' or characteristics and each characteristic provides information on the use of the horse in sports. Instructors should nevertheless be able to judge the horse as a whole, as certain characteristics can compensate for others and a horse is always more than a collection of characteristics (van der Veen and van Ander, 1996).

The KWPN has separate breeding standards for each horse breeding direction. These standards are descriptions of, for example the ideal dressage- or jumping horse. The functional aspect of a horse used for sport is the starting point for determining the breeding standard (KWPN, 2018) These standards are not static. New scientific research, market trends and new insights are constant developments the breeding standard may be influenced by (KWPN, 2018). For horses in the show jumping arena, intelligence, manoeuvrability and athletic ability will become increasingly important. The breeding standard helps to evaluate horses in an objective and uniform way. It is the framework in which jury members evaluate KWPN horses and with this framework, the risk of having pronounced personal preferences of jury members is reduced. This increases the uniformity, reproducibility and the reliability of the evaluation of horses in the KWPN population (KWPN, 2018). For the show jumping horse, the following traits, as retrieved on the website of KWPN (2018) are part of the breeding standard:

Conformation

- Stands in rectangular model
- Is long lined with a proportional build
- Has a horizontal build
- Has a long neck that is slightly raised and arched with muscling in the top line
- Has a strongly built and strongly muscled back/loin formation
- Has a correct and hard foundation
- Is attractive

Movement

- The walk is a regular 'four beat' gait that is active and has suppleness and impulsion
- The trot is a regular 'two beat' gait, that is active and has suppleness and impulsion, balance and self-carriage
- The canter is a pure 'three beat' gait, that is active, light with suppleness, impulsion, balance and self-carriage
- Can lengthen and shorten easily in the canter without losing rhythm, tact, balance or self-carriage
- The canter is light and balanced without making much front
- Remains more horizontal in the body
- Is able to collect strongly during the last canter stride before the jump and is able to place the hind leg far forward under the body in order to get a powerful take-off
- Leaves the ground quickly with power
- Jumps with an upward wither with the highest point over the middle of the jump
- Brings the underarm above the horizontal and folds the cannon under the underarm

– Bascule: brings the neck down during the jump and the rump follows the direction of the neck, opens the hindquarter
– Athletic ability: is supple and can develop forward motion over the jump, lands lightly and canters off easily, is careful, is efficient and has much scope.

Character
– Has courage
– Has a willing, hardworking and honest character
– Is intelligent, looks at and evaluates the jump
– Has the will to perform
– Is easy to handle
– Reacts quickly to aids (KWPN, 2018)

Many aspects of the breeding standard, can be retrieved and scored with the linear score form of the KWPN. This form is divided in an upper and lower bar. The lower bar holds the criteria that are used to identify the shape and size of the different characteristics of the horse. The upper bar provides information of how these shapes are valued, by, for example, a KWPN inspector. To paraphrase, the lower bar provides an explanation for the findings by the KWPN inspector in the upper bar (van der Veen and van Andel (1996).
It is important to state that the KNHS does not offer training for KWPN inspectors, but for KNHS riding instructors and these instructors need to be able to judge the suitability of the horse for certain disciplines in sports, but do not need to inspect the horse as thorough as a KWPN inspector would do for horse breeding purposes.

By presenting a video still or picture of both sides of the horse standing still on an even surface, the exterior of the horse can be scored. The ideal angle for viewing the horse is 90 degrees, which provides the most honest image of, for example, the length of the horses' back or the length of the neck. For statements on the horses' position of front and hind-legs the position of the camera should be in 90 degrees located towards the back or front of the horse, so the instructor can determine whether horses' legs are straight or not. The circumstances in which the video stills or photographs are shot should be similar for all material used for the exam. Sufficient lighting, contrast and an even, paved footing for the horse to be presented on are key to create images suitable for scoring the exterior of the horse. Also, the person handling the horse should not walk in front of the camera.

Since the linear score form used by KWPN is quite extensive and also includes movement (which is extremely difficult to capture in stills or photographs), for this research, only the nineteen static characteristics from the linear score form on exterior will be used. This excludes the movement and show jumping section of the linear score form, which are all dynamic characteristics. The nineteen characteristics of exterior of a horse are provided in figure 1 and elaborated on below.

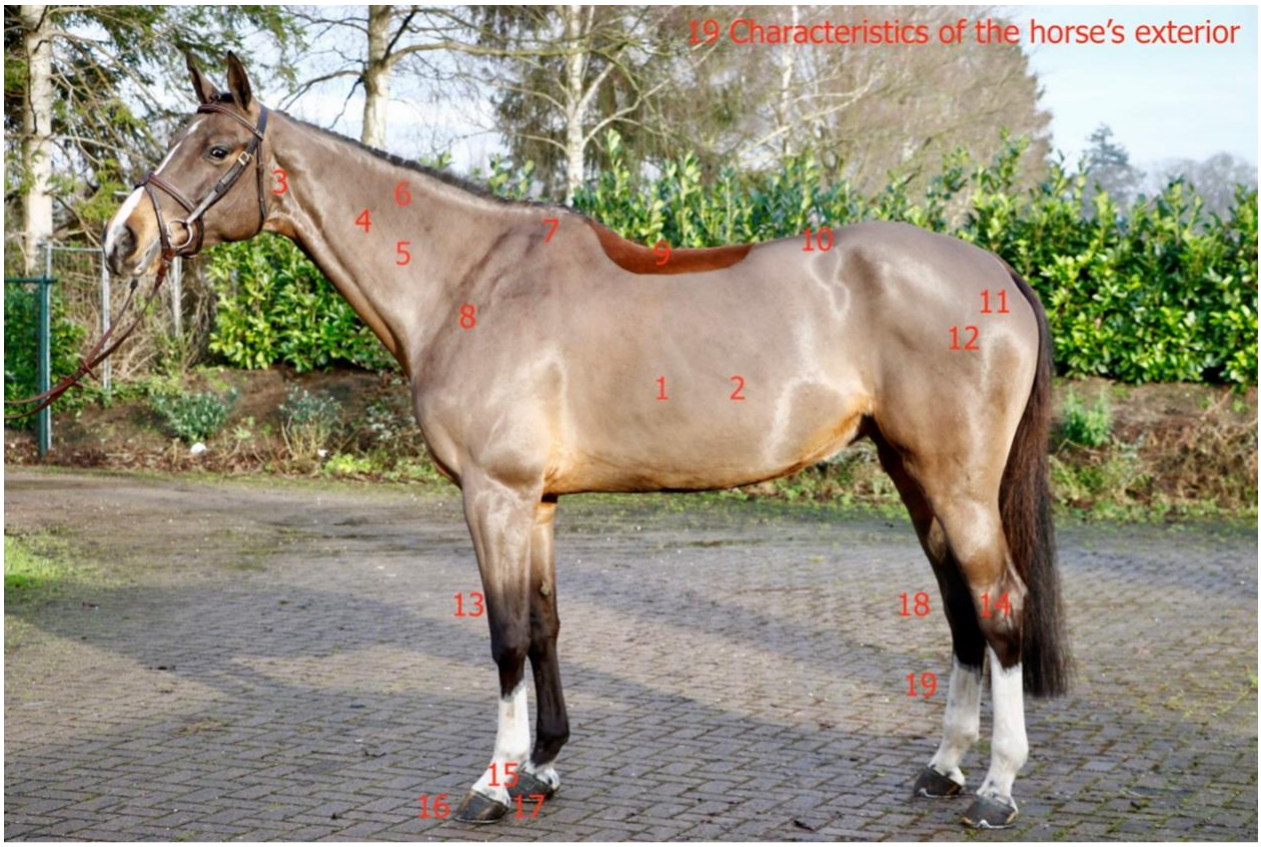

Figure 1, *19 characteristics of the horse's exterior, and where to look for them on a horse.*

The nineteen characteristics of the exterior of the horse can each be scored on a 9-point scale using the letters "A" to "I", ranking it from obvious on one end, through average, towards obvious on the other end of the scale. On top of the table, general remarks on the horse's condition, mouth and head can be made and faults or defects can be registered. On the right side of the table, all faults or defects of the horse's exterior per characteristic are listed and can be checked, if applicable.

CONFORMATION/TRAIT		obvious average obvious		Fault/defect
Condition				O fat O poor
Mouth				O underbite O overbite
Head		a b c d e f g h i		O convex profile O coarse O long
1. Body: shape	rectangular	O O O O O O O O O	square	
2. Body: direction	uphill	O O O O O O O O O	downhill	O shortlegged
3. Head-neck conn.	light	O O O O O O O O O	heavy	
4. Length of neck	long	O O O O O O O O O	short	O deep out of chest
5. Position of neck	vertical	O O O O O O O O O	horizontal	
6. Muscling of neck	heavy	O O O O O O O O O	poor	O ewe-neck
7. Height of withers	high	O O O O O O O O O	Flat	
7a. Lenght of withers	long	O O O O O O O O O	Short	
8. Position of shoulder	sloping	O O O O O O O O O	straight	
9. Line of back	roached	O O O O O O O O O	weak	
10. Line of loins	roached	O O O O O O O O O	weak	
11. Shape of croup	sloping	O O O O O O O O O	Flat	

		a b c d e f g h i		
12. Length of croup	Long	O O O O O O O O O	short	
13. Stance of forelegs	over at knee	O O O O O O O O O	back at knee	O tied in O standing under
14. Stance of hind legs	Sickle hocked	O O O O O O O O O	straight	O long O cow hocked O tied in O abnormal hock O abnormal stifle
15. Stance of pastern	weak	O O O O O O O O O	upright	
15a.St. pastern behind	weak	O O O O O O O O O	upright	
16. Shape of feet	wide	O O O O O O O O O	narrow	O slightly different O different O very different
17. Heels	high	O O O O O O O O O	Low	O different
18. Quality of legs	lean	O O O O O O O O O	blurred	
19. Substance of legs	heavy	O O O O O O O O O	Fine	

Figure 2, *Nineteen characteristics of the horses' exterior, the upper bar of the KWPN linear score form*

It would be too time consuming to explain all nineteen characteristics into further detail here (these are provided in appendix I). Therefore, one characteristic of each third of the horses' body is elaborated on, to indicate how instructors should judge the quality of a certain characteristic of the horses' body. To indicate there are different levels of difficulty in judging the segments, from each of the three examples an indication of the level is provided, E.g. 'easy to judge', 'normal' (exemplary) or 'difficult to judge' (a-typical). Figure 3 provides an image of how the horse is divided into three main body parts, in jargon known as the 'forehand', the 'middle' or 'back' and the 'hindquarters' or 'haunches'. In this research, the terms 'front,' 'middle,' and 'hind' will be used to indicate these three body parts of the horse.

