THE REDESIGN OF A CASHIER TRAINER

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SUMMARY

The cashier trainer that has been studied for this research is already used to train about 45.000 cashiers. This cashier trainer trains new cashiers in their leisure time, with a simulation on the computer. The aim of this cashier trainer is to reduce the time needed for on the job training to a minimum or most preferably to no time for on the job training. However, research by Oprins and Korteling (2012) stated that new cashiers still need a certain amount of on the job training. To identify the specific tasks that need on the job training, interviews with five cash managers and five new cashiers are conducted. These interviews show that new cashiers are not able to ask for additional small change and counting aloud when handing over change. Therefore, a part of the cashier trainer is redesigned whereby cognitive overload is reduced (Mayer & Moreno, 2003) and strategies for learning procedures are used (Smith & Ragan, 1999). This redesign is tested by an experimental group (N=6), and compared to a control group (N=6) who used the current cashier trainer. All participants were at the age of fifteen or sixteen and had no cashier experience. Results of this test show that the reduction of cognitive overload is especially advantageous for memorizing information. Although the experimental group has more self-confidence in several tasks, performs better at asking for additional small change and gained more knowledge, the used strategies for learning procedures did not all benefit the redesign. For example, the control group made less mistakes in the exercises, took less time in exercising, and performed better in counting aloud when handing over change.

INTRODUCTION

This thesis will discuss the redesign of a part of a cashier trainer. This cashier trainer is one of the products of Jutten Simulation, a company that provides virtual learning products for the retail industry. More than 45.000 cashiers have so far been trained by this cashier trainer. With this cashier trainer, Jutten Simulation provides retailers a training that heightens the quality of employees' work and reduces training costs and time for on the job training. However, research conducted by Oprins and Korteling (2012) showed that cashiers still need a certain amount of on the job training on their first day of work. Since this is not completely in line with the aim of the cashier trainer, Jutten Simulation acknowledges the need for further research. After approaching several clients of Jutten Simulation, a supermarket has agreed to contribute and cooperate in this research by providing new cashiers and cashier managers for several interviews. This supermarket also experienced that new cashiers needed on the job training for several tasks after finishing the cashier trainer. Since this costs the supermarket extra time and money, the supermarket also sees the need for further research.

This research will not only benefit the company Jutten Simulation and the supermarket, but also research in the field of simulations. "Computer-based alternatives to live training have become more common in recent years" (Alexander, Brunyé, Sidman, & Weil, 2005, p. 1). Ruben (1999) argues that these have helped to address many of the limitations of traditional instructional methods. This research discusses the cashier trainer, a simulation on the computer that trains people to become a cashier. Learning based on simulated experiences like in the cashier trainer can play a significant role for learning about the real world, because many relevant competencies can be trained in a realistic, challenging and attractive manner (Swaak, Van Joolingen, & De Jong, 1998). Simulations are not only effective in the area of instruction, but are also supposed to be time and cost-effective because it can be done in leisure time and no teacher is needed. Supermarket managers estimate the savings on training costs at about 50-70%, due to the use of the cashier trainer (Oprins & Korteling, 2012).

If the upward trend in the use of simulations continues, research on simulations is of major importance to provide well-designed simulations. Current research about simulations mainly focuses on simulations for the military (e.g. Mavor & Pew, 1998), pilot trainings (e.g. Jones et al., 1999), and healthcare (e.g. Issenberg, 2006). Yet, no research can be found on a simulation like the cashier trainer, except the research of Oprins and Korteling (2012). According to Emmerik (2004), there exists a lack of knowledge about instructional factors and training in relation to simulations. This research will contribute to more understanding of training and instructional factors in relation to simulations by the use of strategies for learning procedures developed by Smith and Ragan (1999). Also, the theory about reducing cognitive load from Mayer and Moreno (2003) is used. Mayer and Moreno (2003) argue that it would be worthwhile to release their theory on problem-based simulation games, online courses that require many hours of participation, and multimedia instruction that includes on-screen pedagogical agents, which also addresses the cashier trainer.

1. GENERAL DESCRIPTION OF THE CASHIER TRAINER

In this chapter, the general design of the cashier trainer will be described with the help of several print screens.

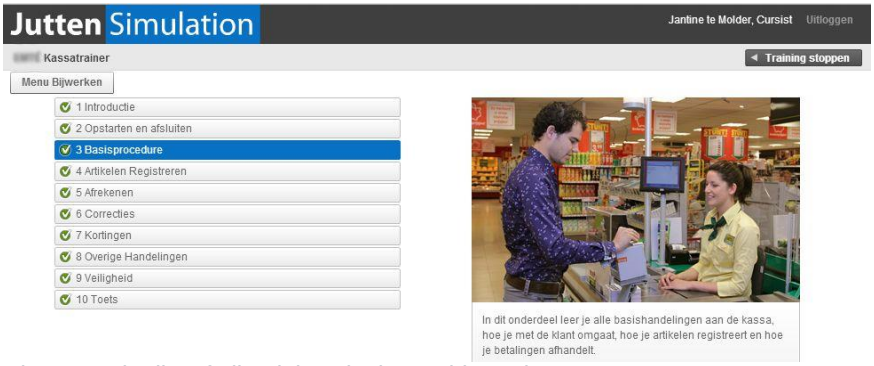

Figure 1: The list of all trainings in the cashier trainer

The cashier trainer is an online simulation where a new cashier will learn all important knowledge and skills to become a cashier. The cashier trainer is divided in several trainings, for example there is a training where new cashiers learn all about registering articles, a training about discounts, and a training about the basic procedure (figure 1).

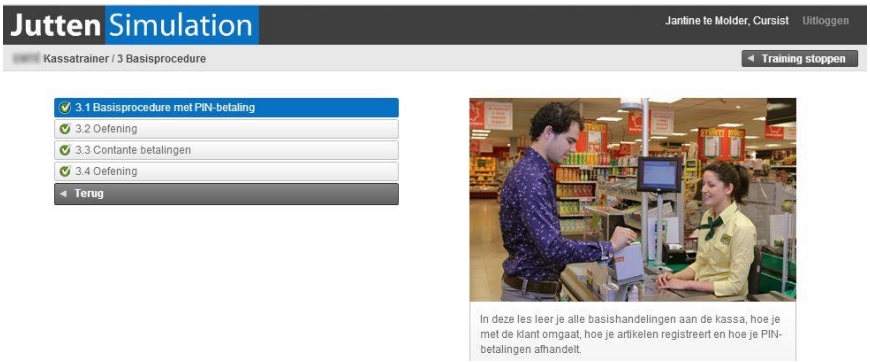

Figure 2: The training parts of the specific training for the 'basic procedure'

A specific training is divided in several parts (figure 2). For example, the training ‘basic procedure’ is divided in a demonstration of a PIN payment, an exercise of the PIN payment, a demonstration of a cash payment, and an exercise of a cash payment. The learner will first see the demonstration of all steps for the procedure, where after the learner has to exercise this procedure.

Figure 3: Demonstration and exercise environment

While exercising, a coach will inform the learner when something goes wrong. Also, the learner can consult this coach at any time by asking what he has to do or how he has to do it. In figure 3, the exercise

and demonstration environment is shown. The cash desk in the training is exactly the same as in the supermarket.

2. Design approach – The ADDIE model

In this chapter, the used design approach will be described.

This research is based on the ADDIE model (figure 4). This model is widely used for developing training programs and instructional courses. It provides clearly defined stages that increases the effectiveness of instruction and ensures an effective implementation of instruction (Allen, 2006; Peterson, 2003). This is is completely in line with the aim of this study. In the following chapters, all stages will be described. First, the analysis provides more clarity about the exact problem and its nature. This will lead to guidelines for the redesign of the cashier trainer in the design stage. In the stages of development and implementation, these guidelines are used to redesign specific parts of the cashier trainer. In the evaluation stage, the redesign is evaluated through a test with an experimental group and a control group.

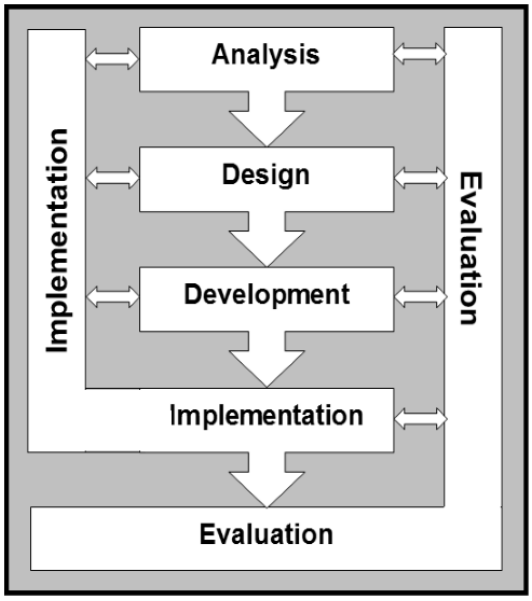

Figure 4: The ADDIE model

3. ANALYSIS

In this chapter, all analyzes will be described. First, the research of Oprins and Korteling (2012) is reviewed. Here after, cash managers and new cashiers are interviewed to provide more clarity about the gap between the competences acquired in the cashier trainer and the competences needed in the supermarket. This leads to the exploration and definition of the problem. Since the problem is related to the design of the cashier trainer, the design of the current cashier trainer is also analyzed.

3.1. PREVIOUS RESEARCH OF OPRINS AND KORTELING (2012)

Oprins and Korteling (2012) investigated the effectiveness of the cashier trainer. In their research, an experimental group (N=22) was trained with only the cashier trainer, and a control group (N=23) was trained according to the usual training procedures in the retail company. Both groups got three hours in total for training. Results showed that the experimental group gained higher scores on almost all training outcomes compared to the control group. However, also after being trained by the cashier trainer, the outcomes show that a certain amount of on the job training is needed. For example, the employees must acquire more routine in operating the cash desk, and have to develop their working speed, independence and accuracy. Also more general competences must be acquired further, like the stress component when there are rows of waiting customers. So, it can be said that there is a gap between the competences acquired in the cashier trainer and the competences needed in the supermarket.

3.2. INTERVIEWS WITH CASH MANAGERS AND NEW CASHIERS TRAINED BY THE CASHIER TRAINER

Interviews with five cash managers and five new cashiers trained by the cashier trainer provided clarity about this gap (appendix 1 and 2). Although Oprins and Korteling (2012) mainly observed the cashiers in their research, for this research interviews are chosen because of several reasons. First, the selected cash managers can provide more information than five or ten separate observations since these cash managers already supervised a total of ten to thirty cashiers trained by the cashier trainer. Therefore, they have a good overview of the competences new cashiers possess. Second, when new cashiers will be observed, they may be even more nervous than they already are at their first day or days of work which may affect their performances. Thereby, mistakes can be observed, but it may be hard to observe what tasks are experienced as difficult tasks for new cashiers, and why especially these tasks are difficult.

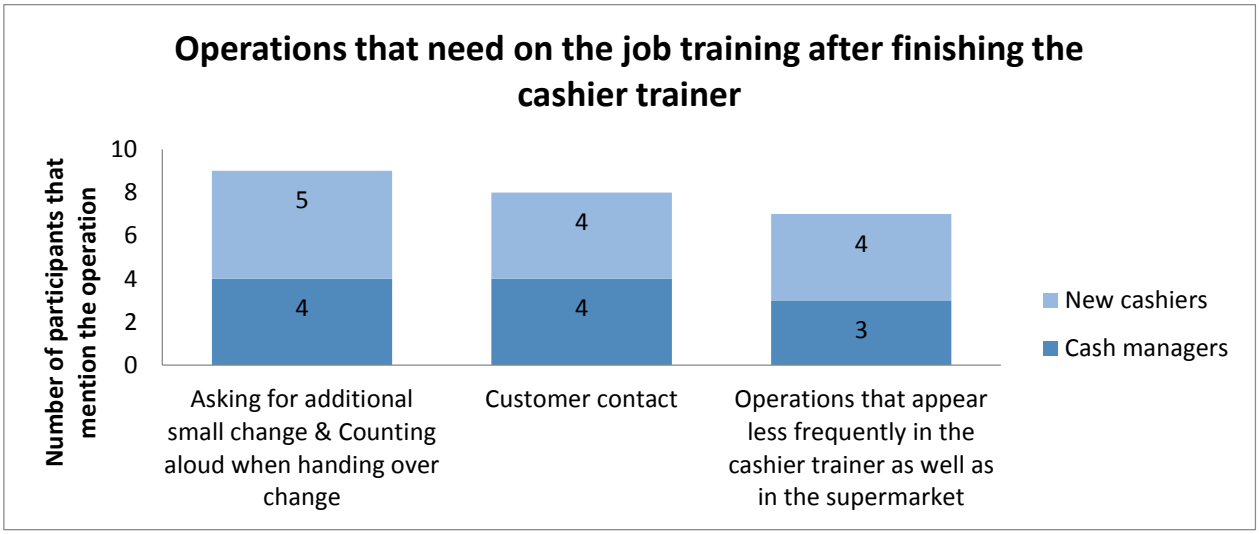

Figure 5: Operations that need on the job training after finishing the cashier trainer

In the interviews, cash managers and new cashiers were asked for what operations new cashiers needed on the job training. The three most mentioned operations can be seen in figure 5. As can be seen, asking for additional small change and counting aloud when handing over change are the most mentioned operations. According to the cash managers and new cashiers, these are also skills that are hard to learn behind the cash desk. When the cashier is not able to do it, this is most times learned during their breaks or they are advised by the cash manager to exercise at home with for example their

parents. A cashier can ask for additional small change in order to prevent giving a lot of small change to the customer. Giving a lot of small change each time can cause a shortage of small change in the cash drawer. Thereby, it is most times not appreciated by the client to receive a lot of small change, and it can take a long time to hand over all the coins. As an example, when the subtotal is €31,15 and the customer pays €50,00, the cashier initially has to hand over €18,85 change. This includes two notes and seven pieces of small change. However, when the cashier asks the customer for an additional amount of €1,15, the customer pays €51,15 and the cashier can give €20,- change, which is only one note. When handing over the change, the cashier has to count aloud. This means that the cashier gives the change from small to large (first coins, then notes) to the customer, whereby the cashier counts from the amount that had to be paid (subtotal) to the amount that is paid by the customer.

