Master Degree Project

EXPLORING THE EFFICIENCY OF A DIGITAL SIMULATION GAME FOR VOCATIONAL TRAINING
An experimental approach

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Abstract

This thesis covers an experiment which explores how effectively skills that are gained in a digital serious game can be transferred to a real situation. The context of the experiment is the casual restaurant industry, with focus on the task of a food runner. The results showed to be unreliable when ruling out the chance element with the use of t-tests, which points to that the data produced were coincidental, however the limited deviation in the groups’ performances indicate that there is potential in the addition of a digital game to the traditional training material. This is learned from the reports of the experiments and the analysis of the questionnaires filled out by all the participators.

Keywords: Serious, Game, NEET, Food, Runner, Transferability, Experiment, Table, Memory, Restaurant, Service, Simulation, Skills, Pilot, t-Test, Turnover, Employee, Rate, Transfer, Effectiveness
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It should also be known that during the period of the experiment, over the summer and between the occasions on which the experiment was conducted, my first child Arion, was brought to this world.

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It has been an intensive, though such an educative, year, but the bottom line is that I further realised my love for learning, by overcoming obstacles and solving problems - I would argue that learning is the best when struggle is involved, however not overwhelming.

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1 Introduction

This thesis is covering a master student research in Serious Games as a part of the Informatics field, and it takes the form of experiments for data gathering and reports on those. The fundamental structure of the experiments are designed around and conducted with the purpose to explore in which volume the effectiveness of using a digital game in addition to traditional instructions and compare this to a comparison group, to see whether it is significantly useful for an industry if used in addition to the training for a job - for vocational training. It has been shown to be of value to use games or computer assisted learning tools for training in some professions (Sitzmann, 2011; Girard, Ecalle & Magnan, 2013), however, it has not yet been extensively explored in relation to the casual restaurant industry. This article focuses on the specific occupation of Food Runner, which the author has a relatively long experience with, to explore how efficiently a digital serious game can increase the training for the occupation.

Furthermore, the Experiment is in two parts, one pilot version and a final, which respectively were to test the experiment procedure to then be altered and executed on a larger scale. To be able to find out if the effectiveness of the vocational training can be increased with the addition of a digital game, the digital serious game called “Table Memory” was used in addition to an analog game designed to simulate a busy moment of a food runner in a casual restaurant, which is referred to as the “Restaurant Food Serving Simulation”. These game are used to by two groups in two different orders, one group performed the one before the other, and the other group did vice versa. This method intended to uncover which group was the most successful, and thus if the digital game had any effect on the training efficiency.

The thesis involves the target group, which are the people who tends to choose to enter the casual restaurant market, which in the experience of the author are rather young. A lot of young people are having trouble finding work and transitioning into the adult-life. A group among them are called NEETs (not in education, employment, or training), and are people in an age between 16 and 24 (Mawn et al., 2017). With the young adults as target the purpose of this paper is to find out if the use of digital games for training is attractive to these people.

Although, the main issue which this article concerns, is the high employee turnover rates of the food service industry, but even more specifically the casual dining restaurant industry (Jang & Kandampully, 2018; Bufquin et al., 2016; DiPietro & Bufquin, 2017).

The digital game that were used in the final experiment was developed by the author of this paper, and is a game which on a low resolution simulates a restaurant. Game offers a fail safe environment for the learner, and has the ability to channel the learning to make the task objectives, in this case of the occupation of Food Running, more tangible.

This game will be used in addition to the instructions for half of the participants in this experiment, while the other half will get to play it after the performance test, a test that will be physical and put the participants in a role play restaurant serving simulation. They will get
to act the role of a food runner, to serve tables in a controlled environment. This way everything can be monitored and can clearly show if there is a difference in the two groups of participants. Thus the training transfer effectiveness should be visible and be able to be measured.

