Analysis of the Usage Context of an mHealth Application for Equestrians

Laura HAASE[a,1]

[a] *Department of Cooperative Studies – Computer Science, Berlin School of Economics and Law, Berlin, Germany*

Abstract. Introduction: One possibility to support veterinarians in times of a vet shortage is by providing animal owners with a technical decision support for deciding whether their animal needs to be seen by a vet. As the first step in the user-centered development of such an mHealth application for equestrians, an analysis of the context of use was done. **Methods:** The analysis was carried out by reviewing existing literature and conducting an online survey with 100 participants. **Results:** Characteristics of the user group and the usage context are presented using an adaptation of the four layers of diversity. Many equestrians are lacking health-related knowledge and competencies as well as social networks supporting them in decision making and gaining further information. This may apply to owners of other animal species in broad ranges as well. **Conclusion:** The results of the analysis provide information to software developers and researchers on mHealth applications for pet owners in general and equestrians in particular to focus their work on the users' needs and therefore provide efficient results/ software.

Keywords. User research, usage context, mHealth, animal owners, horse owners

1. Introduction

By the end of 2019, 1,600 veterinarians provided care for more than 1.2 million privately owned horses in Germany [1, 2]. This makes an average of 750 horses one veterinarian needs to provide regular care for. Additionally, emergency services on weekends, public holidays and at night must be ensured, all resulting in a severely limited time a veterinarian can dedicate to one animal and in the increasing importance of triage in equine medicine. This applies to other animal species as well, as studies have shown a growing psychological pressure on veterinarians due to high workloads [3]. Therefore, finding ways to relieve veterinarians in their daily work is crucial.

While this problem persists, the general public shows a great interest in digital health services [4]. In veterinary medicine, mobile health (mHealth) applications, especially those determined to triage and presumptive diagnoses, may have the potential to provide animal owners with information on the current health status of their animal and support them in determining the need of a veterinary examination or treatment even before a veterinarian has dedicated time to the case. This could reduce the burden (in this case e.g. responding to calls or text messages) on the vets, especially during poorly staffed service

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[1] Laura Haase, Department of Cooperative Studies – Computer Science, Berlin School of Economics and Law, Alt-Friedrichsfelde 60, 10315 Berlin, Germany; E-mail: laura.haase@hwr-berlin.de.

times. At the same time, the support of triage through telehealth services is perceived as particularly positive by many veterinarians and animal owners [5, 6].

When developing a helpful and effective mHealth application for supporting owners in the triage of their animal, a user-centered and participatory design approach may be key. The analysis of the usage context is one of the first steps to this [7]. However, the literature regarding the usage context of veterinary mHealth applications is scarce; no comprehensive context analysis had been found by the author of this paper. To ease future research in this field, this paper should provide the reader with information about users and the usage context to take into account while developing mHealth-related software or studies. As the context of an mHealth application for the triage of animals by their owners might show variations depending on the animal species and geographical location, an analysis specific to horses and equestrians in Germany was carried out. The execution of the analysis based on a review of the literature and an additional user survey is described in this paper. The results are then presented and discussed, thereby focusing on the transferability of the results to mHealth applications for other animal species.

2. Methods

2.1. Aspects of the Analysis

An overview of all relevant aspects of the analysis was created by merging and grouping all characteristics described in [7-10]. Those sources were selected by their relevance as a norm, their citation impact and the competence of their publishers in the respective field. All irrelevant organizational aspects (respective to e.g. a company) were removed. Figure 1 shows all aspects that were part of the analysis.

2.2. Literature Review

The literature analysis was done in two parts. Firstly, a literature search regarding the relationship between horse and human was conducted, with this topic containing many aspects of the analysis. The search was conducted using the search string "*human horse relationship" OR "human-horse-relationship" OR "human-horse relationship"*. As the search aimed towards scientific results from social studies, all databases of EBSCOhost and the Scopus database were used. The search was conducted last in January 2023. The results were screened by the author for their relevance with a title/ abstract, followed by a full-text screening. Relevance was defined as containing information about at least one of the analysis aspects shown in Figure 1 with respect to Germany or any other Western country. Publications not being written in German/ English language, not being available to the author in full text or not being published in a journal or in proceedings were excluded. The relevance of further sources cited by those publications was also considered, this way extending the possible targets. Additionally, similar publications to the ones already included were searched using Research Rabbit (researchrabbitapp.com). With all of them, a screening like the one described above was done.