The second most mentioned operation is customer contact. This is mentioned as a big difference between the cashier trainer and the real work in the supermarket. In the supermarket, the cashiers have to talk, while in the cashier trainer they only have to click on the right sentence where after a voice over speaks. At the first days of work, new cashiers often don't talk aloud and have no real conversations with customers. This is usually caused by the fact that cashiers are more focused on executing the procedure itself in the right way, and sometimes are a little bit shy in the beginning. However, cashier managers and new cashiers mention that customer contact is a skill that is most times learned naturally at the workplace after a short period of time.

The third most mentioned are operations that appear less frequently in the cashier trainer as well as in the supermarket. These are for example corrections after making mistakes, handling coupons and discount stickers. Cashiers have learned and done this once in the cashier trainer, and these skills may not be used at the first days or weeks after the cashier trainer. Once the skills are needed, they forgot how to do it exactly. Nevertheless, most cashiers only need a little bit of help when they encounter these problems, and usually don't forget it anymore.

3.3. EXPLORATION AND DEFINITION OF THE PROBLEM

As mentioned before, asking for additional small change and counting aloud when handing over change are the most mentioned operations. Thereby, cash managers and new cashiers mention that it is hard to learn these operations behind the cash desk, whereas customer contact is more or less learned naturally at the workplace. Operations that appear less frequently do need extra support after the cashier trainer, but are not seen as such a big problem as asking for additional small change and counting aloud when handing over change. Asking for additional small change and counting aloud when handing over change are pointed out by the cash managers as very important skills because it can be annoying for both the customer and the cashier when the cashier is not able to do this. Also, asking for additional small change is sometimes really needed because small change may run out when the cashier does not ask for additional small change. However, it has to be mentioned that this is mainly a problem for cashiers that are weak at mathematics or have a lower level of education, according to the interviews with the new cashiers and cash managers. To solve this problem, the part of asking for additional small change and counting aloud when handing over change in the cashier trainer have to be redesigned. In paragraph 3.4, the current design of the cashier trainer will be analyzed according to several theories in order to discover weak points in the current design that can be improved. This will lead to guidelines for the redesign of the cashier trainer that will be described in chapter four.

3.4. THE DESIGN OF THE CURRENT CASHIER TRAINER

In chapter one, the general design of the cashier trainer is described. In this paragraph, the focus will be on the cash payment, the part of the training where asking for additional small change and counting aloud when handing over change belong to. The cash payment is a part of the training for learning the 'basic procedure', where the PIN payment also belongs to. In the training for the PIN payment, the learner will not only learn the specific part of the PIN payment, but also how to read the cash screen and general cashier tasks like greeting and scanning. These skills are also needed in the cash payment, that is learned after the PIN payment.

Figure 6: Asking for additional small change

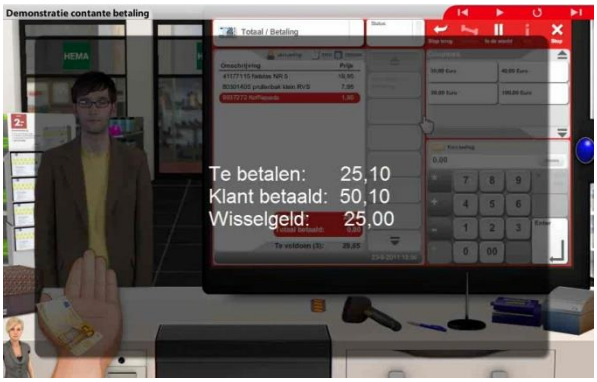

Figure 7: Asking for additional small change

In the cash payment, the learner is first told what he is exactly going to learn by a voice over. Thereafter, the demonstration begins. This demonstration shows the whole procedure of a cash payment, that takes 4.29 minutes. In this demonstration, the learner will learn how to ask for additional small change and how to count aloud when handing over change. How and when to ask for additional small change is learned with one example, explained by a voice over and supported with the screens depicted in figure 6 and 7. The following text is told by the voice over:

"Als een klant met een biljet wil betalen, kan het handig zijn om geld bij te vragen. Bijvoorbeeld wanneer een klant 25 euro en 10 cent moet betalen, en betaalt met een briefje van 50 euro. Je zou dan €24,90 terug moeten geven. Dit kost veel kleingeld. Om de uitgifte van kleingeld te beperken, vraag je in dit geval 10 cent kleingeld bij. De klant betaalt dan 50 euro 10. Als je het aankoopbedrag van 25 euro 10 hier van aftrekt, houdt je precies 25 euro over. 25 Euro kun je eenvoudig teruggeven in de vorm van briefgeld. Wanneer je kleingeld bij wilt vragen kan je kiezen uit de opties in het dialoogvenster. Kies hierbij het bedrag waardoor je minder munten hoeft terug te geven, maar niet onnodig veel geld aan de klant vraagt. Als de klant het geld heeft, zal deze het geven."

Counting aloud when handing over change is explained in the demonstration environment, where the voice over first explains how to do it and then shows how to do it. The following text is told by the voice over:

"De kassa geeft aan hoeveel wisselgeld de klant terug krijgt. Je verzamelt dit wisselgeld in je hand van groot naar klein. Zorg ervoor dat je zo weinig mogelijk geldstukken teruggeeft. Als je het wisselgeld verzameld hebt geef je het geld terug van klein naar groot. Tel hierbij terug naar het betaalde bedrag zodat de klant gemakkelijk kan controleren of deze de juiste hoeveelheid wisselgeld krijgt. Allereerst geef je het kleingeld terug: pak het muntgeld op, beweeg het geld naar de klant en laat het los bij het juiste bedrag. Vervolgens doe je hetzelfde met de losse biljetten."

Both asking for additional small change and counting aloud when handing over change are explained with one example. It should be considered whether this one example is sufficient for a learner to generalize the information in order to use it in every other situation. This is mainly the case for asking for additional small change, since a cashier does not always need to do this and thus needs to know about all situations in which it is applicable. In contrast to asking for additional small change, counting aloud when handing over change has to be done for every cash payment. Thereby, there is only one way to count aloud when handing over change: to count further from the subtotal to the amount of money paid by the customer. Presumably, this is a task that is not performed well because of the lack of mathematic skills of the cashier since they have to count at a fast pace with clients waiting. Another reason can be that in the cashier trainer the learner does not have to count aloud himself, but only has to click on the right amounts of money, where after a voice over counts aloud.

Besides learning these difficult tasks, the learner is expected to learn a lot of other steps of the procedure. For example, the learner also has to learn how, when and why to use the counterfeit detector and the afroambox, and how to enter amounts of money on the cash screen. Learning how and when to ask for additional small change is thereby explained quite at the beginning, where after the learner is provided with nine other steps and its sub steps. These nine steps also include counting aloud when

handing over change. After all, the learner has to keep a lot of information in his memory before he can exercise. Thereby, the learner gets all information at once, without a pause. The learner can decide for himself to press pause in the demonstration, but since the learner doesn't know what is still coming and how long the demonstration will take, it is hard to decide whether to press pause and when to do that.

3.5. ANALYSIS OF THE CURRENT CASHIER TRAINER

It can be concluded from paragraph 3.4 that the design of the current cashier trainer should be analyzed further. It should be considered whether this design supports learning asking for additional small change and counting aloud when handing over change, and whether learners are able to watch a demonstration with a length of 4.29 minutes including a lot of information that has to be kept in memory during the demonstration. Therefore, two theories are selected to analyze the design of the cashier trainer in order to discover the specific parts that have to be improved.

First, in paragraph 3.5.1, strategies for learning procedures of Smith and Ragan (1999) are used to analyze the general structure of the current design, in order to find out whether the current design is suitable for learning procedures. Second, in paragraph 3.5.2, the theory of Mayer and Moreno (2003) about reducing cognitive overload is used to discover whether cognitive overload may be the problem within the demonstration with a duration of 4.29 minutes and a lot of information at once. These analyzes will lead to the design guidelines for the redesign in chapter 4.

3.5.1. STRATEGIES FOR LEARNING PROCEDURES

According to Smith and Ragan (1999), the designer first has to clarify the procedure and list its steps in an unambiguous form. Since asking for additional small change and counting aloud when handing over change belong to a cash payment, the whole procedure of the cash payment is described in its operation steps, sub operations, decision points and following operation steps in table 1.

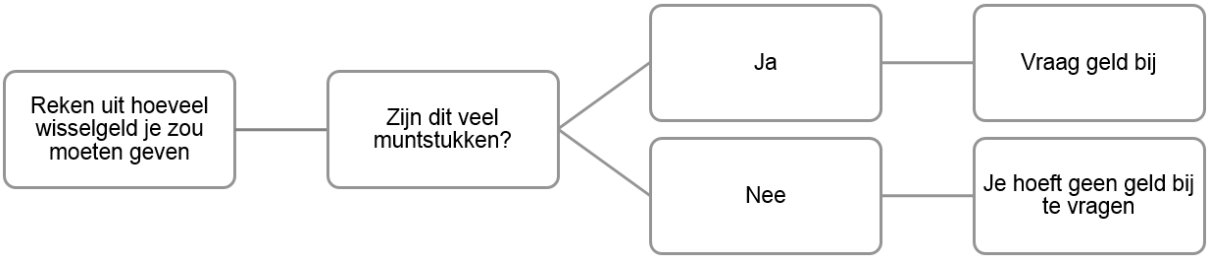

Figure 8: Scheme to decide whether it is efficient to ask for additional small change

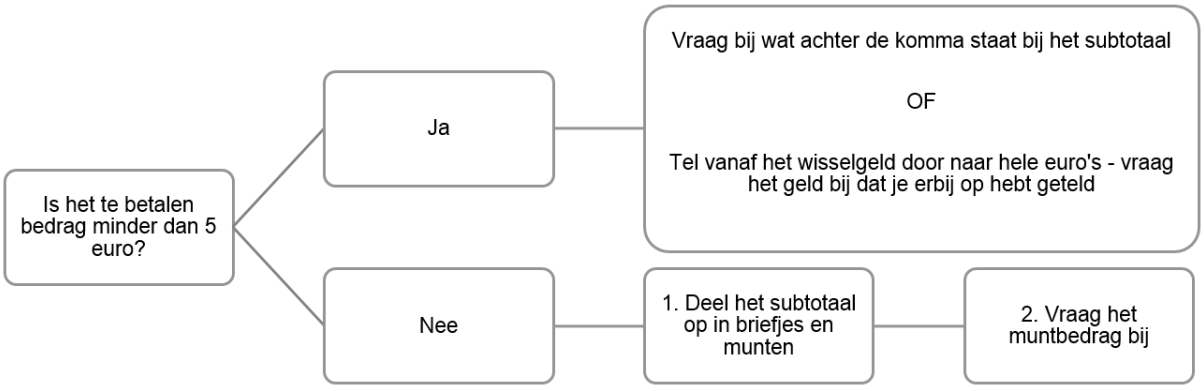

Figure 9: Scheme to decide how much additional small change to ask

While writing table 1, it became clear that asking for additional small change did not fit into the scheme like all other tasks. Asking for additional small change consists of more decision steps compared to the other steps of the cash payment. Therefore, the sub operations and decision steps are shown in figure 8 and 9. First, the learner has to decide whether to ask for additional small change. To decide this, the learner should follow the scheme of figure 8. The step '***zijn dit veel muntstukken***' can be a very difficult step, because the learner actually already has to figure out whether he can give less coins if he asks for additional small change. Additionally, if the learner decides to ask for additional small change, the learner has to follow the scheme of figure 9 in order to decide how much additional change to ask.

Step	Operation	Sub-operations	Decision?	Operation
1	Begroet de klant.			
2	Controleer of de klant alle producten op de band heeft liggen.	Vraag of je in de tas mag kijken. Kijk via de camera in de kar van de klant.	Heeft de klant nog producten?	Vraag of de klant de producten op de band wil leggen.
3	Scan alle producten			
4.	Vraag of de klant lege flessen heeft ingeleverd.		Heeft de klant lege flessen ingeleverd?	Scan de emballagebon. Streep de streepjescode door.
5	Klik op 'subtotaal'.			
6	Noem het totaalbedrag.	Rond af op 5 cent.		
7	Vraag de klant of hij met pin wil betalen.		Wil de klant met pin betalen? Wil de klant contant betalen?	Klik op pin/chip. Neem het geld in je hand.
8	Vraag geld bij indien dit handig is.			
9	Voer het betaalde bedrag in centen in.	Klik op 'contant' in het kassascherm.		
10	Controleer biljetten van €20 of meer met de valsgelddetector.	Houd het biljet onder de valsgelddetector.	Kleurt het lampje rood?	Vraag de klant of hij met ander geld of met pin kan betalen. Adviseer hem om met het biljet naar de bank te gaan ter controle.
11	Leg biljetten op de kassalade.			
12	Leg munten in de kassalade.			
13	Verzamel het wisselgeld in je hand van groot naar klein.			
14	Geef het wisselgeld terug van klein naar groot.	Tel hierbij hardop terug van het subtotaal naar het betaalde bedrag.		
15	Doe de emballagebon in de kassalade.	Sluit de kassalade.		
16	Vraag de klant of hij de kassabon wil hebben.			
17	Neem afscheid van de klant.			