2 Background

2.1 Serious Games
As what the label suggests, these sort of games are developed with the purpose of educating, training or healing, among others - the rather serious-sided use of the technology and simply not with the purpose to solely entertain. A wide range of definitions on the subject exists, however, according to Alvarez et al.’s definition, a serious game is:

“...a data-processing application whose intention is to combine at the same time teaching, training, communication, or information aspects, with ludic mechanics based on video game.” (2007, p 1)

Djaouti et al. refers to serious games as of this quote:

"games that do not have entertainment, enjoyment or fun as their primary purpose." (2011, p 1)

Additionally, Djaouti et al. (2011) sums up the definitions and states that any game that is developed with a purpose that stretches further than just entertainment, can be referred to as a Serious Game.

From Lameras et al. (2017) we can learn that Serious Games are of higher complexity, because they need to comprise pedagogical strategies, compared to commercial games, those which are made for entertainment purposes, which only need to incorporate art, story and software development.

Fundamentally, the scene of serious games is a realised potential to harvest the playfulness of entertainment games and integrate teaching material, to with greater effectiveness teach a larger mass of recipients. This becomes increasingly relevant for the younger and coming generations considering these individuals entering this world along with the rise of technology and thus the popularity of games. This young generation is often referred to as “millennials” and they have the preference of learning through first-person experience with a high level of activity and visuals, and less text to read (Kron et al., 2010).
2.1.1 Brief History of Serious Games

Serious games have been used for training for many years, among others by the US military, which gave spawn to games like Half-Life, Quake and Unreal Tournament (Brandão et al., 2012). Djaouti et al. (2011) states that one can suppose that the first video games were developed with the intention of serving a serious purpose. For example Djaouti et al. explains in their article (2011) that a few of the first games served the purpose of illustrating scientific research in computer science and specifically in artificial intelligence, training professionals significantly in the military industry with detailed simulations, albeit also in corporate industries with training in Product Management, and to broadcast messages in the form of advertisement.

The concept “Video Games” can be argued to be coined after the appearance of these first digital Serious Games, considering that they were not developed for commercial use (Djaouti et al., 2011).

2.2 Transfer Effectiveness

This article covers an experiment that were conducted with the purpose to learn if and how well a digital game or simulation can provide skills in the learner which can be used further in a real analog situation. The quality of the transfer efficiency, the transferability, therefore is of essential interest for this thesis. The phenomena of knowledge and/or skills transfer is the fundamental purpose of a serious game - to provide its user with this educative experience. Many mention the fact that this phenomenon is or need to be occurring (Whyte, Smyth & Scherf, 2014; Arnab et al., 2014; Thompson et al., 2008; Bellotti et al., 2014), though there is a shortage of research on the matter of training transfer.

Dennis Charsky provides a deeper analysis of the matter in his article (2010, p. 193), where he is stating that the more authentic the “story” (as a tool to increase immersion and motivation in games design), the higher the chance is that the knowledge is transferred to the real world. Further on the same page, Charsky underlines that the use of “context” in the design of games may additionally make the desired connections of the skills and knowledge gained from games to real-world situations more likely to occur.

In this thesis the context is the restaurant setting which both the analog and the digital games are developed for, with the specific purpose to train food runners (see 2.4.1 Food Runners).

The effectiveness of serious games is seemingly realized as proven (Girard, Ecalle & Magnan, 2013; Sitzmann, 2011), however, the amount of substance is scarce. The research needs to identify the different characteristics of serious games and provide experimental results to connect to the characteristics that are identified, and this way provide evidence of the serious games effectiveness over traditional educational methods.
This thesis are founded in Traci Sitzmann’s meta-analytical article of 65 research articles which are reporting on the effectiveness of simulation games (2011). Her review article is highly thorough and provides a sound base for the reasoning of this thesis, and defines the different methods and features for the design of simulation games.

Firstly, Simulation Games:

“ [...] refer to instruction delivered via personal computer that immerses trainees in a decision-making exercise in an artificial environment in order to learn the consequences of their decisions” (Sitzmann, 2011, p. 490).

She explains that these kinds of games should be designed to incorporate a game cycle which constitute the user’s judgement (immersion), behavior, and the feedback received from the game system (Sitzmann, 2011, p. 493). These cycles should place the user in an optimal performance state, which then should be followed by the reflection of the activity - the debriefing of the event. This latter should enhance the effectiveness of the training and therefore the transfer from the practice to the real situation.

