**Master thesis**

# Do user opinions matter? The contribution of user feedback in instructional video design


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## Abstract

**Purpose:** Many academics suggest that user involvement is important during the design process of instruction materials, but it is not clear yet what effect user involvement has. In the present study, the effect of user involvement, specifically one user feedback moment, in instruction video design on the usability and user experience is researched.  In the past feedback as a method of user involvement is studied only in the context of textual communication materials.

**Method:** In this experimental study, an in-between subject design with two groups was used to measure the effect of user involvement in video instruction design. Both groups were exposed to an instructional video for a software system, followed by a survey asking feedback and measuring user experience (UX) and usability. The first group watched a video designed based on the theory of multimedia learning and the demonstration based training approach. The second group watched a video adjusted based on the feedback of the first group. To create the second video feedback from the survey data and interviews of participants in the first group were coded and then used to adjust the first video.

**Results:** The present study showed that user feedback in the design process did not have a significant effect on quantitative usability and user experience measures of both the video and the software system. User feedback did tend to improve the user experience of the video. Qualitative measures did not show an overall decrease in user problems but did show a decrease in user problems related to the pace of the video. Looking to the unique user problems, it was found that revisions resulted in more diverse, less fundamental and more specific user problems than the original video.

**Conclusion:** Results indicate that using user feedback in video instruction design improves the results of the design process. However, these improvements cannot be measured using the quantitative scales used in this study. Even though the study did not result in significant effects of user feedback, it cannot be stated that user involvement has no added value in an instruction video design process, as the qualitative measures indicated a change in user problems found by participants. This was a change towards less critical problems and more diverse problems. Future research is suggested to expand research in the field of user feedback in video instruction design.

**Keywords:** Demonstration-based training, multimedia learning, software instruction, usability, user experience, user feedback, user involvement, video instruction

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# 1 Introduction

In an evolving society that is more and more digitalized, people have to work with complex software systems more often. Not only in personal life software is essential, within companies professional software systems become increasingly important as well (Esteves & Pastor, 2001). Although it is important to work with software systems, many users lack skills or knowledge on how to operate these software systems. When implementing a new software system good user support, user instruction, for example, can contribute to implementation success. Therefore, the design of good user support is ever more important. Different factors of these instructions are related to the success of implementation (Niazi et al., 2005; Sharma & Yetton, 2007). Not only is the quality of user support important for the success of the implementation, but it is also important for the image of the company providing it (De Jong et al., 2017). Thus, it is important to provide a good quality of user support to support the image of the company providing the product.

In the field of technical communication, digital instruction starts to play a bigger role. For example, video instruction has received increasing attention in the scientific literature over the past years (Giannakos, 2013). Video instruction can contribute to the knowledge and motivation of users (Van der Meij & Van der Meij, 2016). The theory of multimedia learning by Mayer (2019c) sets guidelines for the design of multimedia instructions. These are instructions consisting of both verbal and pictorial information, such as instructional videos (Mayer, 2019c). Another relevant approach in video instruction design is demonstration based training. A demonstration based training is an instruction consisting of both examples of task performances and instructional features (Rosen et al., 2010).

Besides theories specifically about the content of video instruction, there are also theories about design processes. Over time, the preference of product designers has shifted to a human-centred approach where users are involved in the design process (Putnam et al., 2016). The human-centred design approach describes different phases of a design process: *Planning the human-centred design process, understanding and specifying the context of use, specifying the user and organizational requirements producing design solutions and evaluating designs against requirements* (Figure 1) (Maguire, 2001b). Many companies follow this trend because they think that human-centred design leads to better usability and user experience of products (LaRoche & Traynor, 2010; Maguire, 2001b).

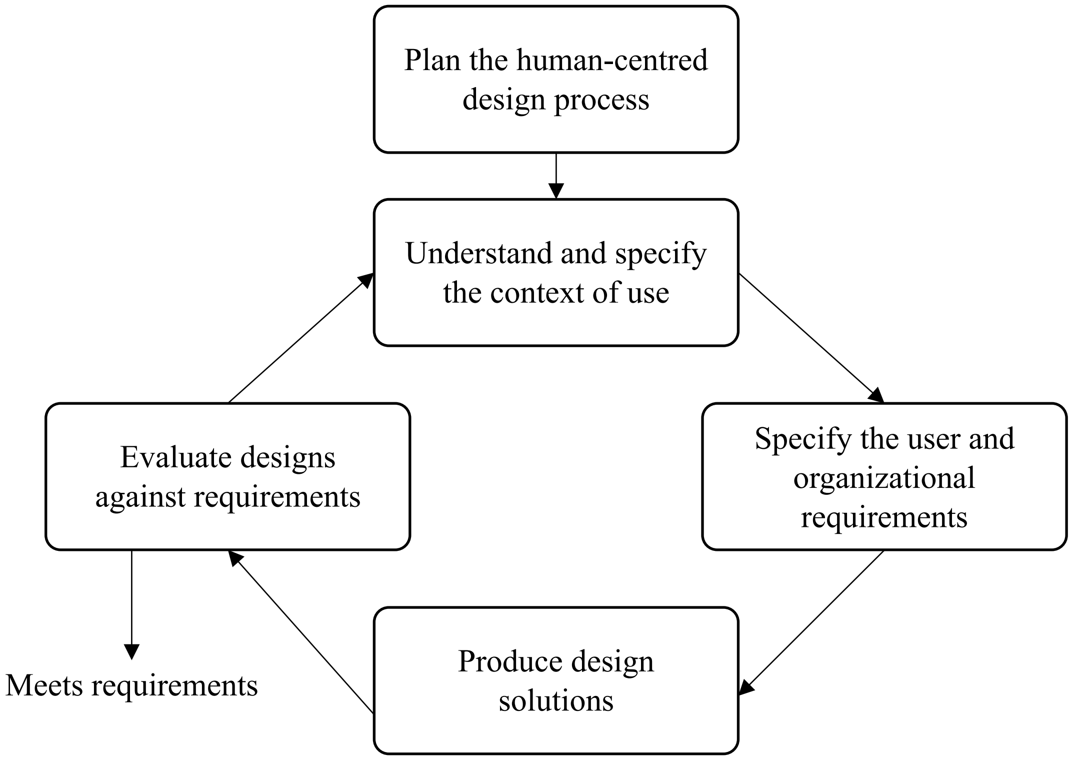


**Figure 1:**

The human-centred design process

*Note.* Reprinted from Maguire (2001b).

User involvement research is more common in other fields than instruction design. For example, a lot of user-centred design research has been done in the fields of system or technology design (Bevan & Curson, 1999; Bruseberg & McDonagh-Philp, 2001; Chan et al., 2011; Maguire, 2001b; Mirri et al., 2018). Nonetheless, research has been conducted in the field of user involvement in document design processes (De Jong & Lentz, 1996; De Jong & Schellens, 2001; De Jong et al., 2017; LaRoche & Traynor, 2010; Lentz & De Jong, 1997; Schellens & De Jong, 1997; Zaharias & Poulymenakou, 2006). The main focus in these studies is on the phase of evaluation of the human-centred design process as they study reader feedback on textual documents. This feedback can be useful to revise the documents successfully (De Jong & Lentz, 1996; De Jong & Rijnks, 2006; De Jong & Schellens, 2001; Lentz & De Jong, 1997; Schellens & De Jong, 1997). These studies contribute relevant information to the field of document design, however, they focus on textual documentation only and are not recent.

It may seem obvious that user involvement has an added value. However, not everyone agrees on this viewpoint. For example, some state that users do not always know what they want and need. This is an argument in favour of user support designed by developers based on theory and experience and not including users in the design process (Gould & Lewis, 1985; Norman, 2005).

There are many reasons why designers do not use a human-centred design approach (Gould & Lewis, 1985; Norman, 2005; Putnam et al., 2016; Selic, 2009). For example, designers state that users do not know what they want (Gould & Lewis, 1985), that requirements change over time (Norman, 2005), and focus on specific users is distracting (Putnam et al., 2016). However, there is no research supporting these claims.

As there are many ideas about user involvement in design and ideas about instruction design, these are barely integrated (Zaharias & Poulymenakou, 2006). Especially knowledge about user feedback during the design process of instruction videos is missing. Yet, it is not clear whether user feedback in the design process of instruction videos has an added value for the user experience or perceived usability. Therefore, this study aims to answer the following research question:

> *RQ: To what extent does user feedback in the design of video instruction improve user experience and usability?*

# 2 Theoretical framework

In the present study, user involvement in video instruction design and the possible effects of this user involvement are considered. Using literature, the key concepts and hypotheses of this study are illustrated. First, user support is described, then the design methods of user support are described and lastly different goals of user support are portrayed. User support, in this study, is defined as technical communication including documents and system support. During this study, the main focus is on video instruction as a part of user support.

There are many assumptions about the best way of designing instructional documentation. In the field of instructional videos, there are three core scientific viewpoints, the theory of multimedia learning by Mayer (2019a) and the demonstration based training approach (Rosen et al., 2010; Van der Meij & Van der Meij, 2016) which is related to the minimalism approach (Van der Meij & Van der Meij, 2016). The main focus in this study is on the first two theories, both are theories have a vision about the content an instructional video should have.

Another leading approach in the field of designing processes is human-centred design, a theory suggesting user involvement during design processes. This theory describes design processes in different phases where users can be involved (Maguire, 2001b). The different phases of the human-centred design process are discussed, especially the phase of evaluation as this phase is central in this study.

## 2.1 Theory of multimedia learning

There are many assumptions about the design of instructional videos. One of the leading theories is the theory of multimedia learning by Mayer (2019b). According to this theory, instructions should consist of both verbal and pictorial information (Mayer, 2019c). This theory is based on three different assumptions: dual-channel processing, limited capacity, active processing.