Table 1: The procedure of a cash payment

Smith and Ragan (1999) distinguish between simple and complex procedures. Simple procedures consist of approximately seven steps and few to no decision points. As can be seen, the procedure of a cash payment consists of 17 steps with several decision points and thus can be seen as a complex procedure. A procedure can also be identified as complex because of the substantive difficulty of the procedure itself. This is the case with asking for additional small change and counting aloud when handing over change, for cashiers that are not that good at mathematics.

Simple procedures can be taught straightforwardly, while complex procedures have to be simplified for their initial instruction (Smith & Ragan, 1999). When the procedure is complex because of the number of steps, the solution is to chunk the steps into stages or phases. When the procedure is complex because of its difficulty, the way to simplify is to teach the most simple or common path through the procedure first. For asking for additional small change, the most simple path can be identified as only asking for extra cents, which is applicable for amounts of money below five euros. The more complex or difficult path through the procedure can be identified as asking for whole euros and cents, which is applicable with amounts of money higher than five euros. For counting aloud when handing over change, there is only one path through the procedure.

Introduction	*Deploy attention.* *Establish instructional purpose.* *Arouse interest and motivation.* *Preview lesson.*	• Ask question, demonstrate procedure, describe efficiency. • Describe procedure to be learned and range of applicability. • Emphasize efficiency and reliability of procedure. • Preview procedure in chunks.
Body	*Recall prior knowledge.* *Process information.* *Focus attention.* *Employ learning strategies.* *Practice.* *Evaluate feedback.*	• Review component concepts, subprocedures, or related principle. • Simplify complex procedures, situations that require procedures, steps in procedure, order of steps, how to evaluate correctness of application. May elaborate over several iterations. • Identify critical characteristics of situations requiring procedure, key cues to transitioning between steps, keywords for each step, cues for correct completion of procedure. • Use job aid, mnemonic for order of steps. • Identify situations requiring procedure, order of steps, completion of steps, correct completion of procedure. • Correct answer with explanation, checklist or rating scale, video feedback.
Conclusion	*Summarize and review.* *Transfer knowledge.* *Remotivate and close.*	• Review major steps in procedure related to principle, appropriate situations for application. • Relate to problem solving, more complex procedures. • Emphasize utility of procedure in terms of reliability and efficiency.
Assessment	*Assess performance.* *Provide feedback and remediation.*	• Identify to which procedure applies, correct order and completion of steps, recognize correctly completed procedure. • Identify common errors and misconceptions.

Figure 10: Key events for learning procedures (Smith & Ragan, 1999, p.202)

When teaching a procedure, four key events and their sub activities have to be addressed to learn the procedure (Smith & Ragan, 1999). Figure 10 shows a summary of those events and activities. A comparison of these key events with the current cashier trainer yielded several differences. In the current cashier trainer, the learner sees a demonstration of the whole procedure at once and thereafter has to exercise the whole procedure at once. However, according to Smith and Ragan (1999), the complete procedure may be demonstrated first at once, but thereafter has to be considered and demonstrated step by step whereby the learner has to practice each step immediately after it is presented. Also, no job aid is provided with the order of steps, that could support the learners' first practice attempts (Smith & Ragan, 1999). Asking for additional small change is in the current cashier trainer learned and exercised with one example, whereas Smith and Ragan (1999) recommend to show the learner various situations in which the procedure is applicable with its critical characteristics. The last difference is the way feedback is given for asking for additional small change. When it is efficient to do it, but the learner doesn't, the learner will only hear from the voice over '*Het was nu handig geweest om geld bij te vragen'*. According to Smith and Ragan (1999), the learner needs substantive feedback with explanation on how to do it.

3.5.2. REDUCING COGNITIVE OVERLOAD

In learning a procedure, simulations like the cashier trainer can provide meaningful learning, defined by Mayer and Moreno (2003, p. 43) as "deep understanding of the material, which includes attending to important aspects of the presented material, mentally organizing it into a coherent cognitive structure, and integrating it with relevant existing knowledge". However, in learning with simulations there is the potential for cognitive overload that hinders meaningful learning. Cognitive overload appears when the learner's intended cognitive processing exceeds the learner's available cognitive capacity (Mayer & Moreno, 2003). There are different types of cognitive overload that have to do with three kinds of cognitive demands. These cognitive demands are essential processing, incidental processing and representational holding. "Essential processing refers to cognitive processes that are required for making sense of the presented material, incidental processing refers to cognitive processes that are not required for making sense of the presented material but are primed by the design of the learning task, and representational holding refers to cognitive processes aimed at holding a mental representation in working memory over a period of time" (Mayer & Moreno, 2003, p. 45).

Load-Reduction Methods for Five Overload Scenarios in Multimedia Instruction

Type of Overload Scenario	*Load-Reducing Method*	*Description of Research Effect*	*Effect Size*
Type 1: Essential processing in visual channel > cognitive capacity of visual channel			
Visual channel is overloaded by essential processing demands.	Off-loading: Move some essential processing from visual channel to auditory channel.	Modality effect: Better transfer when words are presented as narration rather than as on-screen text.	1.17 (6)
Type 2: Essential processing (in both channels) > cognitive capacity			
Both channels are overloaded by essential processing demands.	Segmenting: Allow time between successive bite-size segments.	Segmentation effect: Better transfer when lesson is presented in learner-controlled segments rather than as continuous unit.	1.36 (1)
	Pretraining: Provide pretraining in names and characteristics of components.	Pretraining effect: Better transfer when students know names and behaviors of system components.	1.00 (3)
Type 3: Essential processing + incidental processing (caused by extraneous material) > cognitive capacity			
One or both channels overloaded by essential and incidental processing (attributable to extraneous material).	Weeding: Eliminate interesting but extraneous material to reduce processing of extraneous material.	Coherence effect: Better transfer when extraneous material is excluded.	0.90 (5)
	Signaling: Provide cues for how to process the material to reduce processing of extraneous material.	Signaling effect: Better transfer when signals are included.	0.74 (1)
Type 4: Essential processing + incidental processing (caused by confusing presentation) > cognitive capacity			
One or both channels overloaded by essential and incidental processing (attributable to confusing presentation of essential material).	Aligning: Place printed words near corresponding parts of graphics to reduce need for visual scanning.	Spatial contiguity effect: Better transfer when printed words are placed near corresponding parts of graphics.	0.48 (1)
	Eliminating redundancy: Avoid presenting identical streams of printed and spoken words.	Redundancy effect: Better transfer when words are presented as narration rather narration and on-screen text.	0.69 (3)
Type 5: Essential processing + representational holding > cognitive capacity			
One or both channels overloaded by essential processing and representational holding.	Synchronizing: Present narration and corresponding animation simultaneously to minimize need to hold representations in memory.	Temporal contiguity effect: Better transfer when corresponding animation and narration are presented simultaneously rather than successively.	1.30 (8)
	Individualizing: Make sure learners possess skill at holding mental representations.	Spatial ability effect: High spatial learners benefit more from well-designed instruction than do low spatial learners.	1.13 (2)

Note. Numbers in parentheses indicate number of experiments on which effect size was based.

Figure 11: Load reduction methods for five overload scenarios in multimedia instruction (Mayer & Moreno, 2003, p. 46)

On the basis of these cognitive demands, Mayer and Moreno (2003) describe a total of five types of overload, with possible methods for reducing the cognitive load and its research effect, that can be seen in figure 11. In the current cashier trainer, cognitive overload may cause the fact that learners are not able to count aloud when handing over change and to ask for additional small change. First, cognitive overload can be caused by the fact that the learner has to watch the whole procedure of a cash payment at once, and thereafter has to exercise the whole procedure at once. Hereby, also counting aloud when handing over change and asking for additional small change are included in the whole procedure. Type 2 of cognitive overload can be identified here, where both channels (visual and verbal) are overloaded with essential processing demands. “By the time the learner selects relevant words and pictures from one segment of the presentation, the next segment begins, thereby cutting short the time needed for deeper processing whereby available cognitive capacity is not sufficient to meet the required processing demands” (Mayer & Moreno, 2003, p. 47). The solution provided by Mayer and Moreno (2003) is to segment the training in learner controlled segments.

Second, type 3 of cognitive overload can take place while learning how and when to ask for additional small change. This is caused by the screen that supports the explanation of this procedure in the current cashier trainer. The translucent overlay that can be seen in figure 6 and 7 still shows a lot of the cash desk, which can be seen as superfluous material. According to Mayer and Moreno (2003, p. 48), “this can cause the learner to use limited cognitive resources on incidental processing, leaving less cognitive capacity for essential processing”. The solution provided by Mayer and Moreno (2003) is ‘weeding’, whereby the raining should be designed as simple as possible, with only the information that is needed in order to help the learner to select the relevant information.

4. DESIGN

From the analyzes it has become clear that several parts of the current cashier trainer are not in line with the theories of Smith and Ragan (1999) and Mayer and Moreno (2003). Therefore, the cashier trainer is redesigned at those parts. In this chapter, the guidelines that will be used for the redesign are described, where after in chapter 5 the development and implementation of these guidelines will be described and shown.

Initially, as described in the analysis, only the part of asking for additional small change and counting aloud when handing over change would be redesigned. However, as mentioned in paragraph 3.5, there are skills needed in the cash payment that are learnt in the PIN payment. Since the redesign will also be tested, whereby the exercise environment of the current cashier trainer will be used, learners have to be able to for example handle the cash desk, which is learnt in the PIN payment. Thereby, the redesign will be compared to the current design with an experimental and a control group. The control group has to do the PIN payment in order to be able to do the cash payment, since important general cashier skills are learnt in the PIN payment. Therefore, in the redesign the PIN payment is also included in order to make a fair comparison between the experimental group and the control group in the test (see chapter 6). This makes it also more meaningful to learn to ask for additional small change and counting aloud when handing over change, because the learner is familiar with the context of these procedures. Thereby, the theories of Smith and Ragan (1999) and Mayer and Moreno (2003) can be used at more points in the redesign, that may also foster learning to ask for additional small change and to count aloud when handing over change. Also, more data can be gathered that will contribute to the field of simulation research.

In chapter 3, the differences of the current design compared to the theories of Smith and Ragan (1999) and Mayer and Moreno (2003) are described. These differences lead to the following guidelines of the redesign for the procedures of a PIN payment and a cash payment:

- Include a job aid with the order of steps (Smith & Ragan, 1999).
- Include an introduction with a demonstration of the procedure, without explanation (Smith & Ragan, 1999).
- After the introduction, the demonstration has to be learned step by step (Mayer & Moreno, 2003; Smith & Ragan, 1999).
    - The procedure has to be simplified: chunk the steps into stages or phases (Smith & Ragan, 1999).
- After the demonstration of one step (or chunk of steps), the learner immediately has to practice (Smith & Ragan, 1999).
- The learner can decide when to move to the next step (Mayer & Moreno, 2003).
- After practicing step by step, the learner has to practice the whole procedure (Smith & Ragan, 1999).

Asking for additional small change will be learned beyond the cashier trainer environment. This is done because of two reasons. First, learning it beyond the cashier trainer can reduce cognitive overload for both the procedure of a cash payment and the procedure of asking for additional small change (Mayer & Moreno, 2003). Second, the design can be kept as simple as possible with only the information needed (Mayer & Moreno). Since Mayer and Moreno (2003) do not provide any additional guidelines on the structure of the design, the theory of Smith and Ragan (1999) will be used for this. The guidelines for asking for additional small change are as following:

- A separate training has to be designed, beyond the cashier trainer environment (Mayer & Moreno, 2003).
- The design has to be as simple as possible, with only the information that is needed (Mayer & Moreno, 2003).
- Include an introduction that points at the efficiency of the procedure (Smith & Ragan, 1999).
- Inform the learner of the purpose of the lesson (Smith & Ragan, 1999).
    - Which procedure is to be learned.
    - Its range of applicability.
- Simplify the procedure, learn the most simple or common path through the procedure first (Smith & Ragan, 1999).
    - The most simple path is defined as only asking for extra cents.

    - First, provide only situations in which asking for additional small change is required (Smith & Ragan, 1999).
    - Later, provide also situations in which asking for additional small change is not required (Smith & Ragan, 1999).
- Show the learner various situations in which the procedure is applicable with its critical characteristics (Smith & Ragan, 1999).
- Learn the more complex form of the procedure after finishing the simplest path through the procedure (Smith & Ragan, 1999).
    - The more complex form is defined as asking for whole euro's and cents.
- Provide substantive feedback when the learner makes a mistake (Smith & Ragan, 1999).