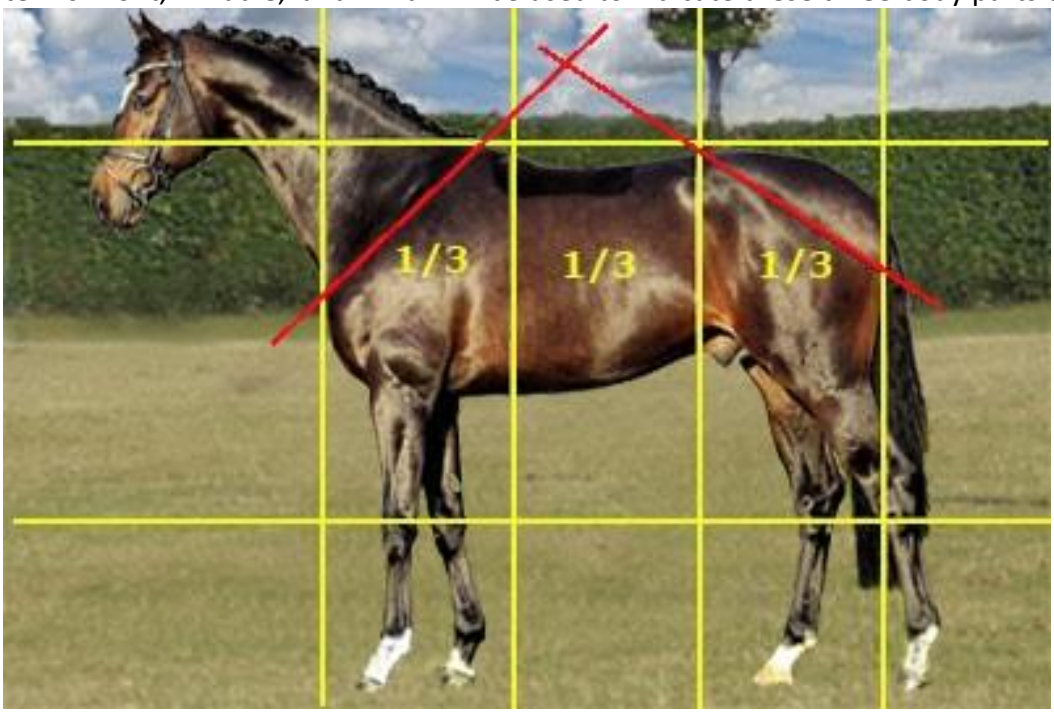

Figure 3, *The horse divided in three main parts, from left to right in front, middle and hind* (Segers, 2016)

When judging a horses' exterior, a normal distribution on a nine-point scale with letters from 'A' to 'I' is used, to refer to the population with a population average of 66% (van der Veen and van Andel (1996). The nine-point scale is divided in three segments, namely 'clearly present' ('A' to 'C'), 'average' ('D' to 'F') and again 'clearly present' ('G' to 'I'). On each end of the scale the measures for each segment of the horse are provided. For example, the length of the neck of the horse uses the measures 'long' to 'short.' So a horse with a short neck would score 'G', 'H', or 'I' for this characteristic, depending on how short the neck really is in relation to "E," the average, or 66% of the population (van der Veen and van Andel (1996). Rating the neck length is therefore somewhat arbitrary, as it is fairly impossible to use a measuring stick to determine the neck length of a horse. In addition, the KNHS instructor only needs to indicate whether a neck is short, normal or long, as this is where the suitability exam of the horse is about. KNHS instructors are clearly not trained to become KWPN inspectors, but the linear score form provides a very measurable way to look at the horses' exterior.

In their study on differences in exterior conformation between primitive, half-bred, and thoroughbred horses, Komosa, Frąckowiak, Purzyc, Wojnowska, Gramacki and Gramacki (2013) used a picture in which the positions of where the horses' exterior features are measured are highlighted, according to the signalling principle of Mayer (2005). This picture is not in line with the nineteen exterior characteristics that are used in this study, but it gives a good impression of the locations on the horses' body where the measurements are taken. Below the picture (figure 4), the exterior characteristics are listed and numbered, according to the numbers on the picture.

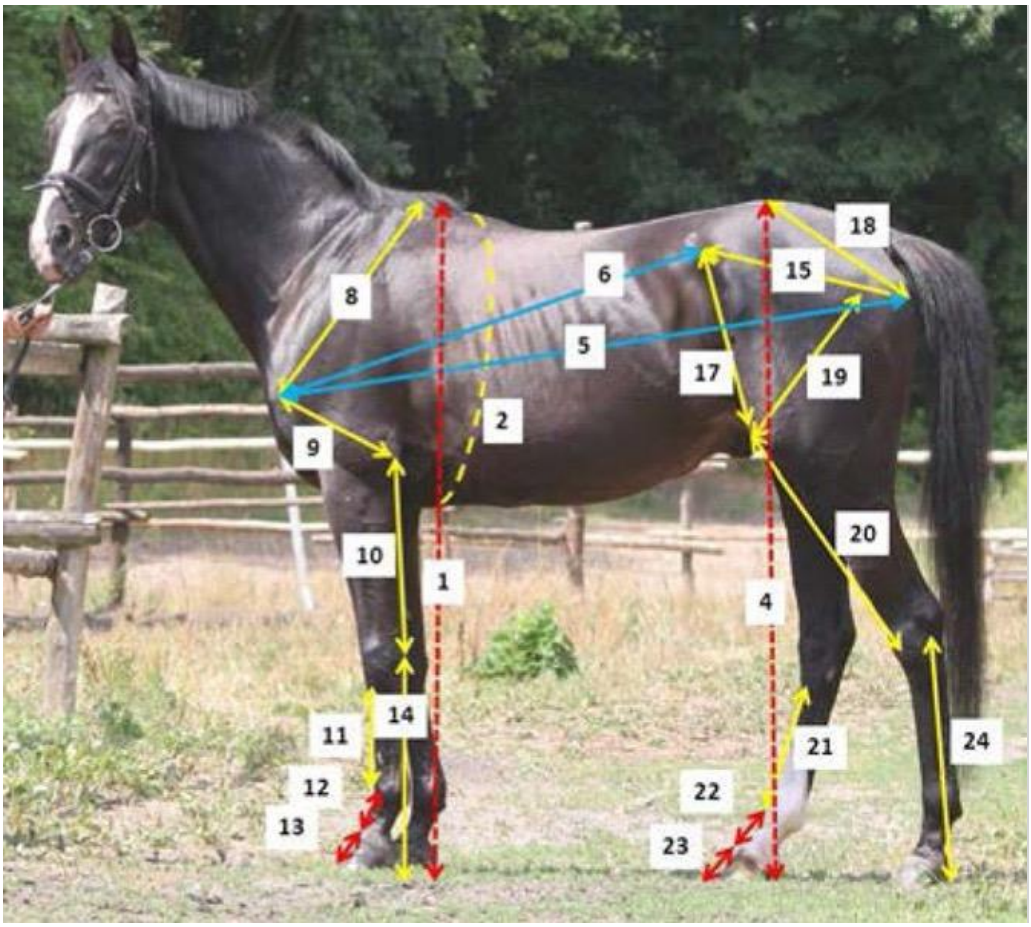

Figure 4, *Exterior measurements.* Wither height [1], chest circumference [2], croup height [4], greater trunk length (distance between greater tubercle of humerus and ischial tuberosity) [5], smaller trunk length (distance between greater tubercle of humerus and coxal tuber of ilium) [6], scapula length (distance from shoulder joint through spina of scapulae to withers), [8], arm length (distance between greater tubercle of humerus and olecranal tuberosity) [9], forearm length (distance between olecranal tuberosity and accessory carpal bone) [10], metacarpus length (distance between proximal epiphysis of third metacarpal bone and fetlock joint) [11], fore pastern length [12], fore hoof capsule height [13], fore autopodium length (distance between accessory carpal bone and ground) [14], pelvis length (distance between coxal tuber of ilium and ischial tuberosity) [15], croup depth (distance between coxal tuber of ilium and patella) [17], croup length (distance between sacral tuber and ischial tuberosity) [18], femur length (distance between greater trochanter of femur and patella) [19], gaskin length (distance between patella and trochlea of talus) [20], metatarsus length (distance between proximal epiphysis of third metatarsal bone and fetlock joint) [21], hind pastern length [22], hind hoof capsule height [23], hind autopodium length (distance between distal prominence of calcaneus and ground) [24]. (Komosa et al. 2013, P 1661).

Chapter 2, Theoretical Framework

The theoretical framework is viewed upon as the backbone of this research and in paragraph 2.1, generic theory on instructional video design will be provided and connected to the KNHS video exam setting. In paragraph 2.2 the theory on cinematography by Mascelli (1998) will be used to explain the design of the KNHS video exam.

2.1 Instructional video design

When speaking of instructional design, it is often the multimedia principle of Mayer (2005) that is used as a starting point, which beholds that "learning with words and pictures is more effective than learning with words alone." (Mayer, 2005, P 175). Nowadays, the multimedia principle refers to learning, supported by a broad spectrum of combined visual and verbal learning content (Mayer, 2005). It should be stated that the KNHS video exam was not designed to be learning content, but Mayer (2005) indicates that certain forms of assessment can also be affected by the multimedia principle. An interesting question concerning the combination of the multimedia principle and certain forms of assessment, like the KNHS video exam is "how, when and why the multimedia principle affects learning outcomes" (Mayer, 2005, P 178).

To be able to make statements on the effectiveness of educational videos, Brame (2016) provides a clear overview of considerations that help develop and use videos as an effective tool in education. One of the first elements that has to be taken into consideration when designing educational material, is cognitive load (Brame, 2016). The cognitive load theory, that was developed by Sweller and colleagues (1988, 1989, 1994), as retrieved in Brame, 2016), mentions several components within the learners' memory. The figure (figure 5) by Brame (2016) based on the theory by Mayer (2005) and Mayer and Moreno (2007) illustrates this.

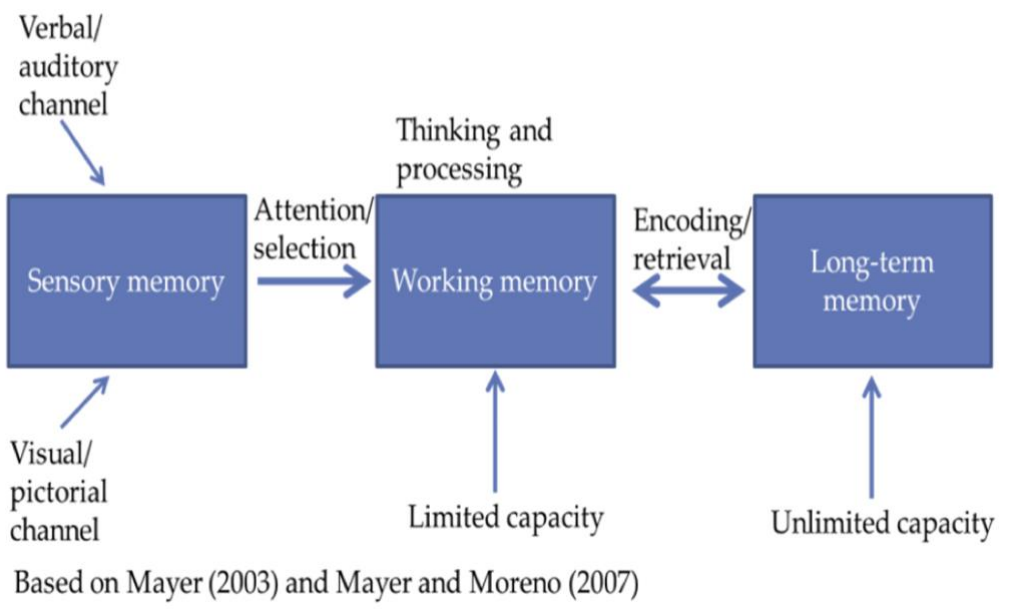

Figure 5, Several components within learners' memory (Brame, 2016, P 1)

As the KNHS instructors do not specifically need to memorize the videos, the cognitive load theory may not be in place at this point, however, an assessment like the KNHS video exam

can also be viewed upon as a learning situation, which affects riding instructors during the video exam.

Figure 5 illustrates the process described by Mayer (2005) of learners, collecting information from the environment, which enters the sensory memory. As the sensory memory can only hold the information very briefly, the information sometimes is selected for temporary storage and processing in the working memory (Mayer, 2005). The working memory however, has limited capacity and processing the information is prerequisite for encoding the information and storing it into the long-term memory (Brame, 2016) who states that "the long-term memory has virtually unlimited capacity" (Brame, 2016, P 1) the learner has to be very selective about what information to store in working memory during the learning process, as the capacity of the working memory is limited. (Brame, 2016) This finding entails important implications for designing educational materials, like videos (Mayer, 2005).