The second part of the review consisted of a hand search for publications regarding more specific aspects of the analysis (e.g. demographics of equestrians in Germany, horse care, veterinarian-owner communication) was performed in order to fill gaps in the results of the first part of the literature review. All included publications were analyzed with respect to the aspects from Figure 1 and information relevant to those was extracted.
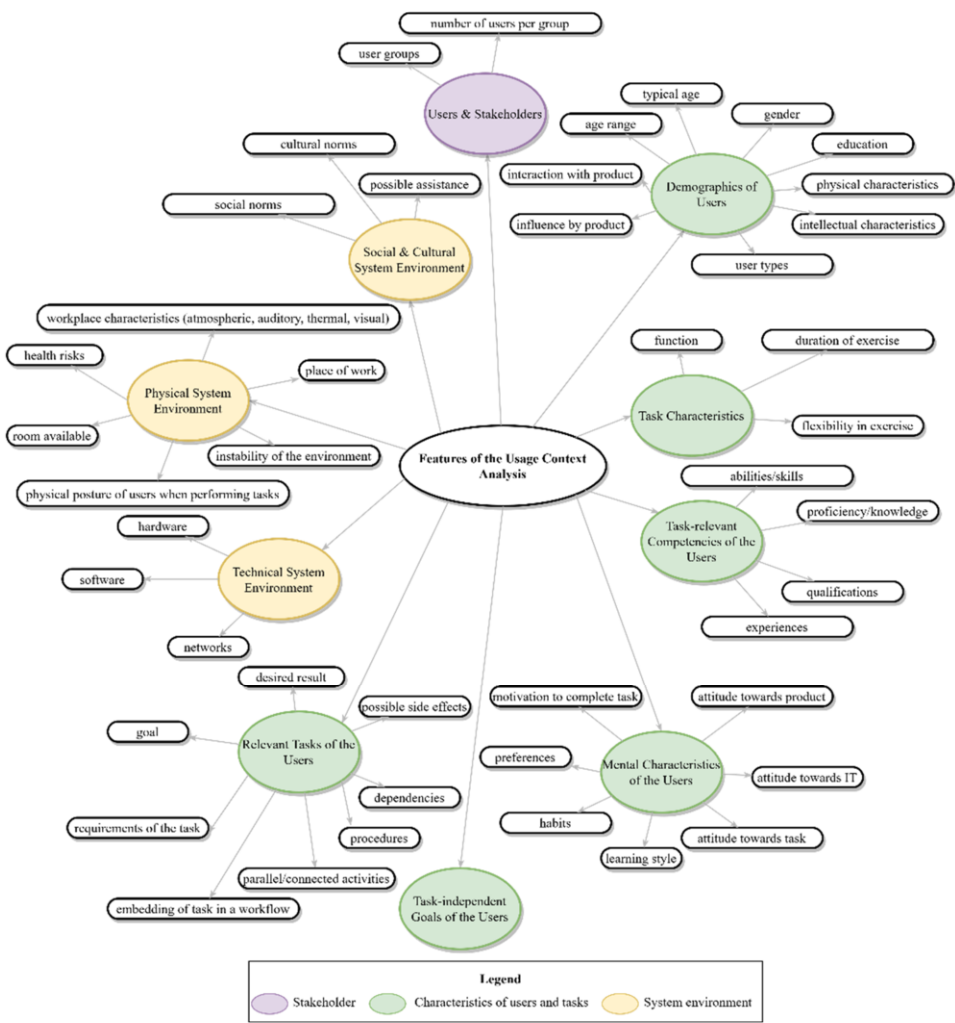
Figure 1. Aspects considered in the usage context analysis.