The explanation of counting aloud when handing over change itself can be identified as a good explanation, since there is also only one way to do this. Perhaps the biggest cause of not being able to count aloud when handing over change after the cashier trainer is that it is a small step within a lot of other steps, that will cause cognitive overload (Mayer & Moreno, 2003). Thereby, learners don't need to talk aloud in the cashier trainer, since the voice over speaks when they click on the right sentence. Hereby, the learner never exercised with really speaking aloud. The guidelines for counting aloud when handing over change are as following:

- Separate counting aloud when handing over change as one independent step from the other steps in the procedure for cash payments (Mayer & Moreno, 2003; Smith & Ragan, 1999).
- Ask the learner to already count aloud in the cashier trainer.

5. DEVELOPMENT AND IMPLEMENTATION

In this chapter, the redesign will be described with the help of print screens. First, the design of the training for PIN payments and cash-payments will be discussed, where after the design of the training asking for additional small change will be discussed. The PIN payment and cash-payment have more or less the same design. If the design is different for one of these, it will be mentioned.

The overall design is kept as simple as possible in order to reduce cognitive overload (Mayer & Moreno, 2003). Nevertheless, in order to give the learner an idea where he is at in the training, two colored strips are added in each screen. At the upper side of the screen, the strip is always blue. This strip tells the learner what procedure is to be learned, for example the procedure for a PIN payment or the procedure for a cash payment. The strip on the left side of the screen tells the learner if it is an introduction (red), a complete procedure (orange), a step by step explanation (light blue), or an exercise (green).

5.1. PIN PAYMENT AND CASH PAYMENT

Introduction

Figure 12: Introduction for a PIN payment

Figure 13: Introduction for a cash payment

First, the learner gets an introduction. Learners have to be informed of the purpose of the lesson both in terms of which procedure is to be learned and its range of applicability (Smith & Ragan, 1999). Here, the learner is introduced by a voice-over supported by a still image of the corresponding procedure (figure 12 and 13).

Figure 14: Demonstration of the actual application of the procedure

After the introduction, the learners' attention is gained by demonstrating the actual application of the procedure itself (figure 14). In this way, the purpose of the procedure will be clarified (Smith & Ragan, 1999). This demonstration does not include an explanation of the steps yet, but will give a good overview of the procedure to be learned. Since it is important to tell the learner that this demonstration is an

overview and they are not expected to learn the entire procedure at this point (Smith & Ragan, 1999), the learner will hear this first before watching the demonstration.

As can be seen at the right side of the screen in figure 14, the learner is provided with a job aid that will improve the learners' first practice attempts (Smith & Ragan, 1999). In this job aid, the procedure is simplified by chunking steps together since the procedure can be seen as complex by its number of steps (Smith & Ragan, 1999). These chunks are in this training the steps. For example, In step 8, the learner has to 1) Enter the amount of money paid by the customer in the checkout, and 2) Click 'cash' at the checkout. These are initially separate steps, but belong more or less together. The full list of steps in the job aid of the PIN payment are as following:

1. *Begroeten*
2. *In de tas kijken*
   Alles op de band?
3. *Scannen*
4. *Lege flessen?*
   Scan emballagebon
   Streep streepjescode door
5. **klik* Subtotaal*
   Noem het totaalbedrag (rond af op 5 cent
6. *Wilt u met pin betalen?*
   **klik* Pin/Chip*
7. *Emballagebon in kassalade*
   Kassalade sluiten
8. *Kassabon geven?*
   Afscheid nemen

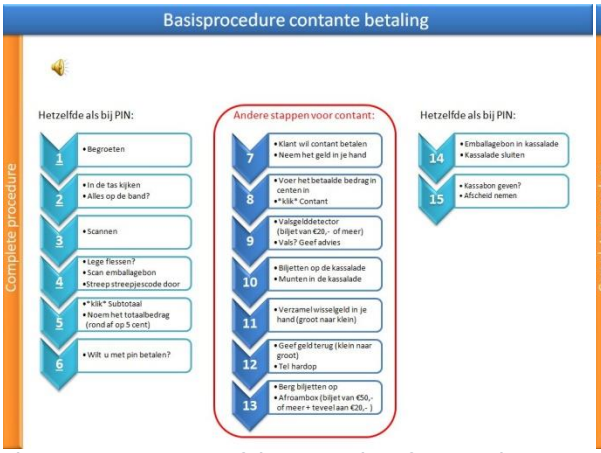

Figure 15: Summary of the procedure for a cash payment

Figure 16: Demonstration of a cash payment

For the cash payment, the demonstration of the complete procedure is a little different. Eight of the fifteen steps from the cash payment are the same as within the PIN payment. This is first made clear to the learner by figure 15, where step seven till thirteen are surrounded with a red line. These steps are different for the cash payment compared to the PIN payment, whereas the first six and last two steps are the same as within the PIN payment. A voice over will explain this. Hereafter, the learner will only get a demonstration of the specific steps for the cash payment, in order to simplify the procedure and because of the fact the learner already has learned the other steps (figure 16). Here, the learner is also provided with a job aid on the right side of the screen. The steps in the job aid of the cash payment are as following:

7. *Klant wil contant betalen*
   Neem het geld in je hand
8. *Voer het betaalde bedrag in centen in*
   **klik* Contant*
9. *Valsgelddetector (biljet van €20,- of meer)*
   Vals? Geef advise

10. *Biljetten op de kassalade*
    Munten in de kassalade
11. *Verzamel wisselgeld in je hand (groot naar klein)*
12. *Geef geld terug (klein naar groot)*
    Tel hardop
13. *Berg biljetten op*
    Afroambox (biljet van €50,- of meer + teveel aan €20,-)

Body

Figure 17: Demonstration of one step

Figure 18: Practicing one step

After demonstrating the whole procedure, each individual step should be considered and demonstrated separately (Smith & Ragan, 1999). The learner first watches the demonstration, where a voice over explains how and why to do the specific step (figure 17), where after the learner exercises the step immediately in the cashier trainer. Figure 18 shows the screen that indicates that the learner has to practice that step. The learner will be sent to the practice environment of the cashier trainer. When the step is executed in the wrong way, the learner hears a voice-over who gives feedback and the learner has to do the step again until it is done right. The training contains learner controlled segments, so after completing a step, the learner can decide when to move to the next step (Mayer & Moreno, 2003).

Figure 19: Counting aloud when handing over change

As can be seen in figure 19, counting aloud when handing over change is now demonstrated and practiced as one separate step. Thereby, before exercising, the learner is asked to count aloud already in the training by the following text: '*Tel nu alvast écht hardop, zodat je dat straks achter de kassa ook kan'*.

Conclusion & Assessment

Figure 20: Practicing the steps together as a whole

First, the learner is provided with all steps demonstrated and practiced separately. In the end of the training, the learner has to practice the steps together as a whole (Smith & Ragan, 1999). Occasionally, initial instruction may include a job aid to support the learners' first practice attempts, like in the redesign the list of steps on the right side of the screen when watching demonstrations (Smith & Ragan, 1999). However, after practicing step by step with the job aid, learners should practice without the job aid until they are proficient (Smith & Ragan, 1999). In the redesign this is realized by first giving the learner the opportunity to take a last look at the list of all steps, after which they have to click it away and execute the whole procedure in the cashier trainer (figure 20). Again, when something goes wrong, a voice-over will give feedback and the learner has to execute the step until it is done in the right way.

5.2. ASKING FOR ADDITIONAL SMALL CHANGE

Introduction

Figure 21: Introduction of asking for additional small change

First, the learner gets an introductory demonstration (figure 21). According to Smith and Ragan (1999), attention can be gained by pointing out the efficiency of the procedure. This is done by showing an inefficient way of handling a cash payment, where the cashier should have asked for additional small

change. This will be recognizable for the learner, who may also had to pick a lot of coins in the exercises of the cash payment. In the end of the demonstration, the learner is told that this is an inefficient way of handling a cash payment, and that it is more efficient at this point to ask for additional small change.

Body

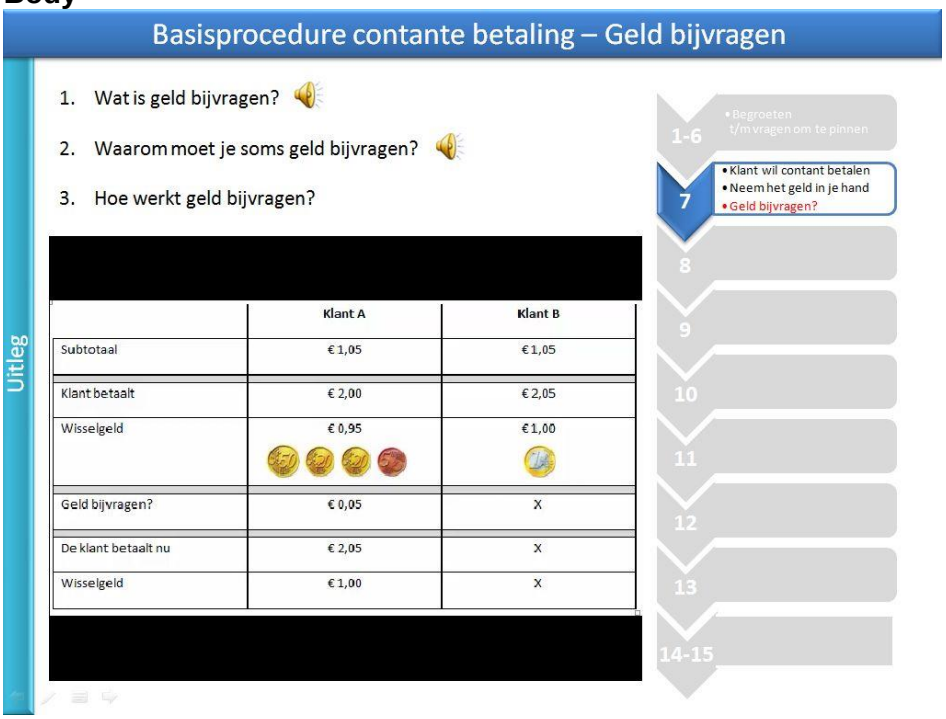

Figure 22: Purpose and efficiency

Then, the learner has to be informed of the purpose of the lesson, including the procedure to be learned and its range of applicability (Smith & Ragan, 1999). This is done in three parts as can be seen in figure 22. In part 1, '*Wat is geld bijvragen*?', the learner is told by a voice over what asking for additional small change exactly is. The following text is told by the voice over:

"We gaan even terug naar stap 7 van de contante betaling. Hier kan het namelijk handig zijn om geld bij te vragen. Maar, wat is geld bijvragen? Nadat je het totaalbedrag hebt genoemd, zal de klant je bij een contante betaling het geld geven. Vaak geeft een klant niet het precieze totaalbedrag, maar iets meer. Daarom moet je wisselgeld geven. Soms moet je dan veel muntgeld teruggeven, bijvoorbeeld bij 95 cent aan wisselgeld. Dit kost je 4 muntstukken. Het is dan slim om geld bij te vragen. Misschien heb je dat al wel eens gehoord in een winkel. De caissière vraagt je dan bijvoorbeeld: Heeft u er misschien 5 cent bij? Dit heet geld bijvragen."

In part 2, '*Waarom moet je soms geld bijvragen*?', the learner is told by a voice over why it is efficient to do it. The following text is told by the voice over:

"Je vraagt geld bij zodat je minder muntstukken hoeft terug te geven. Hierdoor ben je minder lang bezig met wisselgeld tellen. Ook zorg je er zo voor dat er altijd voldoende muntgeld in de kassalade blijft. Daarnaast vinden de meeste klanten het fijn om niet zoveel munten in hun portemonnee te hebben."

	Klant A	Klant B
Subtotaal	€ 1,05	€ 1,05
Klant betaalt	€ 2,00	€ 2,05
Wisselgeld	€ 0,95 	€ 1,00 
Geld bijvragen?	€	X
De klant betaalt nu	€	X
Wisselgeld	€	X

Figure 23: Demonstration of the efficiency of asking for additional small change

In part 3, '*Hoe werkt geld bijvragen*?', the learner learns how and when to ask for additional small change by watching a demonstration. In this demonstration, a voice over tells about the efficiency of this procedure and how it works by comparing two clients (figure 23). Both clients have to pay the same, but client B pays another amount of money whereby the cashier can give less change compared to client A. While explaining, the table is filled in part by part and the parts the voice over is telling about are highlighted blue as can be seen in figure 23, or an arrow points at it. Table 2 shows the script that belongs to this demonstration.