### 2.1.1 Dual-channel processing

One of the assumptions Mayer (2019b) used in their theory of multimedia learning, is dual channel processing. Both Paivio (2014) and Baddeley (1992) proposed a model for dual-channel processing. Both indicated that people have a different channel for processing visual and verbal information (Baddeley, 1992; Paivio, 2014). However, they differ in the idea of which channel is used. According to Paivio (2014), the type of processing depends on the way information is presented. He argues that the type of processing depends on the representation mode. Verbal representations, such as spoken or written words are processed in the verbal processing channel, and non-verbal representations such as pictures videos or instrumental music in the non-verbal processing channel (Mayer, 2019b; Paivio, 2014). Baddeley (1992), however, states that the channel of choice depends on how information enters the working memory. According to this sensory-modality approach, stimuli enter the cognitive system either through the ears, such as spoken words and instrumental music, or the eyes such as printed words, pictures and video's (Baddeley, 1992; Mayer, 2019b). Therefore, the dual-channel theory of Baddeley (1992) is slightly different from the dual-channel theory of Paivio (2014).

### 2.1.2 Limited capacity

The assumption of limited capacity is also used to support the theory of multimedia learning (Mayer, 2019c). The assumption of limited capacity follows from the cognitive load theory and concerns the amount of information that can be processed at the same time. Therefore, the amount of cognitive load a learning task can contain to be processed properly is limited as the cognitive resources to process the cognitive load are limited as well. This explains why expert users can process more complex learning tasks than novice users can. Because experts already have knowledge about the subjects, new information is easier to process (Sweller, 1988).

A way to cope with the limited capacity of cognitive resources in learning activities is to manage cognitive load (Chandler & Sweller, 1991; Sweller, 1988). For example, cognitive load can be managed by reducing the split attention effect where information is presented in different sources. Having split attention increases the cognitive load because these sources have to be mentally integrated. By physically integrating the sources in the learning material cognitive load is reduced and the material is more likely to be learned (Ayres & Sweller, 2019; Chandler & Sweller, 1991).

### 2.1.3 Active processing

The assumption that people actively process information to create a mental representation of this information. This assumption considers people as active processors (Mayer, 2019b). The structure of the learning material is key to the quality of the cognitive mental representation created by the learner (Cook & Mayer, 1988; Mayer, 2019b; Mayer et al., 1984). Training learners in recognizing structures in learning materials (Cook & Mayer, 1988; Mayer et al., 1984) or structuring the learning materials (Mayer, 2019b; Mayer et al., 1984) can help people in active processing and thus creating a mental representation of the information.

The main cognitive processes in active learning are selecting, organizing, and integrating, as displayed in Table 1.

**Table 1**

*Three cognitive processes required for active learning*

| *Process* | *Description* |
|---|---|
| **Selecting** | Attending to relevant material in the presented lesson for transfer to working memory |
| **Organizing** | Mentally organizing selected information into a coherent cognitive structure in working memory |
| **Integrating** | Connecting cognitive structures with relevant prior knowledge activated from long-term memory |

*Note.* Reprinted from Mayer (2019b)

## 2.2 Demonstration based training (DBT)

Video instruction often contains examples of tasks in the form of demonstrations. This type of instruction is commonly referred to as demonstration-based training (DBT) (Grossman et al., 2013; Rosen et al., 2010; Van der Meij & Van der Meij, 2016). DBT can be defined as training involving systematic design and using observational stimuli help the learner develop knowledge, skills, or abilities (Rosen et al., 2010). To enhance the effects of the observational stimuli, adding different instructional features is suggested (Grossman et al., 2013; Rosen et al., 2010). A DBT should consist of both observational stimuli (demonstrations) and instructional features in addition to the example of the task performance (Rosen et al., 2010).

DBT is based on the social cognitive theory (Bandura, 1977). According to this theory, people learn from observing, following four learning processes: Attention, retention, production, and motivation. During the attention process, a learner should actively focus and process on the learning material. The retention process is the process where the observed information should be stored symbolically. When a learner is in the production process, the learner actively performs according to the stored knowledge. In the last process of motivation, the learner should perceive consequences positive enough to increase the likelihood of reperforming the action.

Brar and van der Meij (2017) have categorized instructional features following the four processes of the social cognitive theory of Bandura (1977). This categorization uses more specific examples of instructional features, such as pace, music, and review (Brar & van der Meij, 2017; Grossman et al., 2013; Van der Meij, 2017; Van der Meij et al., 2018). The last-mentioned feature, review, is a much-discussed topic in literature as many discussed its effects (Brar & van der Meij, 2017; Van der Meij, 2017; Van der Meij & Van der Meij, 2016).

Summarizing the demonstration after finishing the example task performance has proved to be an effective measure to increase knowledge, motivation (Van der Meij & Van der Meij, 2016) and performance (Van der Meij, 2017).

## 2.3 User involvement

Many academics claim that designing with end-user involvement results in better systems (Bruseberg & McDonagh-Philp, 2001; Chan et al., 2011; LaRoche & Traynor, 2010; Maguire, 2001b). For example, including users in the design process can lead to improved usability which can lead to improved acceptance, the enhanced reputation of the designers' company, increased productivity, and reduced errors (Maguire, 2001b).

One of the methods to design user support while including users is human-centred design. Key principles of this design method are an early focus on users, empirical measurements, and iterative design (Gould & Lewis, 1985). The early focus on users should result in a better understanding of the target users by studying their characteristics. During the process, all measurements including users should be empirical, which means that they should be observed, recorded, and analyzed (Gould & Lewis, 1985). The iterative design method means that the prototype should be tested, measured improved and tested again as many times as necessary (Gould & Lewis, 1985; Maguire, 2001b).

The design process can include users during different phases (Bevan & Curson, 1999; Maguire, 2001b). To follow these phases, different methods are proposed. The designers should choose whether they want to follow all methods or choose one or more methods (Maguire, 2001a, 2001b; Maguire & Bevan, 2002). The different phases are:

- *Plan the human-centred design process*. In this phase, the objectives of the project are set and the following phases are planned. The design team decides when to include which users. Furthermore, they decide which methods will be used in the following phases (Maguire, 2001b).
- *Understand and specify the context of use*. This phase aims to gain insights into the goals users have and conditions that may affect their use of the product (Maguire, 2001a, 2001b).
- *Specify the user and organizational requirements.* In this phase, designers should identify their users and other stakeholders. They should gain insights into their requirements and prioritize them in the right order (Maguire, 2001b; Maguire & Bevan, 2002).

- *Produce design solutions.* Based on the requirements and context, designers should produce design solutions in this phase. This can start with simple simulations or prototypes and later evolve into actual usable products (Kanai & Verlinden, 2009; Maguire, 2001b).
- *Evaluate design against requirements.* In this phase, the designed products are evaluated using the previous set requirements. This can provide further information that can be used to redesign the product (Maguire, 2001b; Sweeney et al., 1993).

During the last phase, the phase of evaluation, different methods can be used. For example usability testing and feedback after using the product (Maguire, 2001b). These methods are studied a lot in the context of designing communication materials (De Jong & Lentz, 1996; De Jong & Rijnks, 2006; Lentz & De Jong, 1997). Research has addressed the relevance of including users in the evaluation phase of designing communication materials. For example, the question of whether user feedback can be predicted by experts was studied. Results showed that experts user problem predictions are not a good substitute for user feedback and suggest value can be added to the communication material by using user feedback (De Jong & Lentz, 1996; Lentz & De Jong, 1997).

Furthermore, various studied the effects of user feedback on the quality of documentation. They focussed on public brochures and found that readers' feedback can be useful to improve these brochures. Brochures revised using the readers' feedback showed positive effects on the appreciation and effectiveness of these brochures (De Jong & Rijnks, 2006; De Jong & Schellens, 2001). This is in line with findings of Maguire (2013) suggesting including users in a design process improves UX.

It has to be noted that De Jong and Rijnks (2006) suggest that revisions based on feedback not always leads to improvements. Revisions can also result in new reader problems or can even result in more problems. Although a revised document can cause new user problems, these problems are from different nature and not as fundamental as previously found problems. For example, new user problems can be caused by an unintentional result of revisions, user problem solutions which trigger new problems and the change of prominence of certain parts in the revised document.

## 2.4 Objections to using user involvement

Although the human-centred design may seem like the best method to design user support, many companies use other methods. They design their user support based on other theories or their previous experience in user support. Reasons for designers not to use a human-centred design method are that designers think diversity is under- or overestimated (Gould & Lewis, 1985; Norman, 2005), user requirements of users change over time (Norman, 2005), focus on specific users can be distracting (Putnam et al., 2016), or it is hard to get acceptance from the team or client (Putnam et al., 2016).

Moreover, the human-centred design method is criticized based on practical issues. Designers believe that including users in the process lengthens the project and including users is just expensive finetuning (Gould & Lewis, 1985). Also, the use and approach of user-centred design depend on the roles of team members. Some roles in design teams naturally lead to the use of user involvement while it can be harder for others to involve users in the process (Putnam et al., 2016).

Overall, the critical notes towards this method are mainly from a practical viewpoint, where the method is not used correctly or completely (Curtis et al., 1988). Other critical notes are more focussing on the beliefs of people working in the technical field (Gould & Lewis, 1985). However, these beliefs are not supported by science. The human-centred design method, in contrast, is broadly supported in the field of technical communication as a method to improve usability and UX (Bruseberg & McDonagh-Philp, 2001; LaRoche & Traynor, 2010; Maguire, 2001b).