2.3. User Survey

To complement the literature review, an online survey to gather user needs for an mHealth application supporting the triage of horses by their caregivers was conducted. The main target group of this application consists of all people interacting with horses but not working with them professionally (as this normally requires a broad knowledge base [11], making them rarely needing support for triage). Veterinarians need to be highlighted as stakeholders of the application because they are essential to the horse's health management [12], but they are not users of the application. The user group and therefore targeted survey participants comprised all people describing themselves as equestrians (horse owners, regular riders, caregivers for a number of specific horses, occasional riders without a connection to a specific horse [2, 12-16]).

Survey participants were asked for demographics (age group, gender, experience with horses in years, number of horses they currently own), the frequency of their

consultations with a veterinarian and experienced uncertainties regarding its necessity. If uncertainties were experienced, participants were asked for external influences to their final decision. Furthermore, participants should provide their attitude towards an application as described in the introduction and, when reporting a negative attitude, they were asked for their reasons/ doubts. Not all questions were mandatory. The survey was designed with LamaPoll (app.lamapoll.de) and distributed on the social networks Facebook and Instagram and the messaging application WhatsApp between May 11th and July 1st 2021. Moreover, participants were asked to share the survey link. A summary of the questionnaire (in German language) can be downloaded from https://cloud.hwr-berlin.de/s/TWEgRzCFQb4mQf2 (password: GMDSin2023).

2.4. Presentation of Results

The four layers of diversity by Gardenswartz and Rowe [17] were used to display the results of the usage context analysis efficiently. They help in characterizing people and groups in diversity management, highlighting the intersectionality of aspects. The author of this paper sorted and grouped the information gathered from the analysis according to those layers, and adapted the form of representation where necessary.

3. Results

3.1. Literature Review

The search for the human-horse relationship produced a total of 253 results. The screening described above (see section 2.2) reduced that amount to only 9 publications being included in the review. 12 additional publications were included by the reference search and the described search for similar articles. Searching for specific aspects of the context analysis resulted in another 8 publications being considered. In total, that adds up to 29 publications being part of the analysis [2, 12-16, 18-40].

3.2. User Survey

100 participants completed the online questionnaire. 94% (n=94) of the participants reported themselves as female, 6% (n=6) as male. 11% (n=11) were less than 18, 16% (n=16) between 18 and 25, 54% (n=54) between 25 and 45, and 19% (n=19) over 45 years old. 83% (n=83) of the respondents reported experience with horses for more than 10 years and 86% (n=86) owned at least one horse. To answer the questions, the participants needed an average of 3 minutes 54 seconds (average deviation: 2 min 59 s).

3.3. Summary

The results are shown in Figure 2. In the figure, a visual focus on the task-specific decision-making aspects is made, as those are highly important to the design of the mHealth application. The knowledge sources for each group of information are displayed as well. Groups to which the conducted online survey added information are marked with a •. In the following, the most important aspects of the results for the development of an mHealth application for equestrians are summarized and clustered for better use. *The*