To capture the user’s immersion, a combination of entertainment and learning material that is active in its nature are used, whereas the entertainment will increase the motivation to continue to partake in the learning material, thus the attitude will be more positive. Traci refer to these structures, the entertainment and the learning material, as “affective” and “cognitive” respectively (Sitzmann, 2011, p. 493-494). The affective structure include the motivational and attitudinal aspects, while the cognitive encompasses the knowledge and memory of the user.

Moreover, deep learning is promoted by intrinsic motivation (Sitzmann, 2011, p. 493), which means that the task itself should be rewarding for the users to perform. It will motivate them to put more energy to learn the material provided while enjoying themselves, and this will then increase the chance of them using the skills or knowledge gained in real life.

Sitzmann writes that learning has been proposed by researchers to be multidimensional (2011, p. 494), which is indicated by changes that occur in affective, cognitive, behavioral or skill-capability processes, and they are crucial to realize the training effectiveness, to transfer to i.e. a profession.

Another cycle is visible by the connection between the user’s different motivations for experiencing entertainment, intrinsic motivation, and the will to play more or replay (Sitzmann, 2011, p. 495). The training outcomes that are critical therefore need to by simulation games affect specifically motivation, effort and reactions of the user. Respectively, the training outcomes are defined as: to find out how much the user is willing to learn the material, how much energy and time the user will allocate, and how they perceive the experience.

Further on, she describes what can make a simulation game intrinsically motivating: with features like fantasy, challenge, and curiosity (Sitzmann, 2011, p. 498) - these will cause the user to feel more immersed in the experience of the game, by finding it more interesting and amusing. This should increase the self-determination of the user.
It is also important to note that learning has been proposed to be enhanced by actively engaging in the material (Sitzmann, 2011, p. 498), contra to passively experience the learning material. Activity in the learning should help the user to evaluate and integrate the knowledge with more cognitive enthusiasm.

The interactivity of simulation games may help the user feel encouraged and empowered, thus enhance the effectiveness of the training (Sitzmann, 2011, p. 495). They should be used in addition to the learning material, because seldom are simulation games designed to be the only material for learning.

We can also learn from her article (2011, p. 500) that the level of activity of the game affects the training effectiveness. If the game is passive in its nature, which it is if the user has to listen, read or watch the material, then the transfer will be of lower quality. On the other hand, the users are active when:

“ [...] they are reviewing with a computerized tutorial, participating in a discussion, and completing assignments.” (Sitzmann, 2011, p. 500).

Thus the difference from a comparison- or control-group to the group that are using the simulation game in addition to the learning material, should be minimal, if the control group also is active during the learning material. But basically, to enhance the learning, it is advised to avoid passive instructions in the learning material and aim to keep it highly active.

What also has been indicated is that by giving the users unlimited access to the simulation game, for example giving them access to download and install the simulation game-application on a smartphone, it is suggested to improve their willingness to use it more often and improve the learning outcomes (Sitzmann, 2011, p. 517). Here Traci also concludes that the instructional context - the setting and relevance connecting the simulation game and the i.e. job that it is training material for - plays an important role in how much the user will learn.

2.3 Food Service Industry

The Industry of Food Service is a part of the Hospitality Industry, and includes catering, cafeterias, restaurants and any other place that sell food “away from home”, which in the US alone, supplied $731 billion in 2014 (USDA, 2017).

Casual restaurants cover most of the food service industry, 79% in fact (USDA, 2017), and is the second largest private-sector provider of work for US citizens.

However, this industry is well known to have a high rate of employee turnover - 60%-300%, meaning that most people tend to “come and go” within a short duration of employment, especially in casual restaurants (Jang & Kandampully, 2018; Bufquin et al., 2016; DiPietro & Bufquin, 2017). This poses a serious issue, that can negatively affect the financial costs of a restaurant (DiPietro & Bufquin, 2017).
2.4 Work in Restaurants

The author of this paper has experience with 3 different restaurants and one busy lunch restaurant-café over a period of about 5 years, two of those restaurants were in Sydney, Australia, and the last restaurant employment was in Gothenburg, Sweden (see List of the author's Restaurant Service Work-Experiences). What has been noticed is that there is a consistency of service structure, consisting of the kitchen, wait staff, bussers, and management. Note that these are common groups of jobs that the author have encountered in his experience in the field - there is a long list of positions if you look over the restaurant industry (National Restaurant Association, 2017). One position that though is not mentioned here or has any scientific description, is the job of Food Running - this position could briefly be described as a combination of the server and the busser occupations.