One of these implications is retrieved in the study on MOOC videos by Guo, Kim and Rubin (2014) who found that shorter videos are much more engaging for learners. Again, it has to be stressed that the KNHS exam videos were not designed to be learning material, but the length of the videos may influence the possible level of attention and focus of both instructor and examiner during the video exam. Brame (2016) also suggests that "videos should be brief and targeted on learning goals" (P 5). Shortening the videos may increase the process of selection the learners need to perform before information is stored into the long-term memory. Guo, Kim and Rubin (2014) suggest video not to be longer than 6 minutes for learners to stay engaged and this would (for the same reasons of learner engagement) be a recommendation for the design of the KNHS exam videos.

Another implication is using audio and visual elements in the video to convey appropriate parts of an explanation (Brame, 2016). In the KNHS videos, there is no audio yet, but it can be imagined that, for example, the sound of the horse walking on the street could be added in future designs. Also, information on the horse can be added to the introductory screen, which only represents the number of the video in the current situation (see Figure 6).

Figure 6, *The introductory screen of the KNHS exam video*

A very well-known implication used for designing educational or instructional videos is the signalling principle by Mayer (2005) in Appendix VIII, several examples of the signalling principle to indicate certain measures of body parts of horses are provided. In the KNHS exam, however, signalling is not in place, as instructors need to be able to demonstrate that they know where to take these measures and where to retrieve certain exterior features of the horse without signalling. Nevertheless, for training and educational purposes, signalling in videos or on photo's like in appendix VIII could be of great value to highlight important aspects in exterior judgement of horses.
Brame (2016) suggests an enthusiastic, conversational style to enhance learner engagement in videos. For the KNHS exam, this implication does not apply as there is no audio in the videos. The examiner however, is responsible for guiding the instructor through the exam and therefore is a real life conversational partner besides the video. This interaction may implicate an active learning environment, since examiners use guiding questions in order to have instructors make statements on the exterior of the horse. The limitation still lies in the fact that the KNHS videos are used only for exam purposes, but the aforementioned theory provides many implications to broaden the use of the videos for educational purposes. The possibility of connecting homework assignments to videos to encourage active learning, as suggested by Brame (2016) could also be part of this.

Schoech (2001) in his study on the usage of video clips as test questions found that multimedia, video use in our case, offers new exam possibilities and videos can be used to deliver new exam formats, methods, analysis and feedback to the users of the exam. Schoech (2001) furthermore claims that videos could possibly be more interactive and realistic for users. This, however, is not in line with the situation within the KNHS, since the exam used to take place in a real life situation and it is believed that a video exam cannot be more realistic than real life.

Another finding in the study of Schoech (2001) is recognized within the KNHS video exam, namely that technology may cause anxiety for users that are not familiar with computers. Exams already are quite stressful events and users that are lacking sufficient computer skills may become more anxious about the exam than if it were a real life or paper and pencil exam (Schoech, 2001). For the participants in the KNHS video exam, it can be stated that most of them have sufficient computer skills to manage to take the exam. Also, the KNHS instructors get a thirty-minute period prior to the exam to become familiar with the videos and the horses that are represented in the videos. They can use this time to fill out a practice form (Appendix III) and take notes, which they can bring with them to the exam. Moreover, the study by Schoech was performed in 2001, and it is assumed that technology and the ease with which computers are operated nowadays probably improved compared to the situation in 2001.

The videos used by the KNHS for the exam on suitability analysis of horses are derived from the online learning environment 'Moodle.' Every video is secured with a password and one has to have login credentials to enter Moodle. This fits two other findings of Schoech (2001), namely that of the size of the video files (which in the aforementioned study, sometimes caused problems) and the security of the exam videos, which is ensured sufficiently in the KNHS situation. Schoech (2001) concludes that "when everything works as desired, a technology based assessment can be very impressive and effective" (P 130).

To improve the quality of video exams, Schoech (2001) suggest that a team effort should be made, where technicians in the field of video, audio and computers work together with SME's to develop, use and update the video exam. Schoech (2001) states that

"technology is changing assessments" (P 130), but the process of using multimedia for assessment can be difficult. This is recognized in the study on the KNHS video exam, as there is little valid and reliable research available on video exams, let alone video exams in an equestrian sports context. This underpins the urgency of this study and hopefully this theoretical framework provides some guidance in the process.

2.2 The KNHS video design

For the first description of the videos, more generic characteristics of video design and movie making (Mascelli, 1998) will be used, combined with the characteristics KNHS demands for the video exams (Appendix IV). Bao, Howard, Spielholz, Silverstein, & Polissar (2009) claimed that, when working with video recordings outside of a laboratory setting, important parameters like lighting, camera angles, and camera distances cannot be controlled very well. In the 1990's, Mascelli (1998) wrote a book on the five C's of cinematography, which are still very relevant today, especially in relation to the KNHS exam videos.

The first C is that of 'camera angle.' When judging the exterior of the horse, the camera should be in a 90-degree angle from the left or right side of the horse, to be able to get a proper overview of, for example, the shape of the horses' body or the length of its back. An example of a still from one of the videos where the angle is close to 90-degrees is provided in figure 7. This still is a good example of a video still for judging the exterior of the horse.

Figure 7, *Good example of video still meeting the criteria to judge the exterior of a horse.*

The second C of Mascelli (1998) is that of 'continuity', which means that the attention of the audience, in our case the riding instructor and the examiner, should be

captured and held, without any distractions. While shooting the videos for the exam, sometimes distractions were inevitable, as the location for the videos was at the KNHS centre in Ermelo, where different horse related events take place at the same time. The videos that contain distractions are expected to score lower on quality than the videos without distractions. An example of a still from one of the KNHS videos with distractions is provided below in figure 8. The man in the background, walking to the car with trailer is distracting the attention away from the horse on the video. This conflicts with the continuity of the video.

Figure 8, *An example of poor continuity in a video, caused by background events.*

The third C by Mascelli (1998) is for 'cutting.' Each shot should have a purpose, and all scenes have to be linked with one another, so the effect of the combination of scenes, rather than the individual content of each scene, is causing the desired response of the audience (Mascelli, 1998). The videos for the exam consist of a part outside on the flat street and a part inside, with the horse ridden by the rider. Especially when working with real animals, cutting is inevitable to ensure all desired content of the videos is represented. All videos should be narrowed down to approximately ten minutes, to avoid repetition and emphasize on the continuity of the videos. Ideally, instructional videos should not exceed six minutes (Brame, 2016).

'Close-Ups' are the fourth C by Mascelli (1998) and in the videos of the horses on the street close-ups are used to illustrate leg deficits or white markings on the horse. Figure 9 provides an example of a close-up of the head of one of the horses, where markings can be recognized.

Figure 9, *Close up from the horses' head, clearly showing white markings between the eyes*

The fifth and final C is from 'composition' (Mascelli, 1998). In the videos for the exam the composition should be designed in a way that comes closest to when an instructor would observe a horse in real life. That is why straightness of the horse in relation to the camera is an important criterion. In real life, one can change his own location in order to get a proper view of a horse, but in the videos the position of the camera is most of the time fixed on a tripod. This indicates the importance of the way the horses are handled in the videos. Moore (2010), who studied the general biomechanics of horses, states on this topic: "Evaluating horses can obviously be done in several ways such as in hand with a halter or bridle, under saddle, on the lunge line, or free in a round pen or arena" (P 382). Moore (2010) continues "The horse's behaviour and the trainer's competence may make a difference, when choosing techniques that are most useful to the veterinarian; in many cases several approaches need to be tried. In hand evaluation can be made difficult by a ''frolic- some,'' noncompliant horse. An inexperienced handler can also make it difficult" (P 382). His statements indicate that presenting the horse in hand, whether it is for a veterinarian, or a video exam, like the current context, is probably most successful when experienced horsemen are handling the horse. Ideally this is done with compliant horses (Moore, 2010).
To conclude, the criteria for the content of the videos are represented in Appendix IV. For this study, only the criteria for the horses standing still on the flat street were used. These criteria are that the horse is represented from both sides, standing still (in a 90-degree angle from the camera). Also front- and hind legs and special markings should be present in the videos. In this way, for example the body shape of the horse (Figure 5) can be judged.

3. Research Questions and Design

This study aims at finding answers to the following questions:

1. "Does the video exam allow examiners (and subsequently instructors) to judge the suitability of a horse for show jumping, based on the nineteen characteristics of the horses' exterior?"

2. "What are the experiences of examiners evaluating the quality of the video exam?"

3. "Which recommendations for improving the videos can be made, based on the theory and the examiners experiences evaluating the video exam?"

3.1 Research design

The main goal of this study is to evaluate an educational design in the form of a video exam. Therefore, it is an evaluative study. The study was conducted with a specific, non-random selected target group (KNHS examiners and SME's in the field of judging the exterior of a horse) The researcher used these expert opinions to evaluate the quality of videos.

The analysis or exploration phase of this study is set apart in chapter one, where the problem is analysed and the content, context and learners are elaborated on. The researcher designed stimulus material (Appendix VIII and paragraph 4.2) to illustrate the important concepts in this study. In chapter two, theory on educational video design is used to underpin the criteria for judging the quality of the videos. In the method and results section, the process is described and the findings of the study are set apart. In the recommendations and conclusions, the research questions will be answered and suggestions for improvement of the videos will be made.

4. Research Method

4.1 Participants / respondents

Since this research is aiming at getting expert information of a particular group of people (examiners) during one event (testing parts of the videos on show jumping horses for judging the quality of the videos), non- random (convenience) sampling was used to involve participants. KNHS provided the researcher with about ten names of examiners, of which only five actually give the exam for instructors in the show jumping competition program.

Since this is a rather small target group, the researcher added 2 examiners of other programs (basic riding and dressage, who are also capable of judging the exterior of show jumping horses) and three subject matter experts from outside KNHS were selected to participate. One of them is a KWPN inspector of show jumping horses. One of them is an experienced horseman and KNHS riding instructor and the last one is a scout of young show jumping horses and also involved in the selection of show jumper foals for auctions.

There were two female participants and eight male participants. Their age varies between 30 and 73 years. All participants filled out an ethical consent form (appendix V), which are filed by the researcher and all participants were informed on the purpose of the study. The ethical committee of Twente University was asked for permission prior to this

study and this permission was granted.

4.2 Instruments and learning materials

The videos in this study are designed to serve the purpose of examination and replace a real life situation in which the suitability of a horse for a certain purpose (show jumping in this case) is judged. The videos do not contain any spoken or written text, since they do not have an instructional character. They only need to present the horses in such a way that the suitability of the horse as a show jumper or dressage horse can be judged. In order to make statements about the quality of the videos for judging the exterior of the horse, the researcher designed two sets of stimulus material. In the theoretical framework, the set on exterior judgement of horses is represented.

The material in this chapter was designed to come to prototypical images of good and poor representations of parts of the horses' body. In the figures (pictures of different horses) below, different representations of exterior features of the horse are provided. The horse therefore was divided in 'front', 'middle' and 'hind' and, for each part of the horses' body, prototypical material is represented in the next three paragraphs.