Text told by the voice over	**On screen**	**Place in table**
Klant A moet 1 euro en 5 cent betalen.	1,05 is typed	Klant A, subtotaal
Klant A betaalt met 2 euro.	2,00 is typed	Klant A, klant betaalt
Het wisselgeld dat jij als caissiere terug moet geven is dus 95 cent.	0,95 is typed	Klant A, wisselgeld
Dit zijn 4 muntstukken.	Coins are placed	Klant A, wisselgeld
Klant B moet net als klant A 1 euro en 5 cent betalen.	1,05 is typed	Klant B, subtotaal
Maar, klant B betaalt 2 euro en 5 cent.	2,05 is typed	Klant B, klant betaalt
Het wisselgeld dat jij als caissiere terug moet geven is dus 1 euro.	1,00 is typed	Klant B, wisselgeld
Dit is maar 1 muntstuk.	Coin is placed	Klant B, wisselgeld
Zoals je ziet hoef je bij klant B maar 1 muntstuk terug te geven.	Arrow points at the 1 euro coin of client B	Klant B, wisselgeld
Dit gaat veel sneller dan de 4 muntstukken bij klant A.	Arrow points at the 4 coins of client A	Klant A, wisselgeld
Dit komt doordat klant B 5 cent méér heeft betaald dan klant A.	2,05 of client B and 2,00 of client A are highlighted	Klant B, klant betaalt Klant A, klant betaalt
Hierdoor kan je ook 5 cent meer teruggeven.	1,00 of client B and 0,95 of client A are highlighted	Klant B, wisselgeld Klant A, wisselgeld
Als je bij klant A ook 1 euro als wisselgeld zou willen geven, moet je geld gaan bijvragen aan de klant.	The cursor is placed	Klant A, geld bijvragen?
In dit geval is het handig om 5 cent bij te vragen.	0,05 is typed	Klant A, geld bijvragen?
De klant betaalt hierdoor 2 euro en 5 cent.	2,05 is typed	Klant A, de klant betaalt nu
Het wisselgeld dat je nu dus kan geven is 1 euro.	1,00 is typed	Klant A, wisselgeld
Hoeveel geld je moet bijvragen kan je op twee manieren ontdekken. Hoe je dit doet wordt op de volgende dia uitgelegd."	/	/

Table 2: Script for the demonstration 'the efficiency of asking for additional small change'.

	Klant A
Subtotaal	€ 1,05
Klant betaalt	€ 2,00
Wisselgeld	€ 0,95 
Geld bijvragen?	€ 0,05
De klant betaalt nu	€ 2,05
Wisselgeld	€ 1,00

Figure 24: How to ask for additional small change

After pointing at the efficiency, the learner has to learn when to ask for additional small change and how much small change to ask (Smith & Ragan, 1999). Since this procedure is complex according to its substantive difficulty, the most simple or common path through the procedure should be learned first (Smith and Ragan, 1999). For this procedure, the most simple path is defined as only asking for extra cents. The learner can find out how much additional small change to ask in two ways. The learner is provided with both ways in two separate demonstrations. Both ways are explained with the same example and same table, that can be seen in figure 24. The first demonstration explains how the learner can really calculate the amount of small change to ask by counting further from the amount of change to whole euro's. This way provides more insight in how and why to ask for a certain amount of small change. The script of this demonstration can be seen in table 3. The second explanation is more like a mnemonic. The learner learns that he can ask what is behind the comma in the subtotal. The script of this demonstration can be seen in table 4.

Text told by the voice over	**On screen**	**Place in table**
Je ziet dat je veel muntgeld als wisselgeld moet geven.	Arrow points at the coins	Wisselgeld
Je wilt minder muntgeld geven.	/	/
Tel vanaf het wisselgeld dat je nu moet geven verder naar het dichtstbijzijnde bedrag in hele euro's.	€0,95 is highlighted	Wisselgeld
In dit geval ligt 1 euro het dichtst bij 95 cent.	€0,95 is highlighted	Wisselgeld
Om bij 1 euro te komen moet je er 5 cent bij op tellen.	€0,95 is highlighted	Wisselgeld
Het bedrag dat je erbij optelt moet je bij vragen aan de klant.	€0,95 is highlighted	Wisselgeld
In dit geval vraag je dus 5 cent bij.	€0,05 is highlighted	Geld bijvragen?

Table 3: Script for the demonstration 'counting further from the amount of change to whole euro's'

Text told by the voice over	**On screen**	**Place in table**
Je ziet dat je veel muntgeld als wisselgeld moet geven.	Arrow points at the coins	Wisselgeld
Je wilt minder muntgeld geven.	/	/
Kijk of er centen achter de komma staan bij het subtotal.	05 (in €1,05) is highlighted	Subtotaal
In dit geval is dat dus 5 cent.	05 (in €1,05) is highlighted	Subtotaal
Vraag dit bedrag bij aan de klant.	€0,05 is highlighted	Geld bijvragen?

Table 4: Script for the demonstration 'asking what is behind the comma in the subtotal'

Figure 25: Exercise one

Figure 26: Subsequent exercises

As stated before, it is important to exercise immediately after something is learned (Smith & Ragan, 1999). This is also the case within asking for additional small change. According to Smith and Ragan (1999), first the learner has to determine if the procedure is required whereby only situations will appear where the procedure is clearly required. Therefore, the learner will first get exact the same situation as showed in the demonstration, where the learner has to decide in which situation asking for additional small change is required (figure 25). Thereafter, the learner will get several exercises with only one client but different amounts of money, where the learner has to decide if it is efficient to ask for additional small change, and how much small change to ask (figure 26). Thereby, later on there will also be an exercise where it is inefficient to ask for additional small change.

Figure 27: Feedback after making a mistake

When the learner makes a mistake, substantive feedback is provided in the form of a hint (figure 27). With the help of this hint, the learner has to adjust his answer and choose the right one.

	Geen geld bijvragen	Centen bijvragen	Euro's én centen bijvragen
Subtotaal	€ 6,10	€ 6,10	€ 6,10
Klant betaalt	€ 10,00	€ 10,00	€ 10,00
Geld bijvragen	X	€ 0,10	€ 1,10
Klant betaalt nu	X	€ 10,10	€ 11,10
Wisselgeld	€ 3,90 	€ 4,00 	€ 5,00 

Figure 28: Pointing at the efficiency of asking for whole euros and cents

	Voorbeeld 1	Voorbeeld 2	Voorbeeld 3
Subtotaal	€ 6,10 	€ 12,20 	€ 31,15 
Klant betaalt	€ 10,00	€ 20,00	€ 50,00
Geld bijvragen	€ 1,10	€ 2,20	€ 1,15
Klant betaalt nu	€ 11,10	€ 22,20	€ 51,15
Wisselgeld	€ 5,00 	€ 10,00 	€ 20,00 

Figure 29: Explanation of how and when to ask for whole euro's and cents

As mentioned before, first the most simple or common path is demonstrated, where after the more complex path is demonstrated because of the substantive difficulty of the procedure that makes it a complex procedure according to Smith and Ragan (1999). After exercising with the simplest form, thus only asking for additional cents, the learner will see a demonstration of the more complex form where he learns to ask for whole euros and cents. In this demonstration, two tables are used (figure 28 and figure 29). First, the learner is told and showed that asking for cents and whole euros can be more efficient than only asking for cents, by comparing the situation of not asking for additional change, asking for additional cents and asking for additional cents and euro's (figure 28). Hereafter, the learner gets an explanation on how and when to do this with the help of three examples (figure 29). The script for this demonstration can be seen in table 5. After the demonstration of asking for whole euros and cents, the learner again gets exercises in which he has to decide whether to ask for additional small change and how much to ask. Here, the same design is used as explained with figure 25, 26 and 27 with other amounts of money.

	Text told by the voice over	On screen	Place in table
Corresponding figure: Figure 28	Er komt een klant bij de kassa.	/	Column 1, geen geld bijvragen
	De klant moet 6 euro en 10 cent betalen.	€6,10 is highlighted	
	De klant betaalt met 10 euro.	€10,00 is highlighted	
	In deze kolom zie je wat er gebeurt als je geen geld bijvraagt.	Collumn 'geen geld bijvragen' is highlighted	
	Je zou dan 3 euro en 90 cent wisselgeld moeten geven.	€3,90 is highlighted	
	Dit kost veel muntgeld zoals je ziet.	Arrow points at the coins	
	In deze kolom zie je hoe je het tot nu toe steeds hebt gedaan.	Column 'Centen bijvragen' is highlighted	Column 2, centen bijvragen
	Je vraagt centen bij.	Column 2, 'Centen bijvragen' is highlighted	
	In dit geval 10 cent.	€0,10 is highlighted	
	Het getal dat achter de komma staat bij het subtotal.	'10' of €16,10 is highlighted	
	Hierdoor betaalt de klant 10 euro en 10 cent,	€10,10 is highlighted	
	en kan je gemakkelijk 4 euro wisselgeld teruggeven.	€4,00 is highlighted	
	Dit zijn 2 muntstukken, heel wat minder dan in de eerste kolom.	Arrow points at the coins	
	Maar, je kan er bij dit bedrag zelfs voor zorgen dat je helemaal geen munten hoeft terug te geven, maar alleen maar één briefje.	/	Column 3, euro's en centen bijvragen
	In deze kolom zie je hoeveel geld je dan bij zou moeten vragen.	Column 3 is highlighted	
	Zoals je ziet, is dat 1 euro en 10 cent.	€1,10 is highlighted	
	Hierdoor betaalt de klant 11 euro en 10 cent,	€11,10 is highlighted	
	en kan je 5 euro teruggeven.	€5,00 is highlighted	
	Je vraagt dus niet alleen centen bij die achter de komma van het subtotaal staan, maar ook nog 1 euro.	/	
Corresponding figure: Figure 29	Hoe werkt dit?	/	Voorbeeld 1
	Kijk naar voorbeeld 1.	Column 1 is highlighted	
	Het subtotaal is dus 6 euro en 10 cent, dit is wat de klant moet betalen.	€6,10 is highlighted	
	Maar de klant betaalt 10 euro.	€10,00 is highlighted	
	Je vraagt dus 1 euro en 10 cent bij.	€1,10 is highlighted	
	Hierdoor betaalt de klant 11 euro en 10 cent,	€11,10 is highlighted	
	waardoor je 5 euro wisselgeld kan geven.	€5,00 is highlighted	
	Als je goed kijkt, zie je dat het geld dat je bijvraagt hetzelfde is als de munten uit het subtotaal bedrag.	€1,10 is highlighted and an arrow points at the coins	
	Wat je dus eigenlijk doet, is het subtotaal opdelen in briefjes en munten.	Arrow points at the money in 'subtotaal'	
	Dus, 6 euro en 10 cent bestaat uit een briefje van 5 euro, een munt van 1 euro en een munt van 10 cent.	Arrow points one after the other at the 5 euro note, 1 euro coin and 10 cents	
	Het muntgeld bedrag is dus 1 euro en 10 cent.	Arrow points at the 1 euro coin and 10 cents	
	Dit vraag je bij aan de klant.	€1,10 is highlighted	
	Zo gaat het ook in voorbeeld 2.	Column 'voorbeeld 2' is highlighted	Voorbeeld 2
	De klant moet hier 12 euro en 20 cent betalen.	€12,20 is highlighted	
	De klant betaalt 20 euro.	€20,00 is highlighted	

	Als je niet zou bijvragen, moet je 7 euro en 80 cent wisselgeld geven, dit zijn 4 munten en 1 briefje.	/	
	Kijk je nog eens goed naar het subtotaal, dan zie je dat dit bestaat uit een briefje van 10, een munt van 2 euro en een munt van 20 cent.	Arrow points one after another at the 10 euro note, 2 euro coin and 20 cents	
	Vraag je 2 euro en 20 cent bij,	€2,20 is highlighted	
	dan hoef je alleen nog maar een briefje van 10 euro terug te geven.	Arrow points at the 10 euro note in 'wisselgeld'	
	Als laatste voorbeeld 3.	Column 'voorbeeld 3' is highlighted	Voorbeeld 3
	De klant moet 31 euro en 15 cent betalen.	€31,15 is highlighted	
	De klant betaalt met een briefje van 50 euro.	€50,00 is highlighted	
	Je ziet dat dit veel kleingeld gaat kosten.	Arrow points at the notes and coins in 'subtotaal'	
	Bekijk het subtotaal nog eens en bedenk welk muntgeld hierin zit. In dit geval dus 1 euro en 15 cent.	Arrow points one after another at the 1 euro coin, 20 cents and 5 cents	
	Dit vraag je bij aan de klant.	€1,15 is highlighted	
	Hierdoor betaalt hij 51 euro en 15 cent,	€51,15 is highlighted	
	en kan je makkelijk een briefje van 20 euro teruggeven.	Arrow points at the 20 euro note	

Table 5: Script for the demonstration 'asking for whole euro's and cents'.

Conclusion & Assessment

Figure 30: How to ask for additional small change in the cashier trainer

Learning how to ask for additional small change ends with a demonstration which shows how to ask for additional small change in the cashier trainer with an example, explained by the voice over and showed at the screen (figure 30). Here after, the learner has to do a whole cash payment in the cashier trainer, where he should especially look after asking for additional small change.

6. EVALUATION

In this chapter, the way the redesign is evaluated will be described.

6.1. RESPONDENTS

A total of 12 respondents (4 male, 8 female) were recruited. All respondents are at the age of 15 or 16, follow VMBO-training and have no cashier-experience. It is chosen to recruit respondents at this age and with VMBO training because this is the minimum entry requirement for new cashiers. Also, the analysis showed that most times learners with a low educational level or learners who are less good at mathematics have problems with asking for additional small change and counting aloud when handing over change. Thus, at least this target group has to be competent after finishing the training. The respondents are recruited by snowball sampling. Snowball sampling is used since the researcher neither the company Jutten Simulation has a network with these types of respondents to be able to take a random sample. The researcher contacted several respondents with the desired characteristics, where after the social network of these persons is used to recruit similar respondents.