## 2.5 Usability

Usability focuses on the instrumental needs of users. It aims to define the quality of the product based on the users' capability to use it. This can refer to different products, for example, the usability (Chorianopoulos & Giannakos, 2013) of instruction videos but also the usability of software systems (Hornbæk, 2006). Usability is defined by the ISO (1998) as “The extent to which a product (service or environment) can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use.” The first aspect mentioned, effectiveness, is the extent of completeness and accuracy of task performances. The second aspect, efficiency, focuses on the resources that are necessary for successful task performance. The last aspect, satisfaction, includes to avoid discomfort and have positive attitudes towards the product (Petrie & Bevan, 2009). The aspect of satisfaction overlaps the definition of user experience which also focusses on the attitudes and experiences of users and is therefore described more elaborate in the next section.

Good usability can increase the productivity of users because they can use a product more effectively and efficiently. Users can focus on the task instead of focusing on the tool they use when a product is usable (Maguire, 2001b). It can also improve the acceptance of the system (Maguire, 2001b), which can be beneficial during the implementation process of a new system. Involvement of users during a design process has the goal of creating more usable systems (Maguire, 2001b).

Considering the discussed perspectives about both usability and user involvement it is expected that user involvement in the design process of instruction videos leads to better usability. Therefore, the following hypotheses are proposed:

> *H1: Instruction videos designed with user feedback lead to better-perceived usability of the instruction video compared to instruction videos designed without user feedback.*

> *H2: Instruction videos designed with user feedback lead to better-perceived usability of the system compared to instruction videos designed without user feedback.*

## 2.6 User experience (UX)

User experience (UX) gained a lot of scientific interest over the past years. In contrast to usability, UX goes beyond instrumental needs in product usage (Bargas-Avila & Hornbæk, 2011; Hassenzahl & Tractinsky, 2006). Although it is interpreted in many different ways, the idea of UX as non-instrumental needs and experiences is central in research (Bargas-Avila & Hornbæk, 2011). The definition used in this study is set by ISO (2019): "User's perceptions and responses that result from the use and/or anticipated use of a system, product or service". Just like usability UX can refer to both, an instruction video and a software system.

There are three characteristics of UX differentiated by Hassenzahl and Tractinsky (2006). These characteristics are being beyond the instrumental, the experiential, and emotion and affect. The third characteristic, emotion and affect, focusses on the human perspective of emotional outcomes of product usage (Bargas-Avila & Hornbæk, 2011; Hassenzahl & Tractinsky, 2006). These emotions can be both positive, (e.g. happiness), and negative (e.g. anger, anxiety, and, sadness). The emotions that occur during learning can change the users' end goal of the learning process (Fischer et al., 1990). Negative emotions have been proven to cohere with low ability, experience, low self-efficacy (Brosnan, 1998; Havelka, 2003; Kay & Loverock, 2008), and a negative influence on computer performance (Brosnan, 1998). Moreover, Giannakos et al. (2014) found that happiness positively relates to the intention to use the software again. In contrast, anxiety leads to a lower intention to use the software again (Giannakos et al., 2014).

Recent research shifted the focus from negative emotions towards positive emotions as outcomes of product use (Hassenzahl & Tractinsky, 2006). However, other emotions related to learning computer skills are not studied yet.

Perceived aesthetics is another core dimension of user experience (Bargas-Avila & Hornbæk, 2011). It is a subjective measure of user experience (Moshagen & Thielsch, 2010; Thielsch et al., 2014). Aesthetics is not only related to user experience but is also related to perceived behaviour. When high aesthetics is perceived, high usability is perceived as well, therefore the relationship between usability and UX is evident. This "what is beautiful is usable- effect" is related to the so-called 'halo effect' in psychology. When people perceive high aesthetics they tend to judge other attributes more positively (Nisbett & Wilson, 1977).

Besides, satisfaction is a more general measurement of user experience and therefore, satisfaction is one of the goals of user support. Good user support can lead to satisfaction among end-users (Laurie et al., 1998; Muldme et al., 2018; Nilsen & Sein, 2004; Shaw et al., 2002). Different factors of user support influence end-user satisfaction, such as length of instructions (Laurie et al., 1998), awareness, need for support, user expectations, perceived importance (Nilsen & Sein, 2004), and the source of the instruction (Muldme et al., 2018). User involvement throughout a design process increases user satisfaction (Mirri et al., 2018).

Based on all discussed information, can be concluded that a human-centred design approach can result in a good UX because the products are designed to meet both user and organisational needs (Maguire, 2013). Therefore, considering all information it is expected that the involvement of users during the design process results in positive effects on the different dimensions of UX. The following hypotheses are proposed:

> *H3: Instruction videos designed with user feedback lead to a better user experience of the instruction video compared to instruction videos designed without user feedback.*
>
> *H4: Instruction videos designed with user feedback lead to a better user experience of the system compared to instruction videos designed without user feedback.*

# 3 Methods

In this chapter, the methodology of the study is described. In this study, Qualtrics is used to gather all data. An experimental study is designed to gain more insights into the effect of user involvement in the design of video instruction for human resource management systems (HRMS).

## 3.1 Study design

In the present study, usability and UX of both instructional videos and HRMS are studied while using videos designed with and without user feedback. The focus of the instruction video is on an HRMS made for tracking and registering working hours of employees.

First, a video without the usage of user feedback was designed. The theory of multimedia learning and the demonstration based training approach were used to create this video. This video was watched by the first group of participants. Usability and UX of both the video and the software system were measured. Also, the participants were asked feedback to evaluate the instruction video. The video is adjusted based on this feedback.

Users can be biased in their judgements and performances when they participated during the design process of a product (Mirri et al., 2018). This may affect their performance and satisfaction with the system. Therefore an in-between participants design is proposed in the present study. A second group watched the video adjusted based on feedback, usability and UX was also measured for this group.

Mixed methods, both qualitative and quantitative measures are used in the present study, to study the effects of user involvement in instruction design. Qualitative measures used are open-ended survey questions (Appendix A) and interviews. Quantitative measures are collected using surveys with five-point Likert-scales.

## 3.2 Participants

Fifty-five participants were recruited using a convenience sampling method among potential users, divided into two groups. As the software system focusses on a broad spectrum of companies the requirements for a potential user were of age above eighteen and no experience with the software product. The participants were divided into two groups: Group 1 and Group 2. The groups were assigned using the order participants volunteered, as the feedback of Group 1 was needed to create the stimulus material for Group 2. Table 2 provides demographical information about these participants.

The age difference between groups was not significant ($t(53) < -.99$, $p = .32$), this shows the age difference between groups did not affect results. There were substantially more male participants than female participants in the second group compared to the first group ($t(48.86) = 3.01$, $p = .003$). Independent samples t-tests are used to examine the possible effect of this difference in gender proportions (Table 3). Gender did not have a significant effect on any of the dependent variables. Therefore it can be concluded the difference in gender proportions between the groups is not an issue while gender did not correlate with the dependent variables.

**Table 2**

The demographical information sample group

| | | ***Group 1 (original video)*** | ***Group 2 (revised video)*** | ***Total*** |
|---|---|---|---|---|
| **Participants** | *N* | 27 | 28 | 55 |
| **Gender** | Male *N* (%) | 12 (44%) | 23 (82%) | 35 (64%) |
| | Female *N* (%) | 15 (56%) | 5 (18%) | 20 (36%) |
| **Age** | *M* (*SD*) | 35.22 (11.57) | 38.07 (9.57) | 36.67 (10.60) |

**Table 3**

*Independent samples t-test comparing the means of male and female participants*

| ***Dependent variable*** | ***Male participants*** | | ***Female participants*** | | ***t(53)*** | ***Significance*** |
|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | | |
| **Usability of the video** | 4.19 | .73 | 4.350 | .46 | -.91 | .37 |
| **Usability of the HRMS** | 3.58 | .68 | 3.55 | 1.03 | .12 | .91 |
| **UX of the video** | 3.34 | .77 | 3.22 | .87 | .54 | .59 |
| **UX of the HRMS** | 3.30 | .79 | 3.30 | .86 | .01 | .99 |

*Note.* All independent variables are measured using 5-point Likert scales.

## 3.3 Software system

Enterprise resource planning (ERP) systems are systems designed for companies to manage different types of data across an organization (Esteves & Pastor, 2001; Fui-Hoon Nah et al., 2001). These types of data include human resources, finance, and administration (Esteves & Pastor, 2001; Hoch & Dulebohn, 2013). Some companies only use one component of an ERP system, such as a human resource management system (HRMS) (Hoch & Dulebohn, 2013).

These systems aim to improve efficiency and reduce time and cost spend on information processing (Barker & Frolick, 2003; Fui-Hoon Nah et al., 2001).

The instructional videos in the current study were both aiming to support an HRMS, called PEP Staff, produced by a technology company in the Netherlands (Nedap N.V.). There is a demonstration environment used in this study (Figure 2), as the production environment should not be affected. This system can among other things be used to administrate among other things standard working hours, worked hours, employees attendance, salary percentages, working schedules, and leave requests.

In this study, the focus is on the task of approving employees registered worked hours by supervisors. To make it possible to use this software product, a fictive enterprise (De Alleshandelaar) was created. This enterprise had fictive employees who all had timecards. This way, participants could use the product.