4.2.1 The front of the horse

Figure 10, *An example of a good picture of the front of the horse.*

With this picture (figure 10), the following characteristics of the linear score form can be judged:
3. head-neck connection
4. length of neck
5. position of neck
6. muscling of neck
8. position of shoulders (this partially overlaps with figure 11)

- The picture provided in figure 14 is a good representation of the neck of a horse, because it is taken from a 90-degree angle, so the length of the neck can be judged.
- Also the contrast of the picture is good, as the position of the neck can be recognized and the head-neck connection is clearly visible.
- The muscling of the neck of this horse is rather poor, as can be indicated from the picture.
- The horse is represented in a position of a horse being focused on something in the distance (as you can see by the ears being forward and the eyes calmly looking at something further away).

- The position of the shoulders is visible, but will be judged when the middle of the horse is also represented, as well as the upper part of the front legs.

Figure 11, *In this picture, characteristic 3, 4 and 5 are difficult to judge*

- The head neck connection (characteristic 3) cannot be judged as the horses' head is turned slightly towards us. This may bias our estimation of the head neck connection.
- The length and position of the neck (characteristic 4 and 5) are difficult to judge as the horses' neck is not standing up straight and the angle of the horse with the camera is not 90 degrees.
- As the head is bent slightly towards us we can see the muscles of the horses' neck (characteristic 6) from the bottom of the left ear towards the withers. However, this is a misleading image, because the head of the horse is bent towards us, which increases the visibility of the neck muscles and biases our judgement.
- The position of the shoulder (characteristic 8) can be judged from this picture, as the upper part of the front legs is visible. The front legs are standing a bit too much under the horses' body and ideally the horses' front legs would be in a 90-degree angle with the horses' belly.
- From this picture one can determine that this horse has a long, more straight than sloping shoulder. To illustrate this; this horse scored an F on characteristic 8, the position of the shoulder by a KWPN inspector, which means the shoulder has an average towards straight position.

Figure 12, *In this picture, characteristic 3 ,4 ,5 and 6 are difficult to judge*

- The horses' nose and head are too high up in the air. Therefore, making statements on the head-neck connection, length, muscling and position of the neck is difficult.

- The position of shoulders (characteristic 8) is also difficult to judge, as there is only a very small part of the front legs visible, so the angle of the shoulder cannot be determined.
- Finally, the horse lifts her head and pushes her back down, which brings the shoulder slightly forward (the shoulder has a tilting function). This can also bias our judgement.

4.2.2 The middle of the horse

Figure 13, *a good image of the horses' middle*

Figure 13, 14 and 15, are three images of the horses' middle (representing characteristic 1, 2, 7, 8, 9, 10, 11 and 12 of the horses' exterior).

- One can tell that this horse (figure 13) is more rectangular than square (characteristic 1) and that the direction of the body (characteristic 2) is more downhill than uphill.
- Note that the line from the right hind to the right front leg is horizontal and the horse is presented in a 90-degree angle with the camera.
- The height of the withers can be estimated, because the horse is totally visible on the picture and there is contrast with the background, though estimating height from a picture remains quite difficult.
- The position of the shoulder (characteristic 8) is clearly visible and also the line of the horses' back and loins (characteristic 9 and 10) can be recognized.
- Finally, the shape and length of the horses' croup (characteristic 11 and 12) can be judged from this picture as it provides enough contrast and the horse is positioned nice and square (90-degree angle) with respect to the camera.

Figure 14, *a more difficult to judge picture of the horses' middle.*

- The horses' front legs are positioned too much under the body, which causes the horse to look shorter than it actually is (when comparing this picture to figure 13, one should be able to recognize this)
- With the horse looking shorter (more square than rectangular) the judgement of characteristic 1, 2, 9 and 10 could be biased.
- Also, the direction of the body also looks more downhill when the distance between the front and hind legs is shortened.
- Judgement of the position and length of the withers (characteristic 7) can be biased, as the stance of the front legs provides a different perspective for looking at the withers (front legs to withers is not a vertical line, as illustrated in figure 7, 8 and 9 in the previous chapter).
- The position of the shoulder (8) is also biased by the stance of the front legs in this picture. The shoulder looks straighter when the front legs are positioned under the horses' body, as the shoulder tilts more forward as the legs move backward.
- Characteristic 11 and 12 are not really biased in this picture as the shape and length of the horses' croup are not significantly affected by the stance of the horses' front legs.

Figure 15, *a very difficult to judge picture of the horses' middle.*

- The picture is blurry, because the camera was probably not steady when taking this picture.

- The horse is not presented in a 90-degree angle from the camera, which can be recognized by the line of the front and back feet of the horse, which is a sloping line.
- The back of the horse is standing more in the background and the front is positioned more towards us.
- The right hind leg is stretched, which makes it difficult to make statements on the position and length of the horses' croup (characteristic 11 and 12).
- One positive point of this picture is the contrast the back of the horse makes with the sky, which makes the line of the back clearly visible.
- The line of the horses' back is biased by the horse not standing in a 90-degree angle from the camera, which decreases the reliability of judgements on the horses' back, loins and withers.

4.2.3 The hindquarters of the horse

Figure 16, 17 and 18, Three images of the horses' hind legs (characteristic 14).

Figure 16, *a good representation of the horses' hind legs*

- In this picture, which is taken from a 90-degree angle with the horses' hind legs, one can clearly follow the lines of the horses' hind legs.
- This horse scored an F (average towards steep) on the linear score form of the KWPN on characteristic 14 (stance of the hind legs).
- One remark that can be made on this picture is that the tail of the horse is covering a part of the leg below the left hock. This, however, does not influence the line of the front of the hind leg and this is the line most people look at to determine the stance of the hind leg.
- Seeing a part of the horses' belly also helps to determine the stance of the hind legs as this provides an angle to which the hind legs are related.

Figure 17, *a poor representation of the horses' hind legs (camera too much in front of the horse)*

- In this picture, the line of the horses' left hind leg cannot be determined very well, since it overlaps with the right hind leg.
- Also, the horse is not positioned in a 90-degree angle with the camera (which also causes the first remark on this picture).

Figure 18, *Another poor representation of the stance of the horses' hind legs (camera too much behind the horse)*

- This picture was, as figure 17, not taken from a 90-degree angle with the horses' hind legs, which biases our judgement of the hind legs, as we see them from behind, more or less.
- Good point of this picture is that the tail of the horse does not cover the left leg and the hock is clearly visible.
- However, the stance of the hind is determined by being sickle hocked or straight and this we cannot see in this picture as we cannot see the front of the hind legs.
- Pictures from a sideway, 90-degree perspective, showing the hind legs and haunches are necessary for judging this.

4.3 Procedure

In order to answer the research questions on whether the video exam allows examiners (and subsequently instructors) to judge the suitability of a horse for show jumping, based on the nineteen characteristics of the horses' exterior, five short movies of the horses that are used for the exam were watched by the researcher and examiner or SME. The researcher briefly introduced the procedure and let the examiner or SME sign the informed consent form (Appendix V). The researcher invited the examiners or SME to think out loud when watching the video, keeping the second research question "What are the experiences of examiners evaluating the quality of the video exam?" in mind.

For each horse, the examiner or SME was invited to judge the exterior of the horse, using the first nineteen characteristics of the linear score form. The researcher filled out the form and took notes on the examiners or SME's judgements. The conversation between researcher and participant on what was seen in the videos was recorded by using the

Dictaphone on the iPhone X of the researcher. Finally, a short questionnaire (Appendix VI) was filled out after each video, allowing examiners or SME's to provide feedback on two five-point scale questions and making additional comments or suggestions for improvement. This last part of the interview helped answering the second part of the final research question, namely "Which recommendations for improving the videos can be made, based on the theory and the examiners experiences evaluating the video exam?"

4.4 Data analysis

The data derived from scoring the first nineteen characteristics of the linear score form on the exterior of the horses in the videos will be displayed in table 1 in chapter five on results. All nineteen characteristics, who are also mentioned in chapter two, figure 2, are entered in the table in the left column. Then, the researcher calculated the mean score (where the number 5 represents the "average" KWPN horse). The standard deviations provide information on the interrater agreement. All standard deviations above 1,96 indicate that examiners did not agree on that characteristic. This could indicate difficulties of judging the video material or it could also be bias in the scoring process.
Next, the data was analysed in SPSS, performing a Chi square test in order to find any further discrepancies between the linear score of the 10 participants. No significant differences were retrieved and therefore, there were no further tables incorporated on this part of the analysis in this report. Finally, the questionnaire was analysed in SPSS by calculating means and standard deviations. The table on the outcome of this calculation is also presented in chapter five.

5. Results and evaluation

5.1 Results of the test using the linear score form

In table 1, the results of the scores of all participants in the research is represented. The numbers in the left column indicate the characteristics of the horse's exterior, as represented in the linear score form. Then, for each video, the mean score and standard deviation is represented. Characteristics that scored standard deviations above 1.96 can be interpreted as "difficult to judge," but no such characteristics can be seen in table 1. The highest standard deviation can be found in video one, on characteristic 5, the 'position of the neck' of the horse, which implies this was the most difficult characteristic to score, as the agreement between Examiners and SME's was at its lowest. The lowest standard deviation lies at the point of 0.30, which can be retrieved in video four and five on respectively the characteristics 'shape of feet' and 'substance of legs.' On these two characteristics, the examiners and SME's reached the highest level of agreement in their judgement.

Table 1. Overview of means and standard deviations for each video on the nineteen criteria for exterior judgement of horses

Char.	**Video S1**		**Video S2**		**Video S3**		**Video S4**		**Video S5**	
	M.	Sd.	M.	Sd.	M.	Sd.	M.	Sd.	M.	Sd.
1	4,09	1,37	5,00	1,00	4,45	1,12	5,45	1,12	4,54	,82
2	6,18	1,16	5,45	1,29	5,18	1,16	5,81	,60	6,18	,60
3	5,18	,87	4,54	,93	5,18	,75	5,45	1,03	5,09	1,04
4	4,45	,93	4,81	,60	4,90	,53	4,36	1,12	4,45	,68
5	5,81	1,72	4,54	,93	4,54	,82	5,45	,82	6,18	1,16
6	5,63	,80	5,81	,60	5,72	,78	4,45	,93	5,54	,82
7	3,90	,70	5,09	,83	3,63	,67	4,18	,87	4,63	,67
7A	3,45	,52	6,00	,63	4,45	,82	5,00	,89	5,00	1,09
8	6,27	1,00	5,00	1,00	5,90	,83	5,18	1,07	6,27	,64
9	5,09	,70	4,90	,94	5,36	1,28	6,36	,67	5,18	,87
10	4,72	,78	4,54	1,03	4,54	1,03	6,09	,83	4,81	,87
11	4,09	,83	3,90	,83	4,72	1,00	5,54	,93	4,63	,92
12	5,18	1,32	5,18	,75	5,72	1,19	5,63	,67	5,63	1,02
13	4,81	,40	5,09	,53	5,18	,87	4,90	,53	5,00	,44
14	5,81	1,25	5,36	,50	5,27	1,19	5,09	,70	5,63	,80
15	6,09	,94	5,27	,64	4,72	,64	5,45	,68	5,72	,64
15A	6,18	,75	5,27	,64	5,18	,60	5,09	,53	5,27	1,09
16	5,09	,83	4,90	,70	4,63	,67	4,90	,30	6,09	,70
17	4,36	,67	5,81	,75	5,18	,40	5,09	,53	4,09	,83
18	4,81	1,32	5,45	,68	6,00	1,00	5,45	,68	6,45	,68
19	5,18	,60	5,27	,64	5,18	,40	5,09	,53	4,90	,30

5.2 Results of the questionnaire

In Table 2, the results of the questionnaire on the quality of the videos are represented. The first question was: "What do you think of the quality of the video's for judging the exterior of the horse?" The respondents could rank their score on a 5-point Likert scale, ranging from "Very poor," "Poor," Acceptable" and "Good," towards "Very Good."