6.2. PROCEDURE

The test is executed at the participants own home or the home of the researcher. Participants were allowed to choose where to do the test. A total of 3 participants chose the home of the researcher, a total of 9 participants chose their own home. At their own home, participants were allowed to choose a place comfortable for them, at the researchers home all participants did the test in the office. Respondents were randomly assigned to the experimental group who executed the redesigned cashier trainer (N=6), or the control group who executed the current cashier trainer (N=6). It is not told to the participants whether they were in the experimental or control group. Hereby, the participants should act and answer objective. Although asking for additional small change and counting aloud when handing over change belong to the part of cash payments, both groups first executed the PIN payment in order to get to know the cash system and learn other basic skills like greeting and scanning. Both groups received the same amount of exercises in the cashier trainer. In total, both groups executed the PIN payment two times and the cash payment three times in the cashier trainer. The experimental group was provided with two screens. On one screen, the redesigned cashier trainer was showed with all demonstrations and explanations. On the other screen, the corresponding exercise in the cashier trainer was showed. This is done because it was not possible to include the exercise environment of the training in the redesign.

6.3. DATA COLLECTION

First, during the exercises of both the control group and experimental group, time is recorded and errors are counted for every exercise. After the training, both groups got the same interview, knowledge test and skills test (appendix 3). The interview and tests are all recorded with a video camera in order to be able to analyze everything in detail. In the interview, questions were asked about the difficulty of the training, the amount of explanation and exercise, and how confident they are about several cash tasks, like handling a cash payment and asking for additional small change. The knowledge test focused on the underlying principles of tasks, like why is it useful to ask for additional small change. In the skills test, the participants got a cash drawer with money and had to fulfill the function of cashier. The researcher was the customer who had to pay six different amounts, but always paid too much. The cashier had to decide whether to ask for additional small change or not, and if asking for additional small change was applied, they also had to decide how much to ask. To finish, the cashier needed to give change in the right way to the customer, which means counting aloud in the right way.

7. TEST RESULTS

Data is gathered by counting mistakes in the exercises in the cashier trainer, recording the time of these exercises, an interview about the general experience of the training and the learners' confidence about learned tasks, and a knowledge and skills test about cash payments. In this chapter, all these different types of data will be described in separate paragraphs. Each paragraph also includes a table with results from all the participants together. A full list of the results, including the results for each participant separately, can be found in appendix 6.

7.1. MISTAKES

Table 6 shows the amount of mistakes made in the exercises. Participants in the experimental group got the first exercise in steps and the second (and third for the cash payment) exercise at once. In the first exercise they had to execute each step right after it was explained. The control group got the whole explanation at once and executed all exercises at once. For the PIN payment, it is remarkable that the control group first made more mistakes compared to the experimental group, but thereafter halved the mistakes from eight in the first exercise to four in the second exercise, whereas the mistakes of the experimental group increased from two mistakes in the first exercise to five mistakes in the second exercise. The cash payment shows somewhat the same 'line' for both groups. Both groups make more mistakes in the second exercise compared to the first, but improve themselves in the third exercise.

		Control group			**Experimental group**		
		Total	Mean	SD	Total	Mean	SD
PIN payment	Exercise 1	8	1,3	0,8	2	0,3	0,5
	Exercise 2	4	0,7	0,8	5	0,8	0,8
Cash payment	Exercise 1	12	2	1,4	15	2,5	1,1
	Exercise 2	16	2,7	1,5	17	2,8	1,7
	Exercise 3	10	1,7	1,4	9	1,5	1,1

Table 6: Amount of mistakes made in the exercises

7.2. TIME

Table 7 shows the time spent on exercises. The experimental group took far more time for the first exercises. This is caused by the fact that the experimental group gets the first exercise step by step, including the step by step demonstration with explanation about the steps. Time is recorded from the demonstration of the first step until the last step is performed in the exercise. Therefore, the time of the first exercises from the control group and the experimental group can't be compared to each other. For the other exercises of both the PIN payment and cash payment, the control group needed the least amount of time.

		Control group			**Experimental group**		
		Total	Mean	SD	Total	Mean	SD
PIN payment	Exercise 1	18,3	3.05	0,62	76.29	12.72	1,68
	Exercise 2	14,47	2.41	0,35	16.01	2.67	0,28
Cash payment	Exercise 1	16,36	3.27	1,46	69.47	11.58	1.99
	Exercise 2	22,87	3.81	1,5	22.23	3.71	1,59
	Exercise 3	12,89	2.15	0,31	16.09	3.22	1,52

Table 7: Time spent on exercises

7.3. INTERVIEW - EXPERIENCES

Table 8 shows the participants' experiences with the cashier trainer. Most easy tasks for both the control group and the experimental group were the first steps, including scanning and greeting. The most difficult tasks for both groups refer to cash payments. Both groups were mostly satisfied about the amount of explanation and exercises. Only in the control group there were some negative responses. The negative responses were 'the cash payment was too much at once', 'it is difficult that the explanation is completely given before exercising, maybe it will be more easy if you can exercise during the demonstration', 'too less exercises', and 'I would rather learn this in real life'. However, the latter two

responses are not specific for the training of the control group, since both groups got the same amount of exercises and both groups learned on a computer. Therefore, these are not included in table 8.

	Control group	**Experimental group**
Easy	First steps	First steps
Difficult	Counting aloud when handing over change	Whole cash payment
	Asking for additional small change	Asking for additional small change
Amount and way of exercising and explanation	2 negative	0 negative

Table 8: Participants' experiences with the cashier trainer

7.4. INTERVIEW – SELF CONFIDENCE

Table 9 shows the participants' self-confidence about several tasks. Participants had to grade their own confidence for several tasks, where 1 indicates that they are not confident about the task and 5 indicates that they are very confident about the task. Over all, participants of the experimental group were more confident than the control group. The greatest difference of confidence shows up by the task of counting aloud when handing over change. The control group give their confidence for this task an average of 2.3, where the experimental group scores a 3.1. Also for a PIN payment the experimental group scores higher than the control group. For a cash payment and asking for additional small change both groups are equally confident .

	Control group		**Experimental group**	
	Mean	SD	Mean	SD
PIN payment	3,7	0,8	4,1	1
Cash payment	2,9	0,8	2,9	0,2
Counting aloud when handing over change	2,3	0,8	3,1	0,9
Asking for additional small change	2,8	1,5	2,8	0,8
All tasks together	2,9	1,1	3,2	0,9

Table 9: Participants' self-confidence about several tasks

7.5. KNOWLEDGE TEST

Table 10 shows the results of the knowledge test. The knowledge test consists of partly open questions about how and why to ask for additional small change and how and why to count aloud when handing over change. Since participants were free to give and explain their own answers, a wide range of answers came up among all participants. Therefore, answers are categorized into 'completely right answers', thus the desired answers, 'partly right answers' and 'wrong answers' (appendix 4 and 5). The experimental group gave more completely right answers and more partly right answers than the control group. However, it has to be taken into account that one question is not asked to a participant in the control group, which could have influenced the little difference on the score for partly right answers.

	Control group			**Experimental group**		
	Total	Mean	SD	Total	Mean	SD
Completely right answers	9	1,5	1,1	13	2,2	1,3
Partly right answers	9	1,5	1,1	10	1,7	0,8
Wrong answers	29	4,8	1,3	25	4,2	0,8

Table 10: Knowledge test

7.6. SKILLS TEST

Table 11 shows the results of the performances in the skills test for asking for additional small change and table 12 shows the results of the skills test for counting aloud when handing over change. Same as within the knowledge test, the answers of the skills test were categorized to completely right performances, partly right performances and wrong performances. For example, when the subtotal is

€31,15 and the customer gives €50,00, completely right will it be to ask €1,15 and partly right will it be to ask €0,15 (appendix 4 and 5).

Participants of the experimental group scored higher for completely right executions, but the control group executed more partly right. The control group counted aloud more often in the right way than participants in the experimental group. One participant of the control group counted aloud five times in the right way. However, this participant later on mentioned he sometimes helps his father in the restaurant behind the cash. This participant had no abnormal score for the rest of the skills test.

Also, there has to be taken into account that most of the amounts of money that are used for this test are already treated in the explanation or in exercises by the experimental group. For the control group, it is not known which amounts of money they had to encounter in the exercises, because the cashier trainer automatically picks a training that can be different for every participant.

As an example, all participants of the experimental group asked for the right amount of money within the first test-exercise (subtotal: €1,05, customer pays: €2,00), while four participants of the control group asked for the right amount of money in that exercise. This amount was treated three times in the explanation and one time in an exercise of the experimental group. In contrast, the amount of money in the last test-exercise (subtotal: €12,90, customer pays: €15,00) was neither treated in an exercise, nor in an explanation of the experimental group. For this test-exercise, the control group scored better (control group: 4 right, 1 partly right, 1 wrong, experimental group: 0 right, 1 partly right, 5 wrong).

	Control group			**Experimental group**		
	Total	Mean	SD	Total	Mean	SD
Completely right performances	13	2,2	1,2	15	2,5	0,5
Partly right performances	12	2	1,3	10	1,7	1
Wrong performances	11	1,8	1,3	11	1,8	1

Table 11: Performances on asking for additional small change

Control group			**Experimental group**		
Total	Mean	SD	Total	Mean	SD
18	3	2,5	10	1,7	1,9

Table 12: Amount of right performances on counting aloud when handing over change

8. DISCUSSION

The goal of this research was to redesign the cashier trainer in such a way that new cashiers do not need on the job training for asking for additional small change and counting aloud when handing over change after finishing the cashier trainer. This is realized by redesigning a part of the cashier trainer, focusing on especially asking for additional small change and counting aloud when handing over change. The redesign is based on the strategies of learning procedures of Smith and Ragan (1999) and ways to reduce cognitive overload of Mayer and Moreno (2003). In this chapter, the redesign will be discussed according to the test results described in chapter 7.

Although the participants of the experimental group have more self-confidence, they made more mistakes and took more time in the exercises. Looking at this amount of mistakes made and the time used for the training, the extended way of learning a procedure following the strategies of Smith and Ragan (1999) worked out less well than expected. However, the step by step approach may have caused the higher score on the knowledge test for the experimental group. The experimental group reproduced more right information in the knowledge test than the control group. This may be the result of the reduction of cognitive overload, that is achieved by giving the participants of the experimental group the control over the decision when to move to the next step. This gave them more time for the deeper processing of the information (Mayer & Moreno, 2003).

For the part of counting aloud when handing over change, the control group scored better in the skills test, but the experimental group is more self-confident about counting aloud when handing over change. Over all, only in 39% off all cases (control group ánd experimental group together), counting aloud when handing over change was done right. Thus, to only make it an independent step seems not to work, but the explanation itself about counting aloud when handing over change may also be improved according to this score.

Also the training of asking for additional small change in the redesign can still be improved. Although cognitive load is reduced and the strategies of Smith and Ragan (1999) are followed, the test results of the experimental group on asking for additional small change are not near the desired results. The ultimate goal is that “the learner is able to correctly apply the procedure across as diverse a range of difficulty and situations as the designer has prescribed” (Smith & Ragan, 1999, p. 197). However, results show that participants are not competent enough. Participants know how to handle amounts of money that were already treated in the explanation or in an exercise, but not all participants know how to handle amounts of money that were not treated. This can be caused by the participants’ lack of mathematical skills. As mentioned in paragraph 3.5.1, the learner has to decide whether the change he has to give is a lot, but actually already has to calculate whether he can give less change if he asks for additional small change. However, when someone is not that well at mathematics, it is hard to calculate from the head at a fast pace. Maybe, the general mathematical skills have to be improved first in order to be able to know how and when to ask for additional small change.

Besides the lack of mathematical skills as a cause, there are four places in the redesign that can still be improved. First, according to Smith and Ragan (1999, p. 193), “learners should see examples of the variety of situations in which the procedure is applicable and the characteristics of the situations that make them appropriate for the application of the procedure”. The learners now only performed good at the amounts of money that were already treated in the exercises or demonstrations. Therefore, it may be an option to provide the learner with even more situations in which asking for additional small change is applicable. Second, learners have to practice until they are proficient (Smith & Ragan, 1999). This was not the case in this part of the redesign of the cashier trainer, since technical skills for designing such an adaptive environment are not in the range of the designers’ abilities. Third, the redesign does not motivate learners to check the appropriateness of their completed procedures. Though, it is recommended by Smith and Ragan (1999, p. 196) “to include an opportunity for learners to view the process and/or product of a procedure and determine whether the procedure was correctly performed in practice”. Fourth, the stage of ‘conclusion’ in learning a procedure should include a summary of the

procedure including its efficiency and types of problems, goals or situations to which the procedure applies. This review will add meaningfulness which might not have been as apparent at the beginning of the lesson, which in its turn supports the transfer of learning (Smith & Ragan, 1999). In the redesign, the procedure is reviewed by showing the procedure in the cashier trainer. However not more than one situation to which the procedure applies is showed. Also the efficiency and types of goals or problems are not reviewed.

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9. CONCLUSIONS AND RECOMMENDATIONS

In this chapter, conclusions are drawn from the discussion in chapter eight. These conclusions lead to recommendations for further improvement of the cashier trainer and further research.

The problem that was defined as a lack of competence in asking for additional small change and counting aloud when handing over change is not completely solved by the redesign, but the test results give good insights into the weak and strong points of both the current design and the redesign. Also, the outcomes emphasize the need for a training especially for counting aloud when handing over change and asking for additional small change.

The step by step approach seems to provide more space for deeper processing which in its turn leads to a better memory of the information behind the operations of a procedure. However, it should be considered whether this outweighs the time needed and mistakes made in the step by step approach. In addition, it is not clear whether the step by step approach of the whole procedures of cash and PIN payments fosters learning how to count aloud when handing over change and how and when to ask for additional small change.