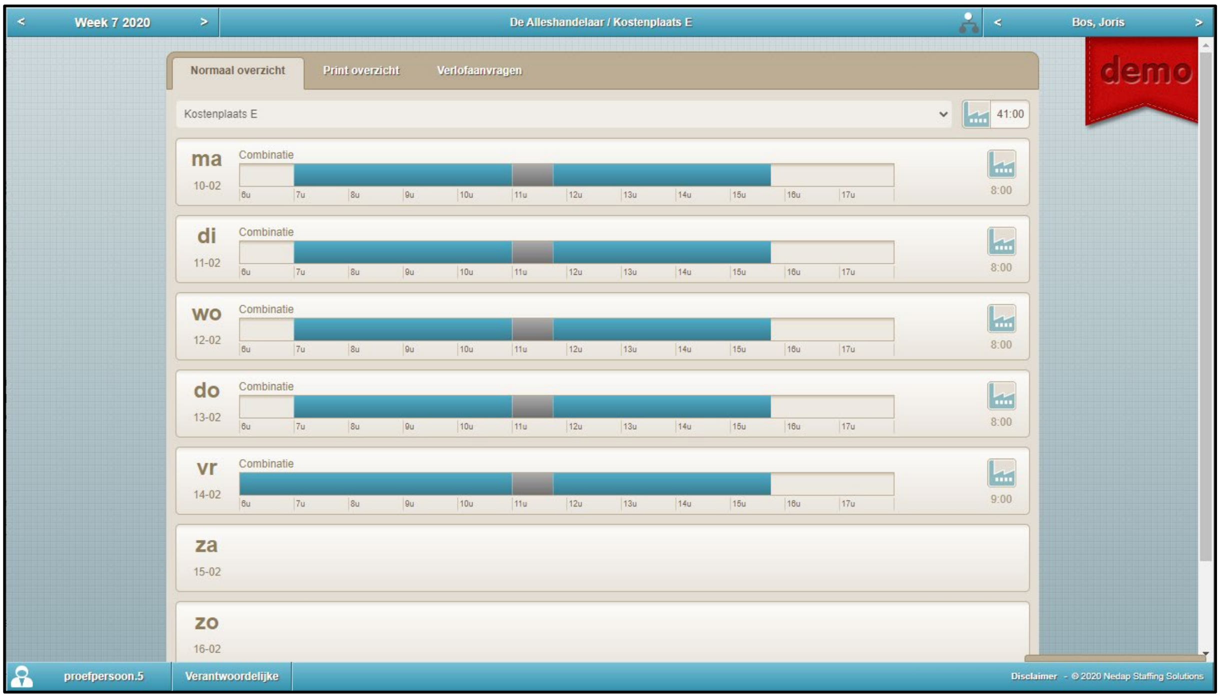


**Figure 2:**

A time card of fictive employee Joris Bos at ‘De Alleshandelaar’ in the demonstration environment of PEP Staff

## 3.4 Video design

As the present study tries to gain insights into the effects of different design processes of instruction videos, these videos are created especially for this study. This resulted in two videos, one designed based on scientific insights about instruction video design and one designed using user feedback. The first instruction video makes use of the theory of multimedia learning

(Mayer, 2019c) and DBT (Grossman et al., 2013; Rosen et al., 2010; van der Meij & van der Meij, 2016). The other instruction video is designed by adjusting the video first video using user feedback.

### 3.4.1 Instruction video based on scientific insights

The instructional video based on scientific insights consists of both pictural as textual information as suggested in the multimedia learning theory (Mayer, 2019b, 2019c). Also, it consists of example task performances supported by instructional features as DBT suggests (Rosen et al., 2010). The creation of the text, visuals, and structure are discussed in the following paragraphs.

#### Audio

The text is made in conversational style as this is supported in both the multimedia learning theory as DBT. The conversational narration style is characterized by the frequent use of pronouns such as “I”, “we” and “you” (Brar & van der Meij, 2017). The conversational style of text fosters generative processing according to the multimedia learning theory. As the conversational style is a social cue it activates a social response which increases active cognitive processing and therefore benefits learning outcomes (Mayer, 2019d). Also, the conversational style of the text supports the motivation process during observational learning and therefore activates affective responses for the learner according to DBT (Brar & van der Meij, 2017). The actual script of the instruction video can be found in Appendix B.

The multimedia learning theory suggests using either spoken or printed text, not both as this would minimize extraneous load according to the redundancy principle. This principle is based on the cognitive load theory and states that using spoken and printed text increases working memory load and therefore is not beneficial for learning (Kalyuga & Sweller, 2019). Therefore, only spoken words are used in this instruction video.

The last topic of interest in creating the textual part of the instruction video is the voice used. The multimedia theory uses the voice principle which suggests using a human rather than other voices for spoken words. The reasoning behind this principle is similar to the reasoning of using a conversational style. A human voice is a social cue that can increase active cognitive processing (Mayer, 2019d). In this instructional video, all text was recorded text spoken by a human.

## Visuals

First of all the visuals consist of example task performances. These demonstrations show how to use the product, as DBT suggests. This is supported by instructional features within these visuals (Rosen et al., 2010).

Signalling is an instructional feature that supports the attention process in observational learning (Brar & van der Meij, 2017). Signalling is emphasizing relevant aspects of the instruction with signals, such as colour-coding or highlighting. This can have a positive effect on comprehension performance (Richter et al., 2016). The instructional video made use of signalling by framing relevant objects (Figure 3).

Also, the visuals were presented simultaneously with the corresponding narration. This is following the temporal contiguity principle which minimizes extraneous processing. As the narration and the corresponding visuals are presented visually close learners do not need to locate and combine corresponding referents themselves (Ayres & Sweller, 2019).

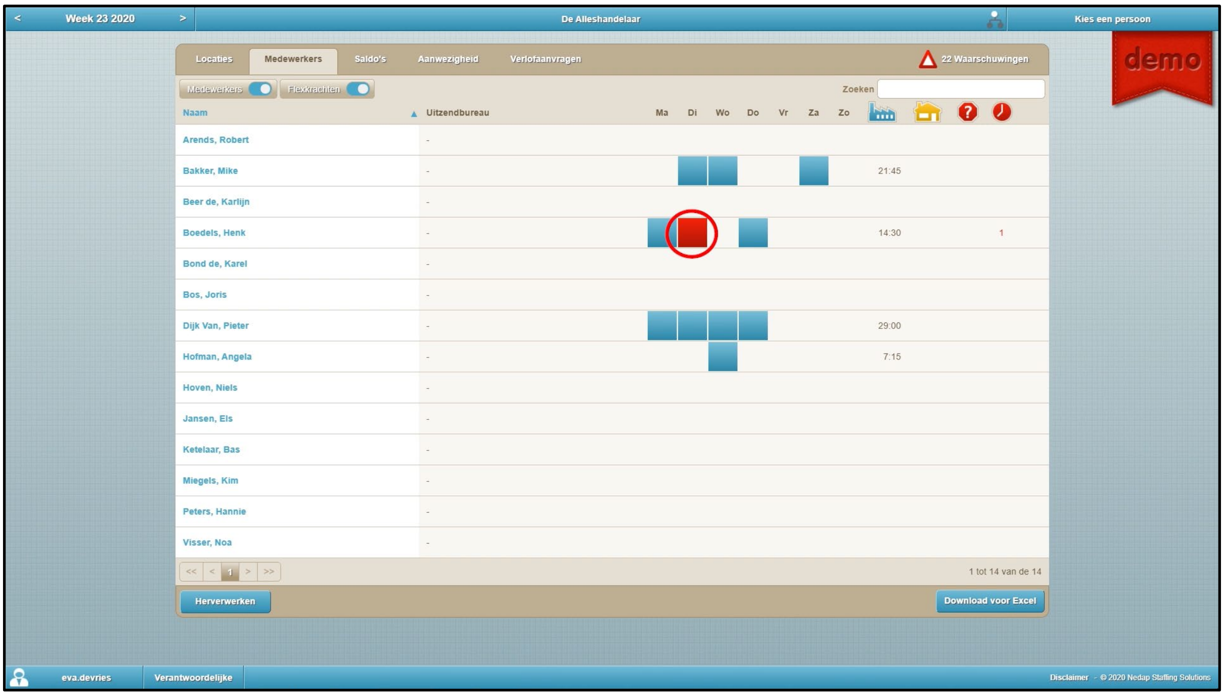


**Figure 3:**

Framing in the instruction video

## Structure

In DBT previews are suggested to address the attention process in observational learning. A preview contains the goals, terms used, and important objects (Brar & van der Meij, 2017). This preview is related to the pre-training principle suggested in the multimedia learning theory. This principle is the idea of providing prior knowledge to make it easier to process information in the instruction (Mayer & Pilegard, 2019). In the instructional video in this study, the goal of adjusting the registrations of employees was introduced. Next, the different terms used were explained. Afterwards, the actual instruction started.

Reviews as an instructional feature in instructional videos have a positive effect on the actual performance of users. A review is a short recap of the key instructions to perform the task correctly. This should address the retention process in observational learning, the repetition of information should aid memory storage (Van der Meij, 2017). In the instructional video, the instructional feature of the review is applied, as a summary of the instructional information followed the demonstration.

In DBT user control is suggested as an instructional feature. User control is giving users the power to stop, pause, and rewind to influence the pace of the video. This way the video can be personalized to fit the learners' capacity for learning (Brar & van der Meij, 2017). In the instruction, users got the possibility to pause, stop, and rewind the video. These functions were also pointed out in the introduction text above the video. This instruction video took 3 minutes and 40 seconds.

### 3.4.2 Instruction video designed using user feedback

Using the feedback on the first video, a second video is constructed. The feedback was collected using survey data of 32 participants, who answered open-ended questions after watching the instruction video. These participants were all participants in Group 1 and those who did not finish the whole survey but completed all feedback questions. This is supplemented with interviews of 5 participants of the survey participant group to find more comprehensive information. The participants were randomly selected out of the participants of Group 1 who left their email address for a follow up of the study. The interviews were transcribed to analyse them.

Data of both the surveys and interviews were gathered and analysed using MAXQDA Plus. All data were first coded into two codes; positive feedback and user problems. Within these codes, sub-codes were created as displayed in Figure 4 and discussed in the following paragraphs. It has to be noted that it is challenging to be sure all revisions are based on the user feedback only and to maintain predictive validity (De Jong & Schellens, 2000; Schellens & De Jong, 1997). Therefore, all user problems are described thoroughly and revision decisions are explained and connected to these user problems.