Table 2. Overview of answers to the question on the quality of the video's for judging the exterior of the horse

	Very Good	**Good**	**Acceptable**	**Poor**	**Very Poor**
S1	2	6	1	1	-
S2	2	3	5	-	-
S3	2	3	4	1	-
S4	1	6	3	-	-
S5	1	4	4	1	-
Total:	8	22	17	3	-

As can be seen in table 2, most respondents scored the video's 'good' on quality for judging the exterior of the horse. Seventeen times, the respondents scored 'acceptable', which indicates there is room for improvement of especially video S2, S3 and S5. The videos were scored 'very good' eight times and three times, respondents judged the video as 'poor.' From the table, it can be seen that it was not just one video that scored 'poor,' but three different videos. Two respondents, 'Paul' and 'Jacob' answered the question on quality of the video's with 'poor.' Respondent 'Paul' scored video S1 and S3 with the answer 'poor', stating that: "If linear scoring is the basis for judgement, the video (S1) is not sufficient. I would then improve the lighting, angles, accents, order of frames and close-ups of this video." On video S3 he stated: "The position of the horse in relation to the camera is not great in this video." The other respondent scoring video S5 with the answer "poor" was Jacob. On the quality of video S5 he stated: "This horse is not positioned nicely in relation to the camera. I feel you cannot judge a horse that is positioned poorly like this. The cameraman starts zooming in too early." Additional respondent feedback on the videos can be retrieved in the next paragraph and in appendix VII.

5.3 Results of the audio recordings

Since this study is already quite extensive, the researcher decided not to transcribe all audio material, but filtered important remarks of the examiners and SME's out of the audio material of the interviews. The total collection of these remarks consists of sixteen pages, listed as "quotes," per participant (the researcher used pseudonyms for each participant) and can be retrieved in appendix VII. In this paragraph, the most important remarks for each video will be listed and in the evaluation, topics that were frequently mentioned will be categorized, E.g. camera angles and position, close-ups, presentation and contrast. For finding the right translations of the horses' body parts, the dictionary of Simon-Schön (2008) was used.

5.3.1 Video S1

For this video, many positive remarks were made, such as the one by William: "the quality of

the video is perfect, it is filmed in a nice manner" And Henry:" I think it is positive that the horses are presented in a very relaxed and natural manner. They are not pushed to show off." On the other hand, Paul stated: "If linear scoring is the basis for the judgement, the video is not sufficient. I would then improve the lighting, camera angles, accents, order of the frames and the close-ups in this video." Mary adds to this by stating: "The video of the horse without the rider is not sufficient to determine the suitability of the horse, but it does give a first impression of the exterior of the horse. This exam entails more than just exterior judgement. One has to be able to see the whole presentation of the horse and rider to make statements on the horses' suitability." Simon is critical about the handlers of the horses and states:" My experience is that the handlers are presenting the horses poorly. They walk in front of the horse, nobody lets their horses walk in a nice and forward pace and the horses are positioned poorly in front of the camera." Simon also adds about the background information: "I miss the wither height in the background information. When the videos are shot in the right way, the screen is nicely filled out. By adding wither height, you have a better idea of the proportions of the horses in the videos." To conclude, Wendy states: "I have a trained eye for judging a horse, so for me the quality of the video for judging the horse is sufficient. I can imagine that this is more difficult for the untrained eye of riding instructors in the training program."

5.3.2 Video S2

In the second video, a grey horse was presented. Some participants found grey horses more difficult to judge, than others. Mary stated: "It is more difficult to determine the quality of the legs with a grey or white horse. The structure of the legs is difficult to see, because everything is white. The lower part of the front and hind legs sometimes seem a little overfilled (swollen), but sometimes not, depending on the angle and clarity of the video." Peter added to this: "The position of the camera may bias judgement in some cases. At 1.38 min the hind legs look a bit steep, but this could be different in real life." Bertram stated: "This horse was more difficult to judge than the first horse. The horse makes the difference and its colour may also influence this." Again, also some critical feedback was given. Bertram states: "If you want to teach young people leg deficits of horses, you really need to have clear images in order to make a good difference between the good horse and the horse with leg deficits. I would not use video to teach this." On the position of the horse, Jacob stated: "The horse is not standing straight, this biased the judgement. A horse that has a short body looks longer when you put it on a diagonal line, away from the camera. Therefore, a 90-degree angle is important for getting a realistic image of a horse. in real life you can change your own position in relation to the position of the horse. With video this is impossible."

5.3.3 Video S3

In the third video, again a grey horse was presented. Mary stated: "This grey horse is easier to judge than the other one before. This one is whiter and the contours of the horse are presented better." Bill stated: "From the background information, I know this is an older horse. I take this into account when I have to judge the quality of the legs." Older horses' legs may be a bit more swollen than the legs of younger horses. Wendy adds: "I have sufficient training material on leg deficits, but this should be a bigger part of the training program, especially related to the functionality of the horse." Peter stated: "Having background information on the horses can place things like muscling into perspective. An older horse should have more musculature than the horse in this video, when it is trained in

the right way." Many respondents also had feedback on the way the horse was presented by the handler. William stated: "She positioned the horse in the worst possible way." and Jacob adds: "This horse is not presented very well by the handler. The horse is not walking straight towards you." and "The image is biased when the horse is not presented straight. For the videos and determining the stance of the legs it is of great importance that the horses are positioned straight and that the camera is positioned in a 90-degree angle from the horse."

5.3.4 Video S4

In the fourth video, we see a brown horse. Bill states:" The shape of the horses' back and loins are more difficult to judge from this side, because there is a tree in the background." Another comment on contrast is made by Bertram: "The contrast for determining the stance of the legs is good, because the legs are black and the street is light grey" and Jacob: "The stance of the hind legs is a bit difficult to judge, because the tail is hanging over the hocks of the hind legs, which takes the contrast away (black tail over black legs)." Paul adds: "This brown horse is easier to judge than the other horses. This is caused by the lighting and the colour of the horse." Peter states: "The way the horse is presented influences the judgement." and: "If you could zoom in on both front feet, and take close-ups from both front feet separately and next to each other, it would be easier to determine the shape of the feet and whether or not they are different from each other." Mary stated: "The length of this horses' back is difficult to determine. The middle (back) of this horse seems rather short. This is important information for the suitability of the horse and for example for the position of the saddle on the horses' back.

5.3.5 Video S5

The horse in the fifth video is dark brown to black. Bill states: "Again the tree biases the image of the horse standing still, with its nose to the left." Peter adds: "The head- neck connection is difficult to determine from this video." Paul mentions: "This horse appears to be in poor condition, as can be seen by its coat (long hair). It can also be that this horse was not groomed before recording the video." He also questions: "What is the relation between filling out the linear score form and judging the suitability of a horse by an instructor in this exam?" The relation, according to the researcher is that the linear score form provides detailed information on the exterior features of a horse, which can be used to determine its usability in sports. Wendy noticed: "There is no sound in the videos. Adding sound, I.e. the sound of the horse walking on the street, could help to hear whether the tact of the horse is correct or not." She continues: "The close-ups of the horses' head does not really add to the quality of the videos. There may be more uniformity in the videos. The way the horses are presented and positioned does add to the quality of the videos. Also try to find horses who actually have leg deficits to make the videos more realistic." Henry states:" I like to walk around the horse myself. Judging a horse in real life is therefore easier. Nevertheless, as learning material, these videos are adequate. Henry concludes: "This video, and the third video for me were the most difficult to judge." Simon adds: "I think a brown horse is the easiest to judge."

5.4 Evaluation and recommendations

The feedback of the examiners and SME provides many cues that may improve the videos. One of the respondents, going by the pseudonym 'Simon', stated on the second video: "This horse is presented poorly. The handlers need instructions on how to do this. Also the

direction they need to turn the horses towards should be clear, as well as the way to position the horse nicely. The handlers that need to do this need instructions and practice for this. I assume they are willing to learn. They just need to be told what to do."

Another point of attention is the position of the horse, in relation to the camera. Many remarks stress the importance of the 90-degree angle the horse should have from the camera and also walking and trotting in straight lines could be improved. Respondent 'Jacob' stated in the fourth video: "This is good, the horse is trotting on the yellow strip of the street, which helps the horse stay in a straight line. It is my experience that horses improve with this kind of support." The angle of the camera in relation to the horse maybe is one of the most noted remarks. Respondent 'Peter' comments in the fourth video: "With a camera, you always work under a certain angle. This angle can really make a difference when having to judge a horse from video. In order to judge correctly and get a complete impression of the horse, different angles, especially of the horses' legs, should be presented in the video."

Close-ups were another point of attention and one frequently heard remark was that taking a good close-up takes some time. Some of the close-ups in the videos were made too hasty, which makes pausing the video inevitable. Close-ups can be very helpful when improving the videos, especially on the smaller parts of the horses' body. Respondent Bill states: "Some shots could be zoomed in a bit longer on certain body parts. My experience is that not all details can be assessed directly by the instructors during the exam. They sometimes need more time to watch the videos. We now solve this by pausing the video during the exam."

In the problem analysis, the transition this exam made from being a real life exam towards a video exam is described. Many remarks were made on the difference between real life and video judgement. Peter states on the first video: "The video provides a good first impression, but horses can be completely different when you see them in real life."

5.4.1 Suggestions for improvement of the videos

From watching and evaluating the videos and scoring the outcome of the interviews with the SME's several recommendations for the videos were found. These will be elaborated on and discussed in this chapter, concluding with a new script for the videos (table 3), that can be used for future recordings. In the table, for each aspect, there will be a reference to either the theory or a quote by a respondent to clarify its source.

In her study on using video material for biology lessons, Brame (2016) listed some recommendations in order to maximize the benefit learners will have from watching the videos. In the next section, her recommendations will be used to create suggestions for improving the KNHS videos.

1. "Keep videos brief and targeted on learning goals" (Brame, 2016, P5). The KNHS videos are approximately 10 minutes of length. Ideally, the videos should be six minutes or shorter (Brame, 2016; Guo, Kim and Rubin, 2014). Maybe, when designing future videos, they should not exceed six minutes. However, the learning goal in this case is to pass an exam, so the KNHS videos are not really educational by nature. This may influence the importance of the videos being brief and the length of the videos may in this case not have an effect on the learning outcome, I.e., whether instructors pass the exam or not.
2. "Use audio and visual elements to convey appropriate parts of an explanation; consider how to make these elements complementary rather than redundant" (Brame, 2016, P5). As one of the Examiners stated "There is no sound in the video's. Adding sound could help to

hear whether the tact (soundness) of the horse is good or not." Also, visual elements that could help explain the purpose of the exam, or provide background information, could be embedded in the KNHS videos. An example that one of the examiners provided is to add an introductory screen, on which a selection of background information is provided, such as age, sex, training level, wither height and current competition level of the horse.
3. "Use signalling to highlight important ideas or concepts" (Brame, 2016, P5). As this is an exam and instructors need to inform the examiner on what they see in the video, signalling cannot be applied here. Important background information on the horses in the videos can be provided in the first frame of each video, but this information can be provided without the signalling principle of Mayer (2005). When the videos would be designed for learning purposes, signalling, as can be seen in figure 1, 3, 3a and 4 to 12 could be applied in the videos to highlight important information.
4. "Use a conversational, enthusiastic style to enhance engagement" (Brame, 2016, P5).
In this video exam, the conversation about the video takes place between the examiner and the instructor. The videos are kept plain, since they are exam material. One of the participants, Wendy quoted: "The examiner also has an important part in this exam. The examiner should be able to pose open questions and challenge instructors to give their opinion on the exterior of the horse."
5. "Embed videos in a context of active learning by using guiding questions, interactive elements, or associated homework assignments" (Brame, 2016, P5). This also does not apply to the video exam. Nevertheless, by taking the exam and sharing thoughts with a subject matter expert, like the KNHS examiner, it is expected that instructors actually learn from taking the exam, since it is a form of active reproduction of knowledge. Therefore, it would be interesting to further investigate the learning effect instructors experience when taking the exam.