current background of equestrians regarding the described mHealth application: About 63% of equestrians belong to the group of digital natives [2, 18]. 69% (n=69 of 100) of equestrians already experienced insecurities over their horses' need of a veterinary examination or treatment [•]. 75% (n=72 of 96) of the equestrians expressed their interest to use an mHealth application supporting this decision [•]. *The current process of care for the horse:* The equestrians' main goal is ensuring the best possible care for, wellbeing of and relationship with their horse [13, 23-26, 32]. They seek support in health-related decisions for their horse from (in descending order) other horse owners, trainers, stable owners and internet/ friends/ family/ other [•]. There are three different types of typical decision-making procedures equestrians may follow: wait – observe – reassess/ provide medical care by themselves – reassess if necessary/ order a vet (mostly by phone) [19, 27, 28, 39, 40]. *Aspects that need to be handled by the application:* The equestrians may each follow individual life and health philosophies, whilst maintaining individual mental disease models (lay interpretations of diseases) [19, 33]. They are often equipped with little knowledge regarding their horse's health, are biased by their own concepts and experiences and asses their knowledge and skills incorrectly [21, 26, 30]. The main concern of people regarding health-related applications is the inability of a technical system to grasp the uniqueness of their case [37], which the equestrians stated as a doubt as well when asked for any reservations regarding such an application [•]. *Aspects to take into account while implementing:* Equestrians show a better detection of behavioral changes of a known horse than veterinarians do [30, 31]. They prefer their information and communication in a private, non-judgmental, lay-friendly and neutral or positive way, that is adjusted to their individual level of knowledge [15, 16, 20, 21, 24, 26, 27, 30, 33-36, 40]. When equestrians experience a possible health-related issue in their horse, they find themselves in an emotional, nervous and stressful situation [12].
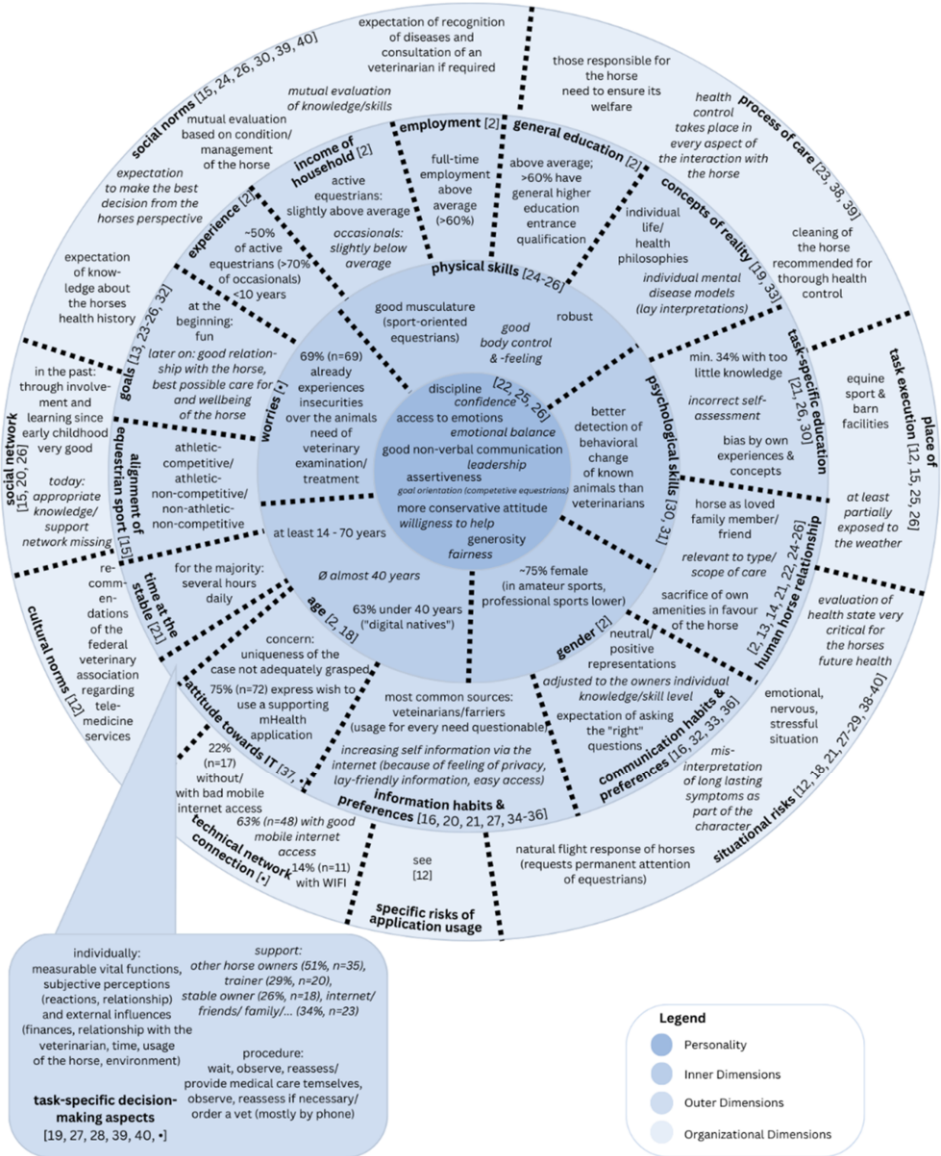
4. Discussion

4.1. Discussion of the Literature Review Results

The limited number of studies that were found and therefore included in the analysis (this also being mentioned by the authors of those) leaves opportunities for future research. It may follow that some characteristics of the equestrians have not been described in the literature yet and are therefore not included in any usage context analysis. The results are coherent, though, with only one exception: in Figure 2, the personality traits described in publications from 2009 to 2018 were included, while an earlier publication from 1999 partially differed from those. In that one, equestrians are described as e.g. having "low levels of cooperativeness, novelty-seeking and nurturance" [13]. Additionally, it is stated that "male [horse] owners were found to be aggressive, dominant, [and] low in expressiveness" [13]. Since this is not stated in any of the more recent publications, it was given less weight in the analysis. It should be noted, however, that all studies regarding this subject are of qualitative nature.