Counting aloud when handing over change should be examined further, since the redesign did not improve learning that task. The test results of both the experimental group and the control group indicate that it is a task that really needs more training. Asking for additional small change is learned beyond the cash trainer, what yielded higher scores on the knowledge test as well as on the skills test. Thus, it can be recommended to also design a separate training for counting aloud when handing over change. Here, the learner should get a clear explanation where after he has to exercise until he is proficient. Especially exercising is important, since there is only one path through the procedure, and mainly the mathematical skills are needed to count at a fast pace. Besides improving the mathematical skills for this procedure, research has to be conducted in order to discover what is needed for a new cashier to really count aloud immediately at the first day of work and how this can be realized in the cashier trainer, since the learner currently only has to click at a sentence where after the voice over speaks aloud.

Also asking for additional small change can be and has to be improved. Learning this task beyond the cashier trainer and with more explanation and examples seems to work well. However, the participants of the experimental group were still not competent enough at asking for additional small change. This shows that for this target group asking for additional small change is a complicated task that still needs more attention than already given in the redesign. To further improve the training of asking for additional small change, the four points mentioned in the discussion have to be taken into account. Thus, to show a larger variety of situations in which the procedure is applicable, let learners practice until they are proficient, let learners review the appropriateness of their completed procedures and include a more comprehensive stage of conclusion.

To conclude, it is possible to learn how to ask for additional small change in a simulation training. However, the redesign that is described in this research does still need a lot of improvement. Counting aloud when handing over change needs more research than conducted in this study. Besides all recommendations for the improvement of the cashier trainer, this research also brings new insights for simulation research. The segmentation of a procedure appears to provide a better memory of information, but also appears to provide more self-confidence. However, a reason for this can't be found in the theories of Smith and Ragan (1999) or Mayer and Moreno (2003). Also, further research is needed to find out why the step by step approach does not work that well for learning procedures like a cash and PIN payment in the cashier trainer.

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APPENDICES

APPENDIX 1 – INTERVIEW CASH MANAGER

Algemene informatie:

Aantal 'kassatrainer' caissières begeleid	
Aantal caissières getraind op de werkvloer	
Aantal jaren ervaring in begeleiden van caissières	

Interview vragen

1. Waar bereidt de kassatrainer caissières goed op voor?
    a. Waar bereidt de kassatrainer caissières goed op voor wat betreft de eerste werkdag?
    b. Waar bereidt de kassatrainer caissières goed op voor wat betreft de periode na de eerste werkdag?

2. Waar bereidt de kassatrainer caissières niet of in mindere mate op voor?
    a. Waar bereidt de kassatrainer caissières niet of in mindere mate op voor wat betreft de eerste werkdag?
    b. Waar bereidt de kassatrainer caissières niet of in mindere mate op voor wat betreft de periode na de eerste werkdag?

3. Op welke manier wordt een caissière die de kassatrainer heeft behaald begeleid op de werkvloer?
    a. Hoe worden deze caissières op de eerste werkdag begeleid?
    b. Hoe worden deze caissières in de periode na de eerste werkdag begeleid?

4. Op welke manier leert de caissière competenties waarover zij nog niet beschikt of waarin zij nog niet voldoende bekwaam is?
    a. Hoe worden deze competenties geleerd op de eerste werkdag?
    b. Hoe worden deze competenties geleerd in de periode na de eerste werkdag?

Indien de begeleider ook caissières heeft begeleid die getraind zijn zónder de kassatrainer:

5. Wat valt je op bij caissières die getraind zijn door middel van de kassatrainer, vergeleken met caissières die getraind zijn zónder de kassatrainer?
    a. Wat valt je op aan deze caissières op hun eerste werkdag?
    b. Wat valt je op aan deze caissières in de periode na hun eerste werkdag?

APPENDIX 2 - INTERVIEW NEW CASHIER

1. Hoeveel dagen voor je eerste werkdag heb je de kassatrainer voltooid?

2. Binnen welk tijdsbestek heb je de kassatrainer voltooid? (alles in één keer / verspreid over meerdere dagen / …)

3. Hoe heb jij de kassatrainer ervaren?
   (bij iedere vraag om uitleg + voorbeelden vragen)
   a. Wat heb je als heel makkelijk ervaren?
   b. Wat heb je als moeilijk en lastig ervaren?
   c. Wat vind je van de hoeveelheid uitleg?
   d. Wat vind je van de manier waarop iets wordt uitgelegd?
   e. Wat vind je van de hoeveelheid oefening?
   f. Wat vind je van de begeleiding in de kassatrainer?

4. Had je er vertrouwen in dat je je zou redden achter de kassa nadat je de kassatrainer had gedaan?
   a. Op een schaal van 1(weinig) tot 5(veel), hoeveel zelfvertrouwen had je voor je eerste werkdag?
   b. Kan je uitleggen waarom?

5. Waar was je goed op voorbereid…
   a. …op de eerste werkdag?
   b. …na een week werken?

6. Waar was je niet of minder goed op voorbereid…
   a. …op de eerste werkdag?
   b. …na een week werken?

7. Wat is volgens jou het grootste verschil tussen de kassatrainer en het werken achter de kassa in de supermarkt?

8. Op welke manier zou naar jouw idee de kassatrainer nog verbeterd kunnen worden?

APPENDIX 3 – EVALUATION: INTERVIEW, KNOWLEDGE TEST, SKILLS TEST

Interview
(bij iedere vraag om uitleg + voorbeelden vragen)

1. Wat heb je als heel makkelijk ervaren?
2. Wat heb je als heel moeilijk ervaren?
3. Wat vind je van de hoeveelheid uitleg?
4. Wat vind je van de manier waarop iets wordt uitgelegd?
5. Wat vind je van de hoeveelheid oefening?
6. Op een schaal van 1(*niet zeker*) tot 5(*zeer zeker*), hoe zeker ben je ervan dat je de basisprocedure voor een PIN-betaling goed uitvoert?
7. Op een schaal van 1(*niet zeker*) tot 5(*zeer zeker*), hoe zeker ben je ervan dat je de basisprocedure voor een contante betaling goed uitvoert?
8. Op een schaal van 1(*niet zeker*) tot 5(*zeer zeker*), hoe zeker ben je ervan dat je wisselgeld op de juiste manier teruggeeft aan de klant?
9. Op een schaal van 1(*niet zeker*) tot 5(*zeer zeker*), hoe zeker ben je ervan dat je weet hoe en wanneer je geld moet bijvragen aan de klant?

Kennistest
Geld bijvragen

1. Leg uit wanneer je geld moet bijvragen, geef een voorbeeld.
2. Leg uit waarom je geld moet bijvragen.

Wisselgeld geven

3. Leg uit hoe je wisselgeld teruggeeft aan een klant.
4. Leg uit waarom je dat op deze manier doet.

Vaardigheidstest
De participant en de interviewer zitten tegenover elkaar aan een tafel. De participant heeft een kassalade met geld voor zich. De interviewer is de klant en heeft een portemonnee met geld. De participant krijgt een stapeltje met genummerde kaartjes. Op ieder kaartje staat een ander totaalbedrag. De interviewer heeft eenzelfde aantal genummerde kaartjes waarop het te geven bedrag staat (zie tabel 1).

Iedere participant krijgt precies dezelfde uitleg:
'Jij bent de caissière, ik ben de klant. Je krijgt 6 verschillende bedragen te zien die ik moet betalen. Eerst noem je het te betalen bedrag, waarna ik zal betalen. Jij neemt dit geld aan en bepaalt of je al dan niet geld moet bijvragen. Als je bepaalt dat je dit moet doen, vraag je het bedrag bij. Ik zal dit bedrag aan jou geven als ik het in mijn portemonnee heb. Jij schrijft het uiteindelijk betaalde bedrag vervolgens op. Dit moet je opschrijven omdat we geen echte kassa hebben waar je het anders op zou invoeren. Vervolgens schrijf ik op hoeveel wisselgeld je moet teruggeven, waarna jij dit wisselgeld op de juiste manier aan mij teruggeeft'.

Verloop

1. De participant pakt het kaartje dat bovenop ligt en noemt het totaalbedrag.
2. De interviewer pakt het corresponderende kaartje en geeft het bedrag dat daarop staat
3. De participant bekijkt het gegeven bedrag en bepaalt of er geld bijgevraagd moet worden
4. De participant geeft het juiste wisselgeld en telt daarbij door.

Kaartje	**Totaalbedrag**	**Klant geeft**	**Geld bijvragen?**
1	€ 1,05	€ 2,00	Ja, €0,05
2	€ 8,95	€ 10,00	Nee (1,05)
2	€ 31,15	€ 50,00	Ja, €1,15
3	€ 12,00	€ 20,00	Ja, €2,00
4	€ 16,10	€ 20,00	Ja, €1,10
5	€ 12,90	€ 15,00	Nee (2,10)

APPENDIX 4 – FORM FOR RESULTS OF PARTICIPANTS IN THE CONTROL GROUP

TEST KASSATRAINER
VERSIE: HUIDIG

Gegevens participant

Nr.	
Geboortedatum	
Geslacht	
Opleiding	
Datum onderzoek	
Tijdstip onderzoek	

Uitvoering kassatrainer

Basisprocedure PIN-betaling

	Tijd (minuten)	**Aantal fouten**	**Soort fouten**
Oefening 1			
Oefening 2			

Basisprocedure contante betaling

	Tijd (minuten)	**Aantal fouten**	**Soort fouten**
Oefening 1			
Oefening 2			
Oefening 3			

Interview

Vraag		**Antwoord**
1	Wat heb je als heel makkelijk ervaren?	
2	Wat heb je als heel moeilijk ervaren?	
3	Wat vind je van de hoeveelheid uitleg?	
4	Wat vind je van de manier waarop iets wordt uitgelegd?	
5	Wat vind je van de hoeveelheid oefening?	

Op een schaal van 1(niet zeker) tot 5(zeer zeker), hoe zeker ben je ervan dat je de volgende handelingen goed uitvoert?

		Niet zeker ---------- ---Zeer zeker				
Handeling		**1**	**2**	**3**	**4**	**5**
6	Basisprocedure voor een PIN-betaling					
7	Basisprocedure voor een contante betaling					
8	Wisselgeld op de juiste manier teruggeven aan een klant					
9	Weten hoe en wanneer je geld moet bijvragen aan een klant					

Kennistest

1. Leg uit wanneer je geld moet bijvragen, geef een voorbeeld
Antwoord:

	Ja	**Nee**
Participant geeft een goed voorbeeld		

2. Leg uit waarom je geld moet bijvragen
Antwoord:

	Participant geeft dit antwoord		
Juiste antwoorden:	**Ja**	**Deels**	**Nee**
Je hoeft minder muntstukken terug te geven waardoor je minder lang bezig bent met geld bijvragen			
Zo houd je genoeg muntgeld in de kassalade			
Een klant vindt het vaak niet zo fijn om veel muntgeld in de portemonnee te hebben			

3. Leg uit hoe je wisselgeld teruggeeft aan een klant
Antwoord:

	Participant geeft dit antwoord		
Juiste antwoorden:	**Ja**	**Deels**	**Nee**
Van klein naar groot			
Eerst muntgeld, dan briefgeld			
Tel terug naar het betaalde bedrag			

4. Leg uit waarom je dat op deze manier doet
Antwoord:

	Participant geeft dit antwoord		
Juiste antwoord:	**Ja**	**Deels**	**Nee**
Zo controleer je samen met de klant of de klant het juiste wisselgeld terugkrijgt.			

Vaardigheidstest

Nr.	Subtotaal	Klant geeft	Participant vraagt bij:				Telt hardop terug?
			Goed	Deels goed	Fout		
1	€ 1,05	€ 2,00	0,05	geen	overig		
2	€ 8,95	€ 10,00	geen	0,95	overig		
3	€ 31,15	€ 50,00	1,15	0,15	overig		
4	€ 12,00	€ 20,00	2,00	geen	overig		
5	€ 16,10	€ 20,00	1,10	0,10	overig		
6	€ 12,90	€ 15,00	geen	0,90	overig		

APPENDIX 5 - FORM FOR RESULTS OF PARTICIPANTS IN THE EXPERIMENTAL GROUP

TEST KASSATRAINER
VERSIE: HERONTWERP

Gegevens participant

Nr.	
Geboortedatum	
Geslacht	
Opleiding	
Datum onderzoek	
Tijdstip onderzoek	

Uitvoering kassatrainer

Basisprocedure PIN-betaling

	Tijd (minuten)	**Aantal fouten**	**Soort fouten**
Uitleg + oefening			
Oefening			

Basisprocedure contante betaling

	Tijd (minuten)	**Aantal fouten**	**Soort fouten**
Uitleg + oefening			
Oefening			
Oefening na uitleg geld bijvragen			

Interview

Vraag		**Antwoord**
1	Wat heb je als heel makkelijk ervaren?	
2	Wat heb je als heel moeilijk ervaren?	
3	Wat vind je van de hoeveelheid uitleg?	
4	Wat vind je van de manier waarop iets wordt uitgelegd?	
5	Wat vind je van de hoeveelheid oefening?	
*****	De hele procedure voor de tijd – nuttig?	

Op een schaal van 1(niet zeker) tot 5(zeer zeker), hoe zeker ben je ervan dat je de volgende handelingen goed uitvoert?