2.4.1 Food Runners

During 4 of the 5 years that the author of this thesis worked in the restaurant industry, he mainly had the occupation of a Food Runner (see List of the author's Restaurant Service Work-Experiences). Any scientific description of the occupation of Food Runners was not found during this research, but there is a shared understanding of the profession on websites like OpenSesame and Chron, and with the author of this thesis’s experience.

The job can be defined as delivering food from kitchen to table, but often include clearing dirty plates and cutlery, answering the customer's miscellaneous requests, among other small tasks that vary (OpenSesame Inc., 2018). The role in the restaurant is also to ease the pressure for the wait staff, especially during rush hours, letting them focus on providing higher quality service to more customers.

Little or no experience is required to start as a food runner, though most probably one would need to at least have a high school diploma or equivalent (OpenSesame Inc., 2018; Bloom, L., 2018). Though, the author have in many occasions been working with colleagues that are younger than 18 years of age, meaning that most of them have not graduated from high school or similar level of education (see List of the author's Restaurant Service Work-Experiences).

Something that this author has observed while being a trainer for new food runners, which he was several times at each of the restaurants he was employed at (see List of the author's Restaurant Service Work-Experiences), is that many for the first period struggle with remembering the numbering of the tables, thus causing them to fail to deliver to the proper tables, getting confused in the stress and pressure - ending up being a hindrance for other staff and slowing down the entire service. These issues have been the task for the author as a supervisor to avoid, by firstly teach the fundamental knowledge of the numbering of the tables. When the table-locating skill is acquired, they can move on to widen their professional skills by, among other tasks, learning to identify what they are serving to the customer, and to be able to carry more plates.
2.5 Not in Education, Employment or Training (NEET)

There is a cohort of the population that falls under the “NEET” classification, being an abbreviation for “Not in Education, Employment, or Training”. This classification aims at the younger part of the population, with 16 years of age as the minimum until the maximum of 24 (Mawn et al., 2017), who are disengaged - facing difficulties to enter or even sustaining any kind of employment. Meaning that most of their time is being spent outside of society, in other words, not in education, employment or training (Bynner & Parsons, 2002).

These people grow up in inner-city environments with increasing pressure and find themselves in disadvantaged conditions with little support from parents and in general. NEETs face an extending challenge in education and training which decrease their chances of building up their merits and thus are of less interest in the eyes of employers (Bynner & Parsons, 2002). Short-term jobs that crave little or no skills are one of the few options they have to enter the adult world. Bynner & Parsons (2002) mention that NEETs suffer from:

“[...] difficult relationships, lack of social and political participation, poor physical and mental health, drug abuse, and criminality.”

According to Bynner & Parsons (2002) it is concluded that poor education is the major cause for people entering the NEET class. The groups that are running a higher risk of entering this classification are concluded to be in need of efficient support and counseling, to save them from the damaging effects of that course of life. It is established socially and economically that the transition from youth to adult is of utmost importance, taking into account how they might shape the future society (Bynner & Parsons, 2002).

Considering that Bynner & Parsons talk about this in 2002, it is possible to believe that the issue has lost its relevance over the years, being a 16 years old study. This is not the case - several more recent studies also point out the magnitude of this issue (Thompson, R., 2011; Nelson & Taberrer, 2015; Mawn et al., 2017).

We can learn from Mawn et al. (2017) that 40% of all the unemployed in the world, are the youth. Among the youth, 13.1% are unemployed, thus most of them are successful in transitioning into the adult life, nevertheless, these unemployed consist of almost 75 million people, and the majority of them are found in high-income countries.

3 Problem

Firstly, this large and realized group of young people, that are not in education, employment and training (NEETs), are lacking in adult- or work-life experience, and are therefore struggling with motivation to work or even look for jobs. As a result, they tend to become excluded from society and “stuck” in their comfort zone (Bynner & Parsons, 2002; Thompson, R., 2011; Mawn et al., 2017). This can be seen as an extreme part of the population, and therefore the thesis argues that this indicates that there are individuals who
are attempting to entering the transitioning into the adult life, but are being pushed back by
the amount of pressure and expectation from the employer and co-workers.