### Positive feedback

All feedback that showed satisfaction with the video was coded in this category. Later this category was sub coded into two codes: signalling and temporal contiguity. The signalling code was used for all positive feedback referring to the signalling principle, in the video, this was about the red frames used. Users experienced these frames as pleasant as it made it more clear where to look. For example, one participant said: "*The red markers are powerful because you know where to look immediately*".

The code for temporal contiguity was used for all positive feedback referring to this principle of presenting the audio and visuals of one item at the same time. Users experienced this as a way to make the instruction video easier to follow. One participant stated, "*The audio explanation was synchronized with the instruction which was executed with the mouse. This made it easy to follow*".

### User problems and revisions

The problems users encountered concerned different aspects of the video. These topics were coded as, 'unclear signalling', 'the pace of the video', 'the context', and 'the audio'. Participants also provided some ideas to improve these topics.

First signalling, as mentioned this was highly appreciated by some participants, others felt it could be even more clear as they did not experience it striking enough or couldn't see it good enough, this was coded as 'unclear signalling'. They suggested different solutions, for example blinking arrows or circles around the items or zooming in; *"Zoom in on items you select. I couldn't read it all the time on my 13-inch monitor because of the small letters"*. Following these suggestions from the user feedback, the red frames around items blinked to make them stand out even more. Also, the video zoomed in on smaller, more detailed items to make them more clear (Figure 5.1). On top of that, the mouse clicks were displayed by a yellow circle (Figure 5.2).

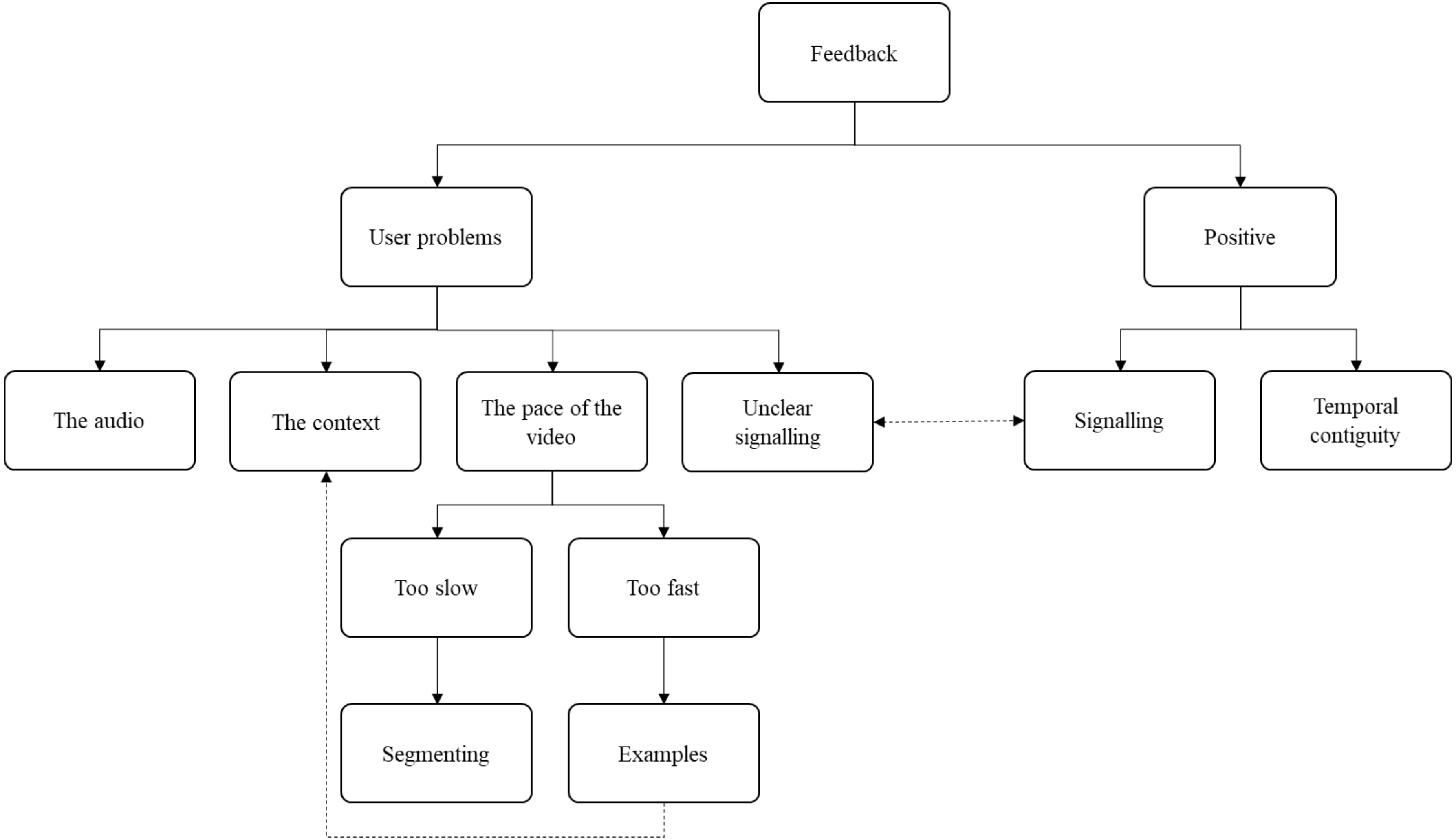


**Figure 4**

Feedback coding scheme

Furthermore, the pace of the video was mentioned by participants many times. Participants either said the video was to slow or too fast. The people who mentioned the video to be too slow said there was unnecessary information mentioned that they naturally already understood, they often got bored watching the video. One of them even said: *"I felt it was a bit too slow. Some things speak for themselves but are explained nonetheless, I had to wait for the instruction to be over"*. Many participants who felt the video was too slow suggested to split it into different segments: *"Cut the instructions into pieces and different videos, this would give me the feeling watching something new every time"*. Others, however, experienced the video as too fast; "*Changing the hour was explained rather quickly, that is why I had to watch multiple times to understand the instruction"*. Many participants suggest to add more example cases to the video to help them understand the actions better; *"I would spend some more time to explain how you do it and show different examples"*.

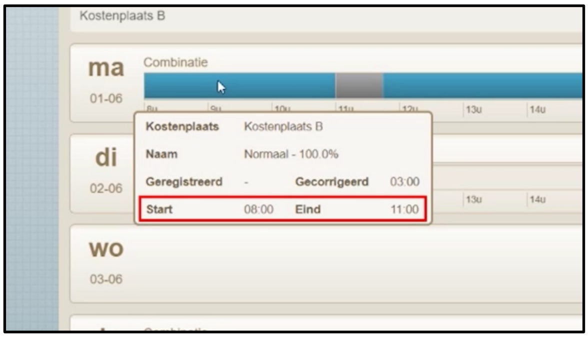


**Figure 5.1:**

Zooming in on smaller objects

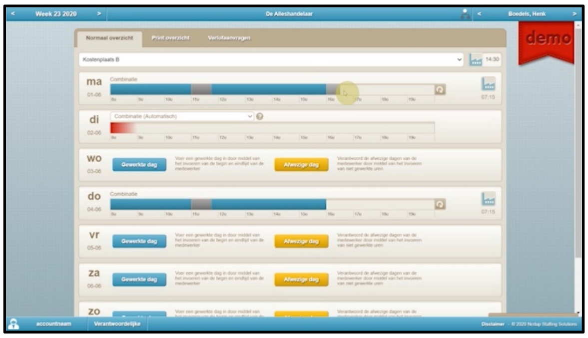


**Figure 5.2:**

Signaling mouse clicks


**Figure 5.3:**

Title page

Therefore, the video was segmented into five different parts separated by title pages (Figure 5.3). It started with the introduction followed by three core parts and ended by an optional part with example situations. The three core parts were about finding the right time card, checking the timecard, and adjusting the timecard. The last part, with example situations, was optional to meet the needs of both users who feel the instruction is too slow, and users who feel the instruction is too fast. The first group could skip this part and go through the instructions faster. The second group could watch the last part to see examples and repeat some information.

This relates to the demand for a context of PEP Staff in the video. Participants missed context to understand what they were doing and why they would do it: *"I have not used such a system ever, so I don't know what to do and why it even exist. This makes it hard to follow the instructions*". They suggested a more specific introduction or more examples to provide context to the video. The video was adjusted by adding a picture of someone behind a computer and a more extensive introduction about the goal of the program. Besides, the examples at the end of the video are used as a tool to add more context, as they describe different possible situations.

The last topic which was mentioned many times by participants was the voice over. They felt the voice was monotone and not enthusiastic enough. *"With a little more energy and enthusiasm in the audio, it is more pleasant and more active to listen"*. Participants suggested to speak with a more enthusiastic voice or to let someone else do the voice over. To tackle this user problem the audio was changed. The audio had a more enthusiastic and active voice, as this was a critical point for many users. The complete script can be found in Appendix C.

### 3.5 Procedure

After the participants permitted for their data to be used, they answered questions about geographical information. Then, they saw the instruction video designed based on the theory of multimedia learning and DBT and were asked open-ended questions to gather the feedback of the video. Next, they filled out the UX scale and usability scale of the video. This was followed by some tasks the participants had to perform in the demonstration environment of PEP Staff. Subsequently, they filled out the UX scale and usability scale of the software system. Lastly, this group of participants had the option to leave their email address to participate in short interviews about the instruction video.

Five participants who left their email address were randomly selected to participate in the interviews. These were semi-structured interviews aiming to gather feedback about the instruction video. This feedback is later used to create another instruction video.