Table 3, *Improved version of script for video exam PVB 3.7 on suitability advice of a horse*

Current script, General content:	**Desired script, General recommendations:**
- Total amount of time: five to ten minutes (Guo, Kim & Rubin, 2014) - No background music - KNHS logo on the top right and number of the video on the bottom left of the whole video (KNHS)	- Maintain general content as listed left (KNHS) Shorten videos that exceed six minutes (Guo, Kim & Rubin, 2014) - Add sound of the horses walking on the street in order to check 'soundness' of the horses (Respondent 'Wendy'). - Add background information on horses age, gender, wither height, training and competition level in a 5-10 second screenshot in the beginning of the video (Brame, 2016 and Respondents; 'Paul', 'Jacob,' 'Peter', 'Simon' and 'Wendy'). - Start with two stills of the horse, filmed from both sides for approximately 15 seconds for each side (Respondent 'Paul'). - Avoid distractions in the background (Mascelli, 1998 and Respondent 'Paul')

	- Handlers all wear appropriate, non-distracting clothing (Respondent 'Paul') - Add a 360-degree "walk around the horse" shot, if the time allows this (Respondent 'Henry' and Guo, Kim and Rubin, 2014).
Minimal content of the video (current situation)	**Improved content of the video (desired situation)**
Both sides of the whole horse standing still	- Ensure the camera is positioned in a 90-degree angle from the middle of the horse (Respondent 'Paul,' 'Wendy' and 'Jacob'). - Mark the position of the horse with tape or poles on the ground and mark the position of the camera (suggestion of the cameraman at first shoot of the videos). - Add one shot of the camera standing in a 30 to 45-degree angle next to the shoulder of the horse (overlooking the back) in order to see the shape of the loins (Respondent 'Wendy').
Front- and hind legs	- Take sufficient time to make close-ups of all legs from 90 and 45 degree angles in adequate lighting and contrast (Respondent 'Bill,' 'Mary' and 'Bertram'). - The tail of the horse should be held aside when filming the hind legs (Respondent 'Henry' and 'Peter').
Specificities and markings	- Close-ups from leg deficits (use horses that actually have leg deficits) and markings on the horses' body (Respondent 'Wendy' and 'Peter').
Movement (on hand)	
Walk 20 to 30 meters in a straight line away from the camera. Turn right and walk back towards the camera.	- Provide handlers with information on how to present the horse and how to turn (Respondent 'Simon' and 'Bertram'). - Mark the line the handler and horse need to follow to ensure straightness (Cameraman and Respondent 'Jacob'). - If necessary, use additional handlers to ensure the pace of the horse is active (Respondent ''Bill,' 'Bertram' and 'Wendy').
Trot 20 to 30 meters in a straight line away from the camera. Turn right and trot back towards the camera.	- Provide handlers with information on how to present the horse and how to turn (Respondent 'Simon' and 'Bertram'). - Mark the line the handler and horse need to follow to ensure straightness (Cameraman and Respondent 'Jacob').

	- If necessary, use additional handlers to ensure the pace of the horse is active (Respondent ''Bill,' 'Bertram' and 'Wendy').
Trot in a circle, both clockwise and counter-clockwise	- Provide handlers with information on how to present the horse on a circle and how to turn (Respondent 'Simon' and 'Bertram'). - Mark the circle with poles or tape in the ground (Cameraman and Respondent 'Jacob'). - If necessary, use additional handlers to ensure the pace of the horse is active (Respondent ''Bill,' 'Bertram' and 'Wendy').

6. Discussion and Conclusion

In this chapter, the research questions will be answered and the limitations of this study will be stressed. Also, the results of this study will be discussed and conclusions will be drawn, based upon the findings in both research and theory. Finally, after having evaluated this study from different angles, suggestions for future research and the practical and scientific relevance of this study will be explained.

Since this is a highly self-designed, evaluative study, in commission of an organization outside of the University of Twente in a very specific context, the scientific value of this study may be limited. As often is the case with qualitative research, the outcomes of this study can be interpreted in different ways and reliability could have been improved by increasing the number of participants. Nevertheless, there are not many experts in the Netherlands with broad experience and knowledge on the exterior of horses, and the participants in this study add enormous value because of their specific expertise. This value may be of less importance, or even biased, when participants with less experience would have been added. In this study, the famous minimalistic saying "less is more" definitely applies to this matter.

'Mary', one of the SME's in this study, already answered the first research question of this study by stating: "When having to do the linear scoring of the horse according to KWPN guidelines, the videos are sometimes not sufficient. For a general suitability advice of the horse (as this KNHS exam is) the videos are sufficient and do what they should do, which is providing a first impression of a horse." When looking at table 2, one can see that most of the SME's in this research share her opinion. Therefore, it can be concluded that the video exam allows examiners (and subsequently instructors) to judge the suitability of a horse for show jumping, based on the nineteen characteristics of the horses' exterior.

The experiences of the examiners, I.e. SME's evaluating the videos are provided in paragraph 5.3 and 5.4 and are diverse, but many general remarks were made by separate SME's. 'Mary' mentioned: "I think the video part of the horse ridden by the rider provides more information for judging suitability of the horse than the exterior part. Leg deficits can also be recognized by a veterinarian before a horse is purchased. A riding instructor may not use all the knowledge on exterior and leg deficits, since this also is the veterinarians job. The instructor has to make statements on the ride-ability of the horse and determines whether a horse suits a client or not." SME 'Wendy' has a different opinion. She states: "Instructors should be trained better in exterior judgement and leg deficits."

The aforementioned statements fit the conclusions of this study, as they comprise both the limitations and possibilities, and also illustrate that SME's often have different opinions on what they think is important when having to teach and examine riding instructors. The scoring form, provided by the KNHS for the video exam (Appendix II), therefore offers an essential guideline for examiners to judge instructors during the exam. The presence of this scoring form can help increase the interrater reliability, as instructors are viewed upon in the same way by examiners. Still, both examiners and instructors are in need of high quality video material in order to judge the horses from video, as opposed to real life judgement, which is favoured by many.

The next part of this chapter aims at answering the third research question, namely "Which recommendations for improving the videos can be made, based on the theory and the examiners experiences evaluating the video exam?" In the theoretical framework, Bao, Howard, Spielholz, Silverstein, & Polissar (2009) already claimed that, when working with video recordings outside of a laboratory setting, important parameters like lighting, camera angles, and camera distances cannot be controlled very well. This is recognized in the KNHS exam videos where SME's often made remarks on lighting, shadows, contrast and camera angles or the position of the horse (Appendix VII). On the other hand, the real work environment may reveal problems in exterior judgement of horses that also occur in real life, like insufficient lighting or shadows, when having to assess the exterior of a horse. The fact that a horse is an animal, which never behaves according to a plan or script, already is quite a challenge when having to assess its exterior, let alone having to produce high quality videos for examination purposes.

When looking at the quality of the videos for judging the exterior of the horse, most SME's state that the quality is acceptable or good. Design guidelines that may help to improve the quality of the videos are provided in table 3 and may be viewed upon as recommendations, as they for the most part, answer the third research question. The general guidelines by Mascelli (1998) were recognized and represented in most of the videos, however, continuity could be improved by limiting background events. Minimizing distractions was also one of the suggestions by SME's. People walking in the background, like in figure 8, or other background activity should be avoided at any time, because it distracts instructors' attention away from the horse in the video and that is what they need to judge.

This distraction may even affect the process of learners selecting information from sensory memory to process in their working memory and possibly encode into long-term memory (Brame, 2016). Removing background 'noise' can be achieved by clearing the film set and placing fences or signs that keep visitors at a certain distance. Also the time of day can influence this and the film crew should try to film at times that it is quiet at the film set.

One of the unexpected suggestions for improvement of the videos made by the SME's was that of the role of the handlers (often also the riders) of the horses, presenting the horses in the videos. The handlers need to present the horse in the best possible way to create high quality videos and therefore more instruction might be necessary on how to present a horse in front of a video camera. Particularly SME 'Simon' stressed the importance of these handlers being trained to present the horses in a correct manner, I.e. horses walking in straight lines and circles and handlers not walking in front of the horse or distracting attention away from the horse by clothing or appearance. Also the presence of second handlers to motivate the horses to walk and trot in an active way would be encouraged, and is a suggestion for improvement of the videos made by most SME's.

When it comes to more general recommendations for the quality of the videos, the findings of the study on MOOC videos by Guo, Kim and Rubin (2014) provide suggestions for improvement. Guo, Kim and Rubin (2014) found that shorter videos are much more engaging for learners. Although the KNHS exam videos were not designed to be learning material, it has to be stressed that, the length of the videos may influence the possible level of attention and focus of both instructor and examiner. Guo, Kim and Rubin (2014) suggest videos not to be longer than 6 minutes for learners to stay engaged and this would (for the reasons of learner engagement) be the recommended amount of time for each of the KNHS videos as well. The influence of video length on the outcome of the KNHS exams may be a question that can be answered in future research.

One of the other findings of Guo, Kim and Rubin (2014) is that "videos produced with a more personal feel could be more engaging than high fidelity studio recordings" (P. 2). The setting in which the KNHS exam videos are filmed should be familiar to most instructors, as they were recorded at the KNHS centre in Ermelo, which is well-known to most equestrian people in the Netherlands. This well-known setting may create a more personal feel, which in turn increases engagement with the learners, as Guo, Kim and Rubin (2014) suggest. It is assumed, with people who like horses in general, having horses presented in videos already increased engagement, but this also could be investigated in future research.

It must be stated in this discussion that the theory on educational video design was somewhat useful, but there are many factors influencing the quality of the video exam, besides the design of the videos. One factor is that of the examiner sitting next to the riding instructor, when the exam is taken. To be able to ask the right (open) questions and allowing the instructor to speak out loud when watching the videos is of great importance. As SME 'Wendy' stated: "The examiner also has an important part in this exam. The examiner should be able to pose open questions and challenge instructors to give their opinion on the exterior of the horse."

SME 'Wendy' brought up another important topic that has to be addressed in this discussion by stating: "All examiners should be on the same page when judging the exterior of a horse and the quality of the instructor they are examining. The interrater reliability can always improve." In their study on interrater reliability of posture observations, which has similarities with assessing the exterior of a horse, Bao et al. (2009) found that larger body parts were easier to observe and resulted in better reliability. This in is line with the findings in this study, where SME's state that especially leg deficits (which can be viewed upon as small body parts) are more difficult to judge from a video than, for example, the shape of the horses back. The way examiners and SME's scored the horses with the linear score form also confirms this in the results of the first video, where the score of the position of the horses' neck (I.e., also a rather small body part) had the highest standard deviation (1,71).

Bao et al. (2009) also state that interrater reliability in their study depended on camera positions, video quality, complicated work postures and the posture parameters. Especially camera positions and video quality are often mentioned by SME's and examiners in this study. To conclude, the position of the camera and the quality of the videos are dependent factors for increasing interrater reliability when having to judge the exterior of a horse from a video. To make statements on the percentages of interrater agreement and reliability, further research on this topic in relation to the KNHS exams is suggested.