Even though the analysis focused on equestrians in Germany, literature on equestrians from other Western countries were included as a cultural proximity is given with only small difference to be assumed [26]. With regard to the social and cultural norms described, it should be noted that those are difficult to grasp due to their mostly implicit character and are therefore often incompletely depicted. The same applies to recording processes for horse care and determining the need for veterinary care for the

horse. Here, too, processes and decision-making criteria usually stem from implicit knowledge and experience, are therefore difficult to name and highly individual [41]. Additional research should be carried out in order to understand the procedures of equestrians in caring for the horse better and gathering information on its health.

Figure 2. Results of the usage context analysis (in an adapted version of the four layers of diversity).

4.2. Discussion of the Survey Results

Because the questionnaire was administered online, participants may be biased regarding their technical affection, leading to a bias in the survey results, However, in terms of

gender and age, the survey participants roughly correspond to the average group of equestrians [2], although female equestrians are overrepresented (94% in the survey vs. 75% in the general population). Since only 6% of the participants are male, this may have led to incomplete or non-representative results regarding male equestrians. The participants represent a group of equestrians that presumably has less need for support due to more experience (longer involvement with horses and a higher percentage of horse owners in the survey than in the group of equestrians in general). This might have led to the frequency of communication between equestrians and veterinarians being below the actual average. At the same time, the average horse experience of all equestrians is not necessarily the same as the average experience of the (in the study over-represented) horse owners. No specific statistics could be found for the group of horse owners in particular. However, since the horse owners bear the main responsibility for the health care of the animal, it can be assumed that those contact veterinarians much more frequently than other equestrians do. Further investigation on this topic might thus be needed. Since the equestrians with less horse experience are underrepresented in the survey and they probably have less knowledge about horse health than those with a longer affiliation, the stated proportion of 69% (n=69 of 100) of the participants having already been unsure about the need to consult a veterinarian may be less than the actual number. Additionally, a bias in the results on the external decision support in the event of uncertainty about the need for a veterinary consultation cannot be ruled out. Research shows that the internet is often used by equestrians, but is not given as a source of knowledge when asked [27]. This might also be the case regarding the specified sources for decision support, where human sources are more explicitly named.

4.3. Transferability of the Results

While some of the aspects presented in the analysis, such as the personal characteristics, the process of care or the system environment, are assumed to be at least partially unique to the equestrian sport, other aspects of the description of the context of use appear transferable to owners of other kinds of animals. Various publications report similarly low levels of animal health skills among the owners of other species, similar sources of information, and a similar relationship to the animal (see e.g. [33, 36]). In one publication, additional parallels are drawn with the health assessment of children by their parents [30]; however, more research needs to be done to fully assess this transferability.

5. Conclusion

The aim of the analysis of the usage context for an mHealth application for equestrians was to provide information on its potential users and possible situations the application may be used in. From the results, the following conclusions may be drawn for implementation, among others: (I) Many potential users know established concepts for mobile application design and do not need to be convinced to use the application, but instead are intrinsically motivated to use it. (II) Every input the system gets needs to be checked carefully for correctness, unbiasedness and completeness with the user, before it can be used for an evaluation of the horse's situation. (III) The application needs to show the user how the uniqueness of their situation is handled and provide them with an easy to understand, non-judgmental and neutral-positive (calming) environment.

With this, developers and researchers will be enabled to address the user- and situation-specific needs in their work. This would therefore contribute to a helpful and efficient application that may improve the general state of the health of horses while at the same time relieving veterinarians in their daily work.

Conflict of Interest

The author declares that there is no conflict of interest.

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