Group 2 saw this video, designed based on user feedback, after they also permitted using their data and answering geographical questions. After watching the video they were asked the same open-ended questions Group 1 had to gather feedback. Just like Group 1, Group 2 filled out the UX and usability scale followed by tasks using the software system. Lastly, they filled out the UX and usability scale of the software system. They were not asked to leave their email address as this study did not aim to make a third video using their feedback.

## 3.6 Measures

Both, qualitative and quantitative measures are used to gain insights into the effects of user involvement in instruction video design. The qualitative measures contained the user feedback on the instruction video. This feedback was asked after watching the video using a survey with open-ended questions (Appendix A). This feedback was also used to improve the video based on the theory of multimedia learning and DBT.

Using a survey usability and UX of both the instruction video and the HRMS are measured quantitatively. The survey contained 5 items for each construct. All measures are statements that could be answered using a 5-point Likert scale ranging from 'completely agree' to 'completely disagree'. To examine the distinguishability of all constructs factor analysis (with varimax rotation) was used. Multiple items are deleted based on these analyses. After removing items a second factor analysis (with varimax rotation) was used. The factor analysis can be found in Appendix D.

**Usability of the instruction video.** The first set of three items is used to measure the perceived usability of the instruction video (Appendix E) (two items deleted based on the factor analysis) (Cronbach's alpha = .767). The three items that remained were 'The instruction video is unnecessary complex', 'I think the instruction video is clear' and 'The instruction video is easy to understand'.

**Usability of the software system.** The second usability scale is used to measure the usability of the HRMS (Appendix F). This scale contained four items (one other item was deleted based on the factor analysis) (Cronbach's alpha = .820). The remaining items were, 'PEP Staff is unnecessary complex', 'I think PEP Staff is clear', 'I think PEP Staff is easy to use', 'Using PEP Staff takes an unnecessary amount of time'.

**The user experience of the video**. This construct contained five items (Cronbach's alpha = .830) (Appendix G). All items remained after factor analysis, while they form a distinguishable construct.

**The user experience of the software system.** The other scale used to measure UX outcomes of the HRMS (Appendix H). It was measured using two items (three other items were deleted based on the factor analysis) (Cronbach's alpha = .642). The remaining items were 'I am curious about the possibilities of PEP Staff'' and 'I thought it was interesting to use PEP Staff'.

## 4 Results

All quantitative data in this study is analyzed using IBM SPSS Statistics 26. All quantitative data were analyzed using MAXQDA Plus and IBM SPSS Statistics 26.

### 4.1 Quantitative results

For all four items (i.e., the user experience of the video, usability of the video, user experiences of the HRMS, and usability of HRMS) means were constructed. To test hypotheses independent samples t-tests are executed (Table 4). This resulted in clearly not significant results for three of the dependent variables. This indicates that the revised video did not have any effect on the usability of the video, the usability of the HRMS and the UX of the HRMS.

The effect of the usage of feedback on the UX of the video also shows a non-significant result. However it shows a near significant result, it indicates a slight improvement. This could be found with bigger sample sizes as not finding statistical results may be a consequence of power issues. A posthoc power analysis showed a limited power (1-β) of .57.

Even though the effect of the usage of feedback on the UX of the video is promising, in the present study, based on quantitative data, all hypotheses can be rejected.

**Table 4**

*Independent samples t-test of the dependent variables*

| ***Dependent variable*** | ***Original video*** | | ***Revised video*** | | ***t(53)*** | ***Significance (one-tailed)*** |
|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | | |
| **Usability of the video** | 4.32 | .63 | 4.32 | .82 | .00 | .50 |
| **Usability of the HRMS** | 3.51 | .95 | 3.46 | .82 | -.23 | .41 |
| **UX of the video** | 3.12 | .71 | 3.47 | .86 | 1.67 | .05 |
| **UX of the HRMS** | 3.13 | .86 | 3.23 | .82 | .45 | .33 |

*Note.* All independent variables are measured using 5-point Likert scales.

### 4.2 Qualitative results

All qualitative data were coded using MAXQDA Plus. User problems were filtered out the data and coded into different categories. The categories they were coded in were length, relevance, appreciation, context, structure, graphics, pace, complexity, correctness, completeness, and comprehension. Using t-tests the effect of user feedback on all categories of user problems was tested.

Furthermore, all problems within the user problems categories were analyzed underlying differences and similarities in all mentioned user problems.

### 4.2.1 User problem categories

Group 1 found 73 user problems, where Group 2 found 71 user problems. This translates to a mean of 2.70 (*SD*=1.51) problems per participant in Group 1 and a mean of 2.54 (*SD*=1.37) problems per participant in Group 2. This difference is negligible as it is not significant ($t(53)=.431$, $p=.67$). Therefore it can be concluded that the processed feedback in the video Group 2 watched did not affect the number of user problems mentioned per participant.

**Table 5**

*The number of user problems found per participant for each user problem type.*

| ***Problem type*** | ***Original video*** | | ***Revised video*** | | ***t*** | ***Significance (one-tailed)*** |
|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | | |
| Length | .26 | .45 | .14 | .36 | 1.07 | ns |
| Relevance | .19 | .48 | .07 | .26 | 1.08 | ns |
| Appreciation | .44 | .64 | .43 | .63 | .09 | ns |
| Context | .56 | .80 | .50 | .64 | .29 | ns |
| Structure | .48 | .64 | .54 | .69 | -.30 | ns |
| Graphics | .22 | .51 | .36 | .62 | -.88 | ns |
| Pace | .26 | .45 | .07 | .26 | 1.89 | $p<.05$ |
| Complexity | .04 | .19 | .11 | .32 | -1.00 | ns |
| Correctness | .04 | .19 | .00 | .00 | 1.00 | ns |
| Completeness | .22 | .51 | .29 | .60 | -.42 | ns |
| Comprehension | .04 | .19 | .07 | .26 | -.55 | ns |

All problems were recoded into eleven unique problem types. The number of user problems of each type found per participant was compared between both test conditions using t-tests (Table 5). This resulted in one significant difference for user problems with pace witch was mentioned less by participants who watched the revised video than by participants who watched the original video. All other problem types did not show significant differences. This indicates that the usage of feedback to adjust the original video did not result in a complete shift of the type of problems found by participants, but it can affect the quantity of mentioned problems for some types.

Furthermore, it has to be noted that the instruction video Group 2 watched was longer than the video Group 2 watched. The difference in length of the video was 145% with the video Group 1 watched taking 220 seconds and the video Group 2 watched taking 319 seconds. The longer instruction video did not lead to more user problems found. It is interesting to mention that participants in Group 2 even did not mention the specific user problem of the video being too long (Length) more often than participants in Group 1.

### 4.2.2 Underling similarities and differences in user problems

Although the number of mentioned user problems did not change in most of the user problem categories, changes were found in the content of the user problems. The user problems found by Group 2, who watched the video adjusted using user feedback were more variated than the problems found by Group 1. For example, the participants of Group 1 mentioned graphic problems such as finding the signalling graphics, "You have to search for the red frames on the screen yourself, which is hard especially when you do not use the full-screen option". The participants in Group 2 mentioned more specific problems with the graphics such as the idea that it was harder to use for potential users with vision impairments, "Clicking with the mouse may be less visible to people with a poor field of vision".

Moreover, the appreciation user problems in Group 1 where almost only about the audio, as participants stated the intonation was very monotonous *"One of the less strong points I found the intonation in the voice-over, which in my opinion could have been a bit more diverse and enthusiastic"*. The voice-over was also mentioned as appreciation user problem by participants in Group 2, however, they mentioned also a variation of other appreciation problems such as silences *"In the end, it is sometimes quiet for too long, this irritated me as a viewer"*.

Besides participants of the second group also experienced problems with the actual text of the video. As the first group mentioned the intonation of the audio many times, the second group mentioned problems with the content of the audio. They had problems with it not being a narrative story and preferred it in a more narrative form especially with the example situations.

There were also similar user problems found by the participants in both groups. For example, both groups mentioned problems with the resolution of the instruction video, this could not be changed as Qualtrics does not support large video files. Another example is the problem users had with the fact that the instruction video was not interactive or split into sub-subjects. Users preferred a video where they were in charge of the content they were watching. Unfortunately, this also could not be changed as Qualtrics also does not support interactive videos and measurements were less reliable when the second group received several short videos compared to the first group who received one video.

In short, user problems with the revised video were more specific, differed and were less fundamental. Revisions did not distract participants from user problems which were not resolved, such as the low resolution as these problems were mentioned by both participant groups. It can be concluded that revisions can help solve user problems but also can result in other user problems, as they shift the attention of users to new or other less fundamental problems.

# 5 Discussion

The current study was designed to determine the effect of user involvement in instructional video design. The research question that was posed is:

> *RQ: To what extent does user feedback in the design of video instruction improve user experience and usability?*

## 5.1 Main findings

It was expected that user involvement during the design process of video instruction resulted in better user experience and usability. However, the results of this study suggest that user involvement, in form of one user feedback moment, did not improve user experience and usability of both the instruction video and the HRMS. However, results indicate that using user feedback during the design process of instruction videos tend to improve the user experience of the video.

Qualitative analysis showed that user involvement in the design process did not affect the number of user problems found by participants. Looking at specific user problem categories a decrease of user problems experienced with the pace of the video was found. Other user problem categories, in contrast, did not differ in the amount that they were mentioned. Looking into all underlying problems there was more diversity in the user problems found, they were less substantial and more specific. This indicates that however qualitative data did not show significant differences, the revision based on user feedback did result in some improvements.