		Niet zeker ---------- ---Zeer zeker				
Handeling		**1**	**2**	**3**	**4**	**5**
6	Basisprocedure voor een PIN-betaling					
7	Basisprocedure voor een contante betaling					
8	Wisselgeld op de juiste manier teruggeven aan een klant					
9	Weten hoe en wanneer je geld moet bijvragen aan een klant					

Kennistest

1. Leg uit wanneer je geld moet bijvragen, geef een voorbeeld
Antwoord:

	Ja	**Nee**
Participant geeft een goed voorbeeld		

2. Leg uit waarom je geld moet bijvragen
Antwoord:

	Participant geeft dit antwoord		
Juiste antwoorden:	**Ja**	**Deels**	**Nee**
Je hoeft minder muntstukken terug te geven waardoor je minder lang bezig bent met geld bijvragen			
Zo houd je genoeg muntgeld in de kassalade			
Een klant vindt het vaak niet zo fijn om veel muntgeld in de portemonnee te hebben			

3. Leg uit hoe je wisselgeld teruggeeft aan een klant
Antwoord:

	Participant geeft dit antwoord		
Juiste antwoorden:	**Ja**	**Deels**	**Nee**
Van klein naar groot			
Eerst muntgeld, dan briefgeld			
Tel terug naar het betaalde bedrag			

4. Leg uit waarom je dat op deze manier doet
Antwoord:

	Participant geeft dit antwoord		
Juiste antwoord:	**Ja**	**Deels**	**Nee**
Zo controleer je samen met de klant of de klant het juiste wisselgeld terugkrijgt.			

Vaardigheidstest

Nr.	Subtotaal	Klant geeft	Participant vraagt bij:				Telt hardop terug?
			Goed	Deels goed	Fout		
1	€ 1,05	€ 2,00	0,05	geen	overig		
2	€ 8,95	€ 10,00	geen	0,95	overig		
3	€ 31,15	€ 50,00	1,15	0,15	overig		
4	€ 12,00	€ 20,00	2,00	geen	overig		
5	€ 16,10	€ 20,00	1,10	0,10	overig		
6	€ 12,90	€ 15,00	geen	0,90	overig		

APPENDIX 6 – TEST RESULTS

Resultaten per respondent – huidige versie

Respondentnr.	Geslacht	Aantal fouten					Tijd (min.)					Zelfzekerheid				Kennistest								Vaardigheidstest						
		PIN – 1	PIN – 2	Contant - 1	Contant - 2	Contant - 3	PIN – 1	PIN – 2	Contant - 1	Contant - 2	Contant - 3	PIN betaling	Contante betaling	Doortellen	Geld bijvragen	Vraag1	Vraag2.1	Vraag2.2	Vraag2.3	Vraag3.1	Vraag3.2	Vraag3.3	Vraag4	Bedrag 1	Bedrag 2	Bedrag 3	Bedrag 4	Bedrag 5	Bedrag 6	Doortellen – aantal goed
1	V	2	2	4	4	0	4	3,02	/	4,4	1,55	3	2	2	1	J	D	N	N	J	J	N	N	J	J	J	D	N	J	0
5	V	1	0	2	4	1	2,4	2,05	2,4	4,14	2,33	3	2	3	2	D	D	N	N	N	J	N	N	N	J	N	D	N	J	3
6	V	0	1	0	0	4	3,1	2,56	3,1	2,14	2,4	3	4	1	2	N	N	J	N	N	N	D	D	D	N	J	D	D	D	5
9	M	2	0	1	3	2	3,01	2,27	3,1	6,29	2,1	5	3	2	3	N	N	N	N	N	N	N	0	J	J	N	D	D	J	0
11	M	1	0	3	3	2	2,37	2,12	4,19	2,49	2,28	4	3	3	4	N	N	J	N	D	D	D	J	J	N	D	D	D	J	5
12	M	2	1	2	2	1	3,42	2,45	3,57	3,41	2,23	4	3,5	3	5	N	N	J	N	N	J	D	N	J	N	N	D	N	N	5

Resultaten per respondent - herontwerp

Respondentnr.	Geslacht	Aantal fouten					Tijd (min.)					Zelfzekerheid				Kennistest								Vaardigheidstest						
		PIN – 1	PIN – 2	Contant - 1	Contant - 2	Contant - 3	PIN – 1	PIN – 2	Contant - 1	Contant - 2	Contant - 3	PIN betaling	Contante betaling	Doortellen	Geld bijvragen	Vraag1	Vraag2.1	Vraag2.2	Vraag2.3	Vraag3.1	Vraag3.2	Vraag3.3	Vraag4	Bedrag 1	Bedrag 2	Bedrag 3	Bedrag 4	Bedrag 5	Bedrag 6	Doortellen – aantal goed
2	V	1	0	3	1	0	15,01	2,5	12,24	2,28	/	4	3	2	3	N	D	N	D	J	N	N	J	J	N	J	D	D	N	0
3	V	0	1	2	4	1	13,25	3,03	15,14	5,45	4,53	5	3	4	2	J	D	N	N	N	J	N	N	J	N	J	D	J	N	2
4	V	0	1	4	3	2	11,5	2,47	11,03	4,28	2,43	2,5	3	2,5	3	N	D	N	D	N	N	N	D	J	N	J	J	N	N	2
7	V	1	1	1	4	3	11,33	2,5	10,38	5,55	3,5	4,5	3	2,5	4	N	N	J	N	J	J	D	N	J	D	J	D	N	N	0
8	V	0	0	2	3	1	14,2	2,48	11,34	2,43	2,53	3,5	2,5	3,5	2,5	N	J	J	N	N	J	D	J	J	D	J	D	J	D	1
10	M	0	2	3	2	2	11	3,03	9,34	2,24	3,1	5	3	4	2	D	N	J	N	J	N	D	N	J	N	J	D	D	N	5

Resultaten van alle respondenten samen

Fouten en tijd bij oefeningen

Aantal fouten

Fouten PIN-betaling

	Huidig	**Herontwerp**
Totaal oefening 1	8	2
Gemiddelde oefening 1	1,3	0,3
Totaal oefening 2	4	5
Gemiddelde oefening 2	0,7	0,8
Totaal oefening 1,2	12	7
Gemiddelde oefening 1 + 2	1	0,6

Fouten Contante betaling

	Huidig	**Herontwerp**
Totaal oefening 1	12	15
Gemiddelde oefening 1	2	2,5
Totaal oefening 2	16	17
Gemiddelde oefening 2	2,7	2,8
Totaal oefening 3	10	9
Gemiddelde oefening 3	1,7	1,5
Totaal oefening 1,2,3	38	41
Gemiddelde oefening 1,2,3	2,1	2,3

Tijd

Tijd PIN-betaling

	Huidig	**Herontwerp**
Oefening 1	18,30	76,29
Gemiddelde oefening 1	3,05	12,72
Oefening 2	14,47	16,01
Gemiddelde oefening 2	2,41	2,67
Totaal	32,77	92,30
Gemiddelde oefening 1,2	5,46	7,69

Tijd Contante betaling

	Huidig	**Herontwerp**
Oefening 1	16,36 (5)	69,47
Gemiddelde oefening 1	3,27	11,58
Oefening 2	22,87	22,23
Gemiddelde oefening 2	3,81	3,71
Oefening 3	12,89	16,09*
Gemiddelde oefening 3	2,15	3,22*
Totaal	52,12	107,79*
Gemiddelde oefening 1,2,3	3,07 (11)	6,34*

* Door het bijvragen van het verkeerde bedrag kon de oefening bij 1 persoon niet worden afgemaakt. Deze persoon is niet meegenomen in het totaal. Oefening 3 totaal en gemiddelde gaat dus over 5 personen (ipv 6), en het totaal en gemiddelde van alle oefeningen gaat over 17 oefeningen (ipv 18)

Interview

Open vragen

Wat heb je als heel makkelijk ervaren?

	Huidig	Herontwerp
Pinnen	X	X
Scannen	XXX	X
Begroeten en afscheid nemen	XXX	
Eerste stappen PIN-betaling		XX
Afrekenen	X	
Op het kassascherm werd wel gezegd wat je moest doen		X
Geld teruggeven	X	
Je hoeft iets alleen maar aan te klikken, de computer zegt het	X	
Alles		X

Wat heb je als heel moeilijk ervaren?

	Huidig	Herontwerp
Contante betaling	X	XX
Emballage		X
Geld bijvragen	XX	XXX
Terugtellen	XXXX	X
Bij welke tas je wel of niet erin moet kijken	X	X
Haal de knoppen contant en subtotaal door elkaar	X	

Wat vind je van de hoeveelheid uitleg?

	Huidig	Herontwerp
Voldoende		X
Goed	XX	XXX
Genoeg	XXX	XX
Soms is het een beetje vaag	X	
Contante betaling was veel in één keer	X	
Lastig dat je het van te voren krijgt, misschien makkelijk dat je het bij de demonstratie ook eerst zelf moet doen	X	

Wat vind je van de hoeveelheid oefening?

	Huidig	Herontwerp
Goed	X	XX
Genoeg	XX	XXX
Dat je het zelf kan doen is fijn		X
Goed, maar mag misschien meer	X	
Te weinig	X	

Wat vind je van de manier waarop iets wordt uitgelegd?

	Huidig	Herontwerp
Duidelijk	XX	X
Goed	XX	
Makkelijk	X	
Stap voor stap is fijn		XXX
Dat je eerst ziet hoe het moet en dat je het dan zelf moet doen is fijn	X	X
Zou het liever in het echt willen zien	X	

Zelfzekerheid

Hoe zeker ben je ervan dat je de volgende handelingen goed uitvoert?
(1 = niet zeker, 5 = zeer zeker)

	Basisprocedure voor een PIN-betaling		**Basisprocedure voor een contante betaling**		**Wisselgeld op de juiste manier teruggeven aan een klant**		**Weten hoe en wanneer je geld moet bijvragen aan een klant**	
	Huidig	Herontwerp	Huidig	Herontwerp	Huidig	Herontwerp	Huidig	Herontwerp
1					X		X	
1,5								
2			XX		XX	X	XX	XX
2,5		X		X		XX		X
3	XXX		XX	XXXXX	XXX		X	XX
3,5		X	X			X		
4	XX	X	X			XX	X	X
4,5		X						
5	X	XX					X	
gemiddeld	3,7	4,1	2,9	2,9	2,3	3,1	2,8	2,8

Kennistest

		Ja		Deels		Nee	
		Huidig	Herontwerp	Huidig	Herontwerp	Huidig	Herontwerp
Leg uit wanneer je geld moet bijvragen met een voorbeeld.	Participant geeft een goed voorbeeld	X	X	X	XX	XXXX	XXX
	TOTAAL	1	1	1	2	4	3
Leg uit waarom je geld moet bijvragen	Je hoeft minder muntstukken terug te geven waardoor je minder lang bezig bent met geld bijvragen		X	XX	XXX	XXXX	XX
	Zo houd je genoeg muntgeld in de kassalade	XX	XXX	X		XXX	XXX
	Een klant vindt het vaak niet zo fijn om veel muntgeld in de portemonnee te hebben				XX	XXXXXX	XXXX
	TOTAAL	2	4	3	5	13	9
Leg uit hoe je wisselgeld teruggeeft aan een klant	Van klein naar groot	X	XXX	X		XXXX	XXX
	Eerst muntgeld, dan briefgeld	XXX	XXX	X		XX	XXX
	Tel terug naar het betaalde bedrag			XXX	XXX	XXX	XXX
	TOTAAL	4	6	5	3	9	9
Leg uit waarom je dat op deze manier doet	Zo controleer je samen met de klant of de klant het juiste wisselgeld terugkrijgt	X	XX	X	X	XXX	XXX
	TOTAAL	1	2	1	1	3	3
	TOTAAL	8	13	10	11	29	24

*1 Bij 1 persoon uit de huidige versie is de laatste vraag niet gesteld

Vaardigheidstest

1.Subtotaal: € 1,05

Klant geeft: € 2,00

		Huidig	**Herontwerp**
Goed	€ 0,05	XXXX	XXXXXX
±	Geen	X	
Fout	€ 0,45	X	

2.Subtotaal: € 8,95
Klant geeft: € 10,00

		Huidig	Herontwerp
Goed	Geen	XXX	
±	€ 0,95		XX
Fout	€ 0,05	XXX	XXXX

3.Subtotaal: € 31,15
Klant geeft: € 50,00

		Huidig	Herontwerp
Goed	€ 1,15	XX	XXXXXX
±	€ 0,15	X	
Fout	€ 0,85	XX	
	Geen	X	

4.Subtotaal: € 12,00
Klant geeft: € 20,00

		Huidig	Herontwerp
Goed	€ 2,00		X
±	Geen	XXXXXX	XXXXX
Fout			

5.Subtotaal: € 16,10
Klant geeft: € 20,00

		Huidig	Herontwerp
Goed	€ 1,10		XX
±	€ 0,10	XXX	XX
Fout	Geen	X	
	€ 0,90	XX	X
	€ 6,10		X

6.Subtotaal: € 12,90
Klant geeft: € 15,00

		Huidig	Herontwerp
Goed	Geen	XXXX	
±	€ 0,90	X	X
Fout	€ 0,10	X	XXXX
	€ 2,90		X

Totaal aantal

	Huidig	Herontwerp
Goed	13	15
±	12	10
Fout	11	11
Goed hardop terugtellen	18*(1 persoon 5x goed gedaan, maar helpt soms in restaurant ouders)*	10