Another angle that can be mentioned in this discussion is that of judging art, in relation to judging the exterior of horses. Hekkert and van Wieringen (1996) in their study titled 'beauty in the eye of the expert and non-expert beholder' found differences in the way experts and non-expert perceive art. They state that experts do agree on which criteria are important for judging art, which is in line with the criteria in, for example, the linear score form. However, they found that differences occur because of the individual interpretation of criteria and the weight each expert or non-expert attaches to the criteria (Hekkert & van Wieringen, 1996). This is also a matter of personal taste and stresses the importance of not only having criteria for judging the exterior of horses, but also add value to the scores of each of these criteria.

The latter is in line with the conclusions of Koenen, Aldridge and Philipsson (2004). In their study on breeding objectives for warmblood sport horses, they found that the

objectives for breeding of sport horses are not very transparent due to many traits that are defined rather subjective. Information on the relative weight of traits is lacking, which implies that the current selection methods of horses for breeding of sport are not optimal, especially when selection of horses across different organisations is taken into consideration. Selecting horses is also what KNHS instructors do, when taking their exam on suitability advice of a horse. Instructors need to demonstrate sufficient skills and knowledge in order to select the suitable horse for their clients. Obviously, this is not the same as selecting horses for breeding purposes, but in many cases, the traits of the horses that need to be assessed are similar, like for example wither height of a horse. This is an important trait of a horse that applies to both breeding and sport and adding wither height to the background information of the horses in the KNHS videos was also recommended by several SME's.

Koenen, Aldridge and Philipsson (2004) suggest that selection efficiency and transparency can be improved when horse breeding organisations are encouraged to improve their definitions of traits in horses and evaluate the optimal number of traits in the breeding standard. Also, the relative weight of each trait and the genetic relationships between traits has to be considered in this evaluation (Koenen, Aldridge and Philipsson, 2004). KNHS instructors in turn need to determine which traits of horses are weighing relatively heavier than other traits, or like SME 'Wendy' put it: "Instructors should be able to see what really stands out in the observation of each horse, I.e. what are highlights in its exterior." Moreover, instructors need to be able to make statements about the horses' movements, ride-ability and character. Thus, a horse can have a stunning exterior, but if its character does not fit the needs of its rider, there will never be a match.

To conclude, the findings of this study, based on both theory, content analysis and statements of experts in the field of equestrian sports, can be used for other educational purposes as well. One could think of evaluation of video exams in other contexts or to provide an outline for designing learning content in the field of equestrian sports. The KWPN for example, could use the outcome of this study to design a program for English speaking customers in order to increase their knowledge of exterior judgement of horses and practice linear scoring. Or, developers of educational material can use the information on the analysis and evaluation of this video exam in order to develop and evaluate video exams in other learning contexts. Moreover, the KNHS can use this evaluation and the figures in the study and in Appendix VIII, to create content for lessons in exterior judgement of horses for their training program for riding instructors. The knowledge produced in this study may be used to improve the process of linear scoring of horses and exterior judgement in general, and can be applied in different, horse- related or non-horse related settings where linear judgement based on videos is considered. Finally, it is with great gratitude that the last sentence of this report is now written, and hopefully it will find its way into the educational departments of organizations within the (equestrian) world.

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Appendix I, Linear score form of the Royal Dutch Warmblood Studbook (English version)

Location:	**Date:**	**Judge:**
Horsename:	**Horse number:** **Sire:**	**Cat. Nr:**
Date of birth:	**Gender:**	**Type:**
Height (cm):	**Studboek entry: Yes / No**	**Paid: Yes / No**
Owner 1:	**Owner 2:**	**Passport: Yes / No**
Name:	**Name:**	
Address:	**Address:**	
Place:	**Place:**	
Colour:	**Markings on head:**	
Right fore:		
Left fore:		
Right hind		
Left hind:		
Other:		

CONFORMATION/TRAIT		obvious average obvious		**Fault/defect**
Condition				O fat O poor
Mouth				O underbite O overbite
Head		a b c d e f g h i		O convex profile O coarse O long
1. Body: shape	rectangular	O O O O O O O O O	square	
2. Body: direction	uphill	O O O O O O O O O	downhill	O shortlegged
3. Head-neck conn.	light	O O O O O O O O O	heavy	
4. Length of neck	long	O O O O O O O O O	short	O deep out of chest
5. Position of neck	vertical	O O O O O O O O O	horizontal	
6. Muscling of neck	heavy	O O O O O O O O O	poor	O ewe-neck
7. Height of withers	high	O O O O O O O O O	Flat	
7a. Lenght of withers	long	O O O O O O O O O	Short	
8. Position of shoulder	sloping	O O O O O O O O O	straight	
9. Line of back	roached	O O O O O O O O O	weak	
10. Line of loins	roached	O O O O O O O O O	weak	
11. Shape of croup	sloping	O O O O O O O O O	Flat	

EVALUATION	CONFORMATION:		JUMPING:
		Walk: Trot:	Canter: Reflexes: Technique: Scope:

		a b c	d e f	g h i		
12. Length of croup	Long	O O O	O O O	O O O	short	
13. Stance of forelegs	over at knee	O O O	O O O	O O O	back at knee	O tied in O standing under
14. Stance of hind legs	Sickle hocked	O O O	O O O	O O O	straight	O long O cow hocked O tied in O abnormal hock O abnormal stifle
15. Stance of pastern	weak	O O O	O O O	O O O	upright	
15a.St. pastern behind	weak	O O O	O O O	O O O	upright	
16. Shape of feet	wide	O O O	O O O	O O O	narrow	O slightly different O different O very different
17. Heels	high	O O O	O O O	O O O	Low	O different
18. Quality of legs	lean	O O O	O O O	O O O	blurred	
19. Substance of legs	heavy	O O O	O O O	O O O	Fine	
MOVEMENT/TRAIT		**evident**	**average**	**obvious**		**Fault/defect**
20. Walk: length of stride	long	O O O	O O O	O O O	short	O irregular
21. Walk: correctness	toed in	O O O	O O O	O O O	Toed out	O on co-ordinated
22. Trot: length of stride	long	O O O	O O O	O O O	short	
23. Trot: elasticity	elastic	O O O	O O O	O O O	Stiff	O irregular
24. Trot: impulsion	powerful	O O O	O O O	O O O	weak	O on co-ordinated
25. Trot: balance	carrying	O O O	O O O	O O O	pushing	
26. Canter: le. of stride	long	O O O	O O O	O O O	short	
26a.Canter: elasticity	elastic	O O O	O O O	O O O	Stiff	
27. Canter: impulsion	powerful	O O O	O O O	O O O	weak	
28. Canter: balance	carrying	O O O	O O O	O O O	pushing	
JUMPING / TRAIT		**evident**	**average**	**obvious**		**Fault/defect**
29. Take off: direction	upwards	O O O	O O O	O O O	forwards	
30. Take off: quickness	quick	O O O	O O O	O O O	Slow	
31. Technique: foreleg	bent	O O O	O O O	O O O	stretched	O under the body
32. Technique: back	rounded	O O O	O O O	O O O	hollow	
33. Techn.: haunches	open	O O O	O O O	O O O	tight	
34. Scope	much	O O O	O O O	O O O	little	
35. Elasticity	supple	O O O	O O O	O O O	stiff	
36. Care	careful	O O O	O O O	O O O	not careful	
Attitude (subject of research)	much	O O O	O O O	O O O	little	

Appendix II , PVB 3.7 scoring form (used by examiners to judge instructors during their exam on suitability advice of a horse, in Dutch)

Naam kandidaat: **Cursus:** Basissport Allround			**Datum:** **Plaats examen:** **PVB-beoordelaar:**	
Voldaan aan de afnamecondities, locatie en voorbereiding kandidaat: ja / nee*				
*Bij nee gaat de PVB niet door. De PVB-beoordelaar motiveert dit bij de toelichting.				
Toelichting				
Beoordelingscriteria		Praktijk	Voldaan	Waargenomen gedrag en/of uitspraken (of nalaten daarvan) waarop score is gebaseerd.
Werkproces 3.7.1 Beoordeelt de geschiktheid van het paard (voor een bepaald doel) op basis van relevante eigenschappen op het gebied van exterieur, beweging, vermogen en karakter				
e resultaten van dit werkproces zijn: • De geschiktheid van de paarden op basis van exterieur, beweging, vermogen en karakter is beoordeeld				
1	Beoordeelt het exterieur van de paarden			
2	Beoordeelt de beweging en indien van toepassing afdruk, techniek en vermogen van de paarden			
3	Beoordeelt het karakter van de paarden			
4	Doet op basis van de beoordeling een uitspraak over de geschiktheid van de paarden voor het vastgestelde doel			
Werkproces 3.7.2 Beoordeelt de geschiktheid van het paard (voor een bepaald doel) op basis van leeftijd, africhtingsgraad en geredenheid				
De resultaten van dit werkproces zijn: • De geschiktheid van de paarden op basis van leeftijd, africhtingsgraad en geredenheid is beoordeeld				
5	Beoordeelt de africhtingsgraad van het paard			
6	Beoordeelt de werkwilligheid van het paard en de ontvankelijkheid voor de hulpen			
7	Doet op basis van de beoordeling en de leeftijd een uitspraak over de geschiktheid van de paarden voor het vastgestelde doel			

<table>
<tr><td colspan="5">Werkproces 3.7.3 Beoordeelt de geschiktheid van het paard (voor een bepaald doel) op basis van relevante gezondheidskenmerken</td></tr>
<tr><td colspan="5">De resultaten van dit werkproces zijn:
• De geschiktheid van de paarden op basis van relevante gezondheidskenmerken is beoordeeld</td></tr>
<tr><td>8</td><td>Beoordeelt de beenstanden van de paarden</td><td></td><td></td><td></td></tr>
<tr><td>9</td><td>Beoordeelt de kwaliteit van het beenwerk</td><td></td><td></td><td></td></tr>
<tr><td>10</td><td>Beoordeelt of en zo ja welke beengebreken het paard heeft</td><td></td><td></td><td></td></tr>
<tr><td>11</td><td>Beoordeelt de voedingsconditie van het paard</td><td></td><td></td><td></td></tr>
<tr><td>12</td><td>Doet op basis van de beoordeling een uitspraak over de geschiktheid van de paarden voor het vastgestelde doel</td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Resultaat van de praktijkbeoordeling
Naam kandidaat: «voornaam» «tv» «naam»</td><td colspan="2"></td><td rowspan="3">Toelichting:</td></tr>
<tr><td colspan="3">Handtekening PVB-beoordelaar:</td></tr>
<tr><td colspan="3">Akkoord toetsingscommissie:</td></tr>
</table>

Appendix III, Practice form for instructors from online learning environment 'Moodle.'

Hulpformulier

Beoordelen geschiktheid paard

Je vult dit formulier in tijdens het examen 'Beoordelen geschiktheid paard'.