## 5.2 Theoretical and practical implications

These results are not in line with the theory of human-centred design, which states that user involvement leads to better user experience and usability (Maguire, 2001b). However, this theory suggests user involvement using different methods on multiple moments during a design process, where this study involved users only one time during the design process of the instruction video. Possibly, other methods of user involvement in instruction video design such as usability testing or requirement surveys,  are more effective to improve usability and user experience. The present study contributes to human-centred design research that user involvement does not always have a positive effect by definition. This indicates that it is important to still examine the human-centred design theory critically, to enrich this theory to a more comprehensive theory.

Just like the study of De Jong and Rijnks (2006) this study did not find a decrease in user problems found by participants after revising a document. This can partly be explained by the fact that users can find new problems which did not exist in the original version (De Jong & Rijnks, 2006). This is a logical explanation for the fact that the number of user problems found per participant did not decrease, as there were more diverse and specific user problems found for the revised video compared to the original video. In the current study, the limits to the revision process may also be a partial cause for the lack of decrease in user problems found by participants. As it was not possible to use an interactive video or a high resolution these points of feedback could not be processed and therefore also were user problems in the revised video.

The present study shows that user problems found in the revised version of the instruction video were more diverse. This can support the phenomena De Jong and Rijnks (2006) suggested in their study. The phenomena of revisions unintentionally causing new user problems, solutions of certain problems triggering new problems and revisions increasing the prominence of revised parts.

This study may provide evidence that the multimedia learning theory (Mayer, 2019b) and the demonstration based training approach (Rosen et al., 2010; Van der Meij & Van der Meij, 2016) are powerful tools to design instruction videos. This could explain the negligible difference between the two conditions as user involvement may not add value to an already strong product. This theory could be studied in further research where a condition with an instruction video designed without theory and involvement is used as a control group.

As this study draws upon previous research examining the effects of evaluation on document quality (De Jong & Lentz, 1996; De Jong & Rijnks, 2006; Lentz & De Jong, 1997; Schellens & De Jong, 1997). These studies substantiate that user feedback has added value in the design process of communication materials. The present study, however, nuances this idea as this positive effect of using user feedback was not found for instruction videos. This indicates that the theory on the usage of user feedback during the design process of communication materials cannot be generalized among different types of materials.

In practice, the results of the present study can imply that it is important to have a critical look towards user involvement during the design process of instruction videos. This study shows that instruction videos can be improved using user feedback, however not on all aspects. Designing an instruction video in the future it is good to keep in mind that the effects of one user feedback moment only has limited results. Therefore it can be considered to have multiple user feedback moments or other forms of user involvement during the design process.

## 5.3 Limitations and suggestions for future research

Qualitative results suggest that the video designed using this feedback is improved in some way compared to the original video but quantitative UX and usability measures did not support this. Perhaps the quantitative measures used in the current study were a bit too rough or limited. Future research may study more detailed or other measures to find the effects of user feedback in instruction video design.

Moreover, there were quite a few items deleted from the scales based on the factor analysis. This resulted in one scale of two items, one scale of three items, one scale of four items, and one scale of all five items. Although the factor analysis justifies deleting the other items of the original scales, it is unlikely that a two or three-item scale covers a complex construct as usability or user experience.

The generalizability of the results is subject to certain limitations. For instance, convenience sampling is a non-probability sampling method, therefore it might result in a lacking representation of the whole population. As a result of this sampling method, Group 2 included a relatively large number of male participants. Therefore, it is not possible to generalize results, however, future research might test the results of this study using a probability sampling method to generalize results.

During the design process of the second video, it was found that many participants suggested an interactive video as a solution to different issues. For example, the length of the video could be managed by the user that way. However, it seemed a good solution it was unfortunately not possible to use interactive video during this research. Changing the video to an interactive instruction video might have resulted in different outcomes. This suggests that theory should be expanded and more modern communication materials such as videos should be studied.

All quantitative measures showed non-significant results. This can be a consequence of the limited power in this study. With limited power, it is harder to find significant results and this may have resulted in false-negative results. Future research may more participants to enhance the power of the study.

Lastly, the design process of the video could be improved as all videos were not created by professional video editors. The limited experience in video creation might have influenced the quality of the videos. On top of that only one person coded all feedback, therefore the reliability of this coding is lower than when the feedback was coded by multiple encoders.

## 5.4 Conclusion

In brief, the present study has contributed to the knowledge about user involvement in instruction video design. As these types of video are used more and more, it is valuable to know what effects user involvement in the design process can have. This study showed that using user feedback at one specific moment during the design process did not add significant value for user experience and usability of both the video and the software system. Similar effects were found for the original instruction video and the video adjusted with user feedback. However, the qualitative data prove users experience other problems while watching the revised video than while watching the original video. This indicates using user feedback in the design process can change the effects of a revised instruction video in comparison to its original video.

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## Appendix A: Survey questions

1. Wat vond je van de instructie video?
    a. Wat denk je dat het beste was van de instructie video?
    b. Wat denk je dat minder sterke punten waren?
    c. Hoe kan dit verbeterd worden?
2. Wat vond je moeilijk te begrijpen in de instructie video?
    a. Kan je uitleggen hoe dat komt?
    b. Hoe kan de instructie video aangepast worden om dit te voorkomen?
3. Heb je andere suggesties om de instructie video te verbeteren?

## Appendix B: Script of the instructional video design scientific insights

Welkom bij deze uitleg over het aanpassen van uren in PEP Staff. Tijdens deze video krijg je uitleg over het controleren en aanpassen van geregistreerde uren van jouw team. Eerst een uitleg over wat je ziet wanneer je inlogt.

Naast je naam kan je kiezen voor de rol die je hebt. Kies je voor medewerker dan kan je alleen je eigen uren zien. Kies je voor de rol van verantwoordelijke dan kan je de uren van je team controleren, aanpassen en inzien. Voor nu kiezen we voor de rol van verantwoordelijke. Dit is wat je dan ziet.

Links bovenin het scherm kan je kiezen voor de week waarover je de controle wil uitvoeren. De standaard instellingen staan op de huidige week, maar je kan er voor kiezen om een andere week te controleren, je kan hierheen gaan door met de pijltjes voor of achteruit te gaan. Wil je meer dan een week terug gaan? Dan klik je in het midden en kan je in de kalender de juiste datum kiezen.

In het midden van de balk bovenin zie je de kostenplaats waarbinnen je de uren controleert. Heb je meerdere kostenplaatsen? Dan kan je hier kiezen welke kostenplaats je wil controleren. Dit overzicht is ook te zien middenin beeld onder het tabblad locaties.

Je kan ook het tabblad medewerkers selecteren. Daar kan je een medewerker kiezen om zijn of haar uren te controleren. Als je klaar bent dan kan je rechts bovenin naar de volgende medewerker of je klikt op terug en je komt terug bij het overzicht van je medewerkers.

In dit overzicht zie je geen uren. We gaan nu kijken naar een overzicht met geregistreerde uren. Wanneer je personeel gewerkt heeft zie je bij het medewerkers overzicht een blokje bij die dag. Is dit blokje rood? Dan is de registratie niet compleet en mist er een in of uitkloktijd.

Ik laat je nu zien hoe je de uren van je medewerkers aan kan passen. Je ziet dat er op dinsdag een incomplete registratie is. Als je met de muis op de datum gaat staan zie je in de pop-up ook de in- en uitkloktijd. We gaan de incomplete registratie aanvullen met een uitkloktijd door op het balkje met de incomplete registratie te klikken en de juiste tijd in de pop-up in te vullen en op te slaan. Je kan de andere uren aanpassen door de uren te selecteren met je muis in de balk en deze aan te passen in de pop-up. Je kan hier de tijden aanpassen, maar ook de kostenplaats, het uurtype en waar nodig het saldo. Je kan ook een deel van de uren aanpassen, wil je dat doen dan selecteer je met je muis in de balk dat deel van de uren en vul je de juiste gegevens in, in de pop-up.

Als voorbeeld passen we de laatste uren van woensdag aan door deze te selecteren. We willen er toeslaguren van maken en daarom selecteren we dit uurtype en klikken we op ‘oke’. Als je klaar bent dan klik je op uren opslaan.

Nu kan je bijna zelf aan de slag met het controleren en aanpassen van uren. Denk er aan om bij het aanpassen van uren eerst naar de juiste week en kostenplaats te gaan. Vervolgens kan je de uren aanpassen door ze te selecteren met je muis en in de pop-up aanpassingen te doen. Houd dit in gedachten en probeer het eens zelf.

## Appendix C: Script of the instructional video design using user feedback

Hoi en welkom bij deze uitleg over PEP Staff. PEP Staff is een programma voor het registreren van uren van medewerkers. Tijdens deze uitleg leg ik je uit hoe jij de uren van jouw werknemers kan controleren en aanpassen. Dit doen we in drie stappen. We gaan eerst de urenbriefjes opzoeken, dan gaan we ze controleren en dan gaan we ze aanpassen.

We gaan nu eerst beginnen met het opzoeken van een urenbriefje, zorg er daarbij voor dat je bent ingelogd als verantwoordelijke, dit kun je onderaan selecteren. Vervolgens selecteer je bovenin de juiste week, de juiste locatie en kan je een persoon opzoeken. Je kan ook een medewerker zoeken door op het tabblad 'medewerkers' te klikken en daar een van de medewerkers te selecteren. In dit voorbeeld selecteren we Karlijn de Beer, dit doe je door op haar naam te klikken.