The fact that most of the NEETs are found in high-income countries, which commonly have
welfare to protect people economically, suggests that these people do not tend to stress the
importance of transitioning into the adult-life, thus are prolonging the transition-process
(Mawn et al., 2017).

With this taken into account, the underlying problem is that young adults focus on the
obstacles, which seems to be extending, when stepping into adult life. This prevents them
from gaining experience and merits to start a career with - the difficulty to provide
motivation for them is growing.

Seeing how the Food Service Industry is the second largest provider of work in the
private-sector in the US (USDA, 2017 ; Bufquin et al., 2016), evidently it’s an industry that
demands a large amount of manpower. As of what the author of this thesis has experienced
(see List of the author's Restaurant Service Work-Experiences), the restaurant industry, and
most of these food service establishments, are always in need of employees. There is always
some place on for example a busy avenue, that is hiring.

From Lily Martis of Monster Worldwide Inc. (2018) we can learn that at least 6 out of 20 of
the common first jobs are found in the food service industry. The info was gathered through
a hashtag movement called “#FirstSevenJobs”, which had a wide range of people share what
jobs they started their adult-life with.

Moreover, as mentioned earlier in 2.3 Food Service Industry-section, the restaurant context
has a significantly high rate of employee turnover (Jang & Kandampully, 2018 ; DiPietro &
Bufquin, 2017), which explains the reason why this industry are known to be in demand of
manpower. This is a problem that full service casual dining restaurants consider as one of the
most challenging ones (Bufquin et al., 2016). In USA, with casual dining restaurants as one
of the major pillars of the US economy, it's important that problems in this context are
resolved. Studies show that poor work-environment is a major cause for people to resign,
among others like long shifts and work on holidays and weekends, and this has been related
to lower service quality and an economical burden for the restaurants, but also the
relationship with other employees and managers have a significant effect on the employees’
satisfaction in their job.

As of the experience of this thesis’ author (see List of the author’s Restaurant Service
Work-Experiences), it has been observed that the first and biggest issue with starting to work
for a restaurant, with the occupation as a Food Runner, is to remember the table numbering.
Consequently they deliver food to incorrect tables and service slows down, hence stress
increases among the staff that the occupation affects (chefs and waiters, mainly), causing
lowered impressions and patience towards co-workers. This could damage the confidence of
a young and inexperienced individual and cause them to resign. Potentially a significant
reason for high employee turnover rates in the food service industry (Jang & Kandampully, 2018).

On top of this, the overarching interest of this thesis is to present data that indicate the level of efficiency of training that a serious game, in this thus far mentioned context and training purpose, can deliver. There is a consensus among the researchers of serious games that the transferability of knowledge and skills from play to real life situations, needs to gain more substance to be able to prove its usefulness (Girard et al., 2013; Sitzmann, 2011).

3.1 Method

To be able to learn how effectively a digital game can increase the effectiveness of vocational training, an experiment with the context of casual restaurants was conducted. The experiment involved the use of a digital serious game which was used in addition to the traditional training of a food runner, which was simulated in an analog game which included the performance of the profession to test the skills. With one group using the digital game before the analog simulation, this is hypothesised to add to the learning effectiveness of the instructions for the analog simulation. By comparing the use of the digital game against a control group, which will not use the digital game in addition to the instructions, this thesis proposes that the effectiveness can be indicated by the difference between the two groups.

A game offers a fail safe environment for the player, to be relieved of the stress and fear of making errors within, where the user can practice their training effectively (Verkuyl et al., 2017). Therefore this thesis argues that a serious game would be ideal to be used in the restaurant industry for vocational training, also because this virtual environment is without actual stress from making errors that affect both co-workers and customers - assisting to preserve the confidence in the learner.

3.1.1 Table Memory

An android-based game have been developed by the author of this thesis, with these problems of the casual restaurant industry realized from first hand experiences, thus to be relevant for vocational training and to act as an attempt to provide an increase in potential human resources for the industry.