	Paard nr. ☐	**Paard nr.** ☐
Kleur / aftekening		
Leeftijd / stokmaat		
Africhtingsgraad		
Exterieur		
Beenstanden		
Beengebreken		
Kwaliteit beenwerk		
Stap		
Draf		
Galop		
Werkwilligheid en ontvankelijkheid voor de hulpen		
Karakter		

Appendix IV, List of content of the video exam on judging the exterior of a showjumping horse (in Dutch)

Basissport
Totale duur filmpje: 5 á 10 minuten Geen muziek ter ondersteuning
Minimaal vereiste beeldmateriaal:
Exterieur:
Beide kanten gehele paard op stand
Voor- en achterbenen
Opvallendheden / aftekeningen
Aan de hand:
20 a 30 m in rechte lijn stappen Rechtsom draaien en terug stappen
20 a 30 m in rechte lijn draven Rechtsom draaien en terug draven
Volte aan de hand in draf Linksom en rechtsom
Onder het zadel: (ruiter rijdt het paard in de indoor arena)
Arbeids-stap, linksom en rechtsom
Arbeids-draf, linksom en rechtsom Lichtrijden en doorzitten
Arbeids-galop, linksom en rechtsom
Overgangen stap-draf / draf-stap
Overgangen draf-galop /galop-draf
Overgangen stap-galop /galop-stap
Tempowisselingen in draf
Tempowisselingen in galop
Stijlsprong 90 á 100 cm
Oxer 90 á 100 cm
Optioneel Kruissprong ter voorbereiding
Hals strekken in draf (lichtrijden) Linksom en rechtsom

Appendix V, Informed consent letter (in Dutch)

Geachte deelnemer,

Wij vragen uw medewerking in dit wetenschappelijk onderzoek naar de kwaliteit van videomateriaal voor de beoordeling van paarden door KNHS-instructeurs.
Het onderzoek duurt ongeveer 30 minuten. Uw gegevens worden zorgvuldig en anoniem verwerkt.

In het onderzoek kijken we alleen naar video's voor het examen PVB 3.7 van de wedstrijdsport springen opleiding. En daarvan kijken we alleen naar de video delen waarin het paard aan de hand gepresenteerd wordt, zodat we het exterieur van het paard kunnen beoordelen.
Naast dat we zelf het exterieur van het paard gaan beoordelen, willen we graag dat u ons informatie geeft over de kwaliteit van de video's. De centrale vraag daarbij is: Kunt u, door deze beelden te bekijken, een goed oordeel geven over het exterieur van dit paard? En waarom wel? Of waarom niet?
U kunt te allen tijde uw medewerking aan dit onderzoek stoppen. Alle informatie die u geeft zal vertrouwelijk worden behandeld (geanonimiseerd) en zal na het onderzoek in beheer blijven bij de onderzoekster. De onderzoekster zal audio opnamen maken van het beoordelen van de video's, zodat zij uw feedback na het onderzoek kan verwerken in haar verslaglegging.
Door deze instemmingsverklaring te ondertekenen geeft u de onderzoekster toestemming voor het opnemen van het audio-materiaal. Ook het audio-materiaal zal geanonimiseerd worden voor gebruik in het onderzoek.
Als u het interessant vindt om op de hoogte te blijven van de uitkomsten van het onderzoek, kunt u hieronder uw e-mailadres invullen. Ook zou het prettig zijn dat, indien er na het onderzoek nog vragen zijn van uw kant of van de kant van de onderzoekster, u hiervoor bereikbaar bent. Alvast heel hartelijk bedankt voor uw medewerking aan dit onderzoek

Met vriendelijke groet,

Mascha Assen,

Masterstudent Educational Science and Technology, Universiteit Twente, Enschede

Naam:.....

E-mail: .....

Plaats:.....

Handtekening:.....

Appendix VI, Questionnaire used in the interviews

<u>Onderzoek video examen PVB 3.7, Geschiktheidsbeoordeling paard</u>
Wedstrijdsport allround, 5 video's S1 t/m S5, exterieurbeoordeling

We gaan 5 stukjes van 5 verschillende examenvideo's bekijken. Per filmonderdeel (ongeveer 3 minuten) scoren we de 19 exterieurkenmerken van het paard op het lineair scoreformulier van het KWPN. Vervolgens wil ik u verzoeken om de onderstaande vragen te beantwoorden:

1. Wat vindt u van de kwaliteit van de video's voor het beoordelen van het paard op exterieur? (U kunt de video's scoren op kwaliteit in de onderstaande tabel)

Video, nummer:	Zeer onvoldoende	Onvoldoende	Acceptabel	Goed	Zeer goed
S1:					
S2:					
S3:					
S4:					
S5:					

2. Geef aan in hoeverre u het eens bent met deze stelling: "De video is geschikt voor de beoordeling van het exterieur van het paard."

Video, nummer:	Zeer mee oneens	Mee oneens	Niet eens of oneens	Mee eens	Zeer mee eens
S1:					
S2:					
S3:					
S4:					
S5:					

3. *Welke tips kunt u geven, die de video's zouden kunnen verbeteren?*

.....

.....

.....

4. *Heeft u verder nog opmerkingen?*

.....

.....

Bedankt voor uw medewerking aan dit onderzoek!

Appendix VII, Quotes by respondents: (translated from Dutch)

This appendix was removed for reasons of privacy and possible advantage for instructors who still have to take the exam. The content of this appendix will remain available in the database of the researcher and can be presented upon request.

Appendix VIII Stimulus material to illustrate the exterior of a horse

The stimulus material designed to illustrate the exterior of the horse

The videos designed for the suitability advice exam are difficult to compare to any other kind of educational video and for the same reason, typical guidelines for designing multimedia educational videos like the ones by Mayer (2005) or Koumi (2013) do not apply, as the videos do not have any spoken or written instructions in them. Mayer (2005) however, can provide guidance in the design of the framework for evaluating the videos by using the signalling principle. An example of signalling is provided in figure 3, where the coloured lines highlight important information, namely the length, position and muscling of the horses' neck (characteristic 4, 5 and 6 on the linear score form) Figure 2, 4 and Appendix 1.

Figure 4, An e*xample of the signalling principle by Mayer (2005) on a picture of a horse*

In figure 4, the signalling principle of Mayer (2005) was applied to indicate the places on the horses' body where KNHS instructors need to look, in order to make statements on the characteristics of the horses' exterior. The red line indicates where a KNHS instructor should look to determine the position of characteristic number 4 and 6, the length and muscling of the horses' neck. The orange (dotted and normal) lines indicate the direction of the horses' neck (characteristic number 5) and the green line indicates the position of the head-neck connection (characteristic number 3). In the following paragraphs, examples of application of the signalling principle on pictures of horses will be provided for each of the three main body parts of the horse; the forehand, middle or back and hindquarters or haunches.

1. The forehand of the horse

In the forehand, exterior characteristics with the numbers 3, 4, 5, 6, 7, 8, 13, 15, 16, 17, 18 and nineteen are represented. Going back to the previous example on neck length, van der Veen and van Andel (1996) state that the length of the horses' neck is important for show jumping horses, as it is their balancing instrument. Also riders like to have something ‘in front of them’ as they approach a big fence. Therefore, a long neck is desirable in a modern show jumping horse and instructors should be able to recognize a long, average or short neck on a horse. As stated before, the length of the neck is scored on a nine-point scale from long (a, b, c) through average (d, e, f) to short (g, h, i). The neck is measured from the

beginning of the withers to the brow bone of the horses' head. The line that the instructors should measure is represented in red in figure 4 and 5. Neck length is considered to be rather easy to judge or determine as the measuring points are fixed points on the horses' body (from the beginning of the withers to the brow bone of the horses' head). An indication of how the neck is measured is provided in figure 4, 5 and 6.

Figure 5, *An example of a horse with average neck length*

The horse represented in figure 5 scored a 'D' on the linear score form of KWPN, which represents average, 1 point towards long. Scoring A, B or C would mean the horse has a long neck.

Figure 6, *Example of a horse with a long neck*

The back or middle of the horse

The back is the segment with the characteristic numbers 1, 2, 7, 9 and 10 connected to it. The example used for the back of the horse is number 7a and 7b, the height and length of the withers of the horse. The withers represent the transition of the horses' neck and shoulder to its back and at this point the spinal crests are at their highest point, closest to the skin of the horse. The withers can influence the position of the saddle on the horse (van der Veen and van Andel (1996). High withers can push the saddle towards the back and low

wither push the saddle towards the front of the horse. Also the length of the withers can influence the position of the saddle.

Figure 7 provides an indication on how to locate and measure the withers. Important detail is that the height of the horse is measured from the ground to the highest point of the withers, but this is not part of the linear score form for exterior of a horse. To be able to estimate the height of a horse is however an important skill every instructor should possess. The height and length of the withers is relatively easy to determine for instructors, as the trained eye is capable of following the lines on the horses' body, as represented in the following figures.

Figure 7, *a horse with average to high whither height, and average wither length.*

The area within the red circle represents the withers. The orange line from the ground to the beginning of the withers represents where the wither height should be measured. This horse has a wither height of 1.72 meters. The orange line on the left represents the line of the shoulder of the horse. The end of this line is the beginning of the withers. The orange line on the right represents the lowest part of the horses back. On the left side of this line the withers end. This horse was scored by the KWPN inspector with a C for height of the withers, representing slightly high withers. ('A' represents the clear presence of high withers, 'I' represents the opposite, the clear presence of low withers). The length of the withers of this horse is average.

Figure 8, *an example of a horse with average high, but short lengthened withers*

The area within the red circle again represents the withers. The orange line from the ground to the beginning of the withers represents where the withers height should be measured. This horse has a wither height of 1.66 meters. The position of the withers of this horse could also be scored with a C (rather high) The orange line on the left represents the line of the shoulder of the horse. With this grey coloured horse this line is more difficult to determine. The end of this line is the beginning of the withers. The orange line on the right represents the lowest part of the horses back. On the left side of this line the withers end. This horse has rather short withers.

Figure 9, *an example of a horse with average wither height and rather long wither length*

The area within the red circle again represents the withers. The orange line from the ground to the beginning of the withers represents where the withers height should be measured. This horse has a wither height of 1.65 meters. The position of the withers of this horse could be scored as average. The line of the horses withers within the circle is not as steep as the line of the horses in figure 1.6.2 and 1.6.1. To conclude, the steepness of this line represents the height of the withers. The orange line on the left again represents the line of the

shoulder of the horse. The end of this line is the beginning of the withers. The orange line on the right represents the lowest part of the horses back. On the left side of this line the withers end. This horse has rather long withers.

3. The hindquarters or haunches of the horse

The numbers 11, 12, 14, 15, 16, 17, 18 and 19 include information on the hindquarters or haunches of the horse. Number 14, stance of the hind legs, will be used as an example in this paragraph. On the linear score form the stance of the hind legs can be scored from sickle hocked to straight. Sickle hocked means the hind leg has more "angle" to it, viewed from the knee, through the hock joint, towards the feet of the horse. Many horses in show jumping appear to have more straight hind legs, whereas dressage horses have more sickle hocked hind legs. In the figures below, the angel the hind leg makes will be indicated by a red line, according to the signalling principle of Mayer (2005). The little circle placed on the hock joint indicates the pivot point on the hind leg of the horse, which determines the angle the leg makes.

Figure 10, *this horse is an example of a horse with average hind legs*

The horse in figure 10 shows an example of a horse with the hock situated rather low. The upper hind leg, from the knee towards the hock, appears to be longer than the lower hind leg (from the hock towards the feet of the horse). The angle the hind leg makes is not very sharp, but this horse also does not have very straight hind legs. This horse should be scored in the middle section (letters d, e or f) on the linear score form.

Figure 11, *an example of a horse with a very straight hind leg*

In Figure 11, a horse with a very straight hind leg is represented. The angle from the knee, through the hock joint (little red circle) to the feet of the horse is obtuse and the hind legs of this horse are clearly straighter than the hind legs of the horse in figure 10. This horse should be scored a letter G or H on the linear score form, which indicates a straight hind leg is clearly present.

Figure 12, *an example of a horse with a more sickle hocked hind leg*

This horse shows a more sickle hocked than straight hind leg. On the linear score form this horse should be scored a B or C for the stance of the hind legs. This can be determined by the angle the leg makes, from the knee towards the feet of the horse. The horse in figure 12 shows a clearly sharper angle of the hind leg than the horses in figure 10 and 11.

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