We gaan nu een urenbriefje controleren. Als je een urenbriefje opent zie je per dag een balkje die de geregistreerde uren laat zien. Je ziet dat er op dinsdag rood in het balkje staat, dat betekent dat er iets niet goed is. Daar kijken we zo meteen naar. We gaan nu eerst kijken naar de maandag. Dit kan je doen door de muis te bewegen naar een van de blokjes. Je kan nu meer informatie vinden over dit blokje. Je ziet de kostenplaats, het uur soort, het totaal aantal uren en de begin- en eindtijd van dit blok. Door je muis naar de datum voor een balk te bewegen zie je meer informatie over die dag. We gaan dit doen om te ontdekken waarom er rood staat in het balkje van dinsdag. Je ziet dat er is geklokt met een pas. Je ziet een begintijd, maar geen eindtijd. De medewerker is waarschijnlijk vergeten om uit te klokken.

Wanneer je een urenbriefje hebt gecontroleerd, wil je misschien wat aanpassen. Je scrolt hiervoor naar beneden bij het urenbriefje en klikt op aanpassen. Je klikt bijvoorbeeld op een blokje dat je wil aanpassen. Je krijgt een pop-up te zien waar je de begin- en eindtijd kan aanpassen, de locatie waarop de uren geboekt worden en het uur type. Je kan ook nieuwe uren toevoegen. Dit doe je door dit deel van de balk te selecteren met je muis en dan de pop-up in te vullen.

Deze medewerker is op maandag eerder naar huis gegaan, namelijk om drie uur in plaats van vier uur. We passen dit aan door te klikken op het blok en de eindtijd aan te passen, vervolgens slaan we dit op door op 'oke' te drukken. Vervolgens vullen we natuurlijk ook een eindtijd op dinsdag in. Hij werkte toen tot kwart voor vier, dit vullen we in in de pop-up. Je ziet dat wanneer je dit doet er automatisch zijn standaard pauze ingevuld wordt. Op donderdag werkte de medewerker juist langer, in dit bedrijf zijn dit overuren en daarom wordt dit uur type ook ingevuld in de pop-up. Na het invullen van de pop-ups sla je het hele urenbriefje op en zie je nog een overzicht.

Dit was de uitleg over PEP Staff, je kan nu nog kijken naar voorbeeldsituaties als je wil. We gaan kijken naar week 23, dus we selecteren die week. Vervolgens openen we de uren van Pieter van Dijk. We gaan deze uren aanpassen want ze kloppen niet. Pieter was namelijk afgelopen donderdag niet aanwezig. Daarom verwijderen we deze uren. Op woensdag hield hij langer pauze. Deze uren vullen we in en we vullen dit aan met zijn normale uren. Ook werkte hij nog net iets langer dan zijn normale uren, dit zijn overuren bij Pieter. Je voegt deze overuren ook toe.

Op maandag begon Pieter eerder. Namelijk om zeven uur, we passen dit aan. Je ziet dit niet direct, maar als je opzij scrolt wel. Nu slaan we de uren op en zien nog een overzicht.

Dit was de volledige uitleg van PEP Staff, je kan nu zelf aan de slag.

## Appendix D: Factor analysis

**Table D1**

*Rotated component matrix*

| | Component | | | | |
|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** |
| I think the instruction video unnecessarily complex (reversed item) | | | .654 | | |
| I think the instruction video is clear | | | .805 | | |
| The instruction video is easy to understand | | | .813 | | |
| Watching the instruction video takes an unnecessary amount of time (reversed item) | | .719 | | | |
| I think it is useful to watch the instruction video | | .369 | | .494 | .484 |
| I thought it pleasant to watch the instruction video | | .787 | | | |
| While watching the instruction video, I was curious about the rest of the video | | .603 | | | .596 |
| I got frustrated while watching the instruction video (reversed item) | | .455 | .390 | | |
| I enjoyed watching the instruction video | | .807 | | | |
| I thought the instruction video was interesting | | .747 | | | |
| PEP Staff is unnecessarily complex (reversed item) | .743 | | | | .364 |
| I think PEP Staff is clear | .873 | | | | |
| I think PEP Staff is easy to use | .866 | | | | |
| Using PEP Staff costs an unnecessary amount of time (reversed item) | .490 | | | | |
| I think Pep Staff is useful | .379 | | | .687 | |
| I thought it pleasant to use PEP Staff | .744 | | .321 | | |
| I am curious about the possibilities of PEP Staff | | | .425 | .497 | |
| I got frustrated while using PEP Staff (reversed item) | .763 | | .335 | | |
| I enjoyed using PEP Staff | .659 | | | | -.449 |
| I thought it was interesting to use PEP Staff | | | | .810 | |

*Note.* Varimax rotation method was used, only coefficients > .300 are displayed.

**Table D2**

*Rotated component matrix after removing items*

| | Component | | | |
|---|---|---|---|---|
| | **1** | **2** | **3** | **4** |
| I think the instruction video unnecessarily complex (reversed item) | | | .777 | |
| I think the instruction video is clear | | | .674 | .413 |
| The instruction video is easy to understand | | | .848 | |
| I thought it pleasant to watch the instruction video | .784 | | | .323 |
| While watching the instruction video, I was curious about the rest of the video | .814 | | | -.302 |
| I got frustrated while watching the instruction video (reversed item) | .424 | | .358 | |
| I enjoyed watching the instruction video | .834 | | | |
| I thought the instruction video was interesting | .798 | | | .357 |
| PEP Staff is unnecessarily complex (reversed item) | | .820 | | |
| I think PEP Staff is clear | | .890 | | |
| I think PEP Staff is easy to use | | .844 | | |
| Using PEP Staff costs an unnecessary amount of time (reversed item) | | .565 | | |
| I am curious about the possibilities of PEP Staff | | | .301 | .624 |
| I thought it was interesting to use PEP Staff | | | | .834 |

*Note.* Varimax rotation method was used, only coefficients > .300 are displayed.

## Appendix E: Usability scale instruction video

**Table E1**

*Usability scale of the instruction video*

| | Helemaal mee oneens | Enigszins mee oneens | Neutraal | Enigszins mee eens | Helemaal mee eens |
|---|---|---|---|---|---|
| **Ik vind de instructievideo onnodig complex** | O | O | O | O | O |
| **Ik vind de instructievideo duidelijk** | O | O | O | O | O |
| **De instructievideo is makkelijk te begrijpen** | O | O | O | O | O |
| **Het kijken van de instructievideo kost onnodig veel tijd** | O | O | O | O | O |
| **Ik vind het nuttig om naar de instructievideo te kijken** | O | O | O | O | O |

## Appendix F: Usability scale HRMS

**Table F1**

*Usability scale of the HRMS*

| | Helemaal mee oneens | Enigszins mee oneens | Neutraal | Enigszins mee eens | Helemaal mee eens |
|---|---|---|---|---|---|
| **PEP Staff is onnodig complex** | O | O | O | O | O |
| **Ik vind PEP Staff duidelijk** | O | O | O | O | O |
| **PEP Staff is makkelijk te gebruiken** | O | O | O | O | O |
| **Werken met PEP Staff kost onnodig veel tijd** | O | O | O | O | O |
| **Ik vind PEP Staff nuttig systeem** | O | O | O | O | O |

## Appendix G: User experience scale instruction video

**Table G1**

*User experience scale of the instruction video*

| | Helemaal mee oneens | Enigszins mee oneens | Neutraal | Enigszins mee eens | Helemaal mee eens |
|---|---|---|---|---|---|
| **Ik vond het prettig om naar de instructievideo te kijken** | O | O | O | O | O |
| **Tijdens het kijken van de instructievideo was ik nieuwsgierig naar de rest van de video** | O | O | O | O | O |
| **Ik raakte gefrustreerd tijdens het kijken van de instructievideo** | O | O | O | O | O |
| **Ik vond het plezierig om naar de instructivideo te kijken** | O | O | O | O | O |
| **Ik vond de instructievideo boeiend** | O | O | O | O | O |

## Appendix H: User experience scale HRMS

**Table H1**

*User experience scale of the HRMS*

| | Helemaal mee oneens | Enigszins mee oneens | Neutraal | Enigszins mee eens | Helemaal mee eens |
|---|---|---|---|---|---|
| Ik vond het prettig om PEP Staff te gebruiken | O | O | O | O | O |
| Ik ben nieuwsgierig naar de mogelijkheden van PEP Staff | O | O | O | O | O |
| Ik vond het frustrerend om PEP Staff te gebruiken | O | O | O | O | O |
| Ik vond het plezierig om PEP Staff te gebruiken | O | O | O | O | O |
| Ik vond het boeiend om PEP Staff te gebruiken | O | O | O | O | O |

## Appendix I: Assignments

**Opdracht 1**

Alle volgende opdrachten gaan over de uren in week 7. Ga naar week 7 om aan de slag te kunnen met de volgende opdracht.

**Opdracht 2**

Op maandag was het druk, daarom heeft [MEDEWERKER A] in totaal maar 15 minuten pauze gehad in plaats van 45 minuten. Pas het urenbriefje zo aan dat er nog maar 15 minuten pauze in staan.

**Opdracht 3**

Woensdag ging [MEDEWERKER A] om 14.00 uur naar huis, in zijn standaard urenbriefje staat dat hij tot 15.45 uur heeft gewerkt. Pas dit aan in het urenbriefje.

**Opdracht 4**

Op vrijdag is [MEDEWERKER A] voor 7 uur begonnen. Voor 7 uur heeft [hij/zij] recht op onregelmatigheidstoeslag van 125%. Pas dit aan in het urenbriefje.

**Opdracht 5**

In het contract van [MEDEWERKER B] is opgenomen dat na 8 uur per dag werken de uren als overuren (125%) geteld worden. [MEDEWERKER B] heeft dinsdag van 7.00 uur tot 17.15 uur gewerkt. Voeg [ZIJN/HAAR] overuren toe.

**Opdracht 6**

Donderdag is [MEDEWERKER B] vergeten uit te klokken. [HIJ/ZIJ] sloot [ZIJN/HAAR] dienst af om 15.45 uur. Pas dit aan.