The Android platform was selected because the developer and author of this thesis owns an android smartphone and was aiming to use his own smartphone to let the participants play the game with during the experiment.

The game “Table Memory” is designed to, like the title suggests, train its players to remember tables, in a restaurant setting, and to resemble the core of the task of a food runner. This means that the tables are numbered, thus the player gets to, during the game-play, digitally deliver food to randomized tables. There are 9 tables in total in the current version of the game, and the tables positions are static while the numbering order changes from level to level, to challenge their adaptability. The numberings are only
presented before the start of each level, meaning that they are required to memorize a pattern of the numbering prior to commencing a level. Though there is always an aid available during gameplay that shows the numbers, but its usage is penalized with the loss of score. Each game-round allow the player to deliver as many plates as possible within 20 seconds, and this way, over the current 6 levels, the total score is added to the high-score list in the end of the game. However, in there is a version which is more limited and confined, which was designed this way for the purpose of being more convenient for the experiment. This version is less developed graphically than the non-experimental version, and has areas during the start and the end of the game that intentionally prevents the player of progressing, specifically in the beginning when entering their desired nickname, the instructor need to manually add a unique code to the player’s name, to then do a secret gesture on the touch screen to progress. This is to prevent the player from continuing without their identifying unique code, which is necessary for the sake of the data-gathering. Another similar obstacle is in the end, preventing the player from controlling when to restart the game.

Basically, this experimental version of the game is designed to challenge people on a cognitive(memory) and affective(motivation, attitude - competition) level (Sitzmann, 2011, p. 493-494), to score as high as possible, and in a second attempt beat their own highscore. Other studies have shown that the use of competition increases the voluntary interest (El-Beheiry et al., 2016), thus adding to the chances of making the game more attractive.

3.1.2 Restaurant Food Serving Simulation

With the aim to test the learning effectiveness from the use of the digital game “Table Memory”, an analog game - a game that is not limited to digital contraptions, which can be played with humans and physical objects - has been designed. A role play that requires a set of tables, or a larger table that can accommodate at least 6 seats, with the reason to add difficulty as the use of less seats would be excessively simple, leaving it hard to create more unique patterns in the ordering of the numbers for each seat or table. An extra table or surface is needed to act as the station from where the plates are kept while not in play, to be of access for the deliveries to run smoothly.

Furthermore, the simulation involves a set of plates to be delivered to the seats or tables, which will be dictated by a randomizer which can be dice or a digital program, important is that the random number is within the minimum of 1 and the maximum according to the amount of seats or tables available. The quantity of plates needs to be one more than the total of destinations available - this will keep the game from halting by always having a plate to deliver.

Lastly an instructor needs to be present, to generate the random numbers and plates for the participant to deliver, to start and end the game, and thus to time the game-round, though not the least to explain the rules. The game has a 2 minute time frame, hence the aim is to gather as many points for this duration as possible. The simulation has the intention to produce a realistic sense of a highly busy moment in a restaurant (For more details about the “Restaurant Food Serving Simulation”, see Appendix A).
3.1.3 Experiment - Restaurant Food Runner Test
To test if a digital game has a significant effect of training - if the skills learned from the digital game can efficiently transfer to a contextually similar analog simulation, an experiment was conducted. The experiment was conducted with 16 participants over the summer of 2018, between June and September in Gothenburg, Sweden, at a central café where a set of tables were available for this study to take place. The occasions of the conductions were scattered over the period: depending on the conductor’s spare time, and also on the participants’ random voluntary interest due to being drop-in guests of the café.

The guests were offered a free lunch from the café’s menu if they participated, though the age requirement was between 18 and 35 years. The choice to aim at this age group is inspired by what ages NEETs tend to be, but 16 has been stated to be the age when they tend to enter the NEET-classification (Mawn et al., 2017), though to avoid asking a minor to bring a guardian or parent to be able to participate in the experiment, the minimum age of 18 was selected. According to Mawn et al. (2017) 24 is the maximum year of the NEET-class, but this thesis argues that it’s likely that many people that have reached 30 years have not transitioned completely into their established adult-lives. The experiment was fundamentally conducted with the interest to see if people that tend to enter the casual restaurant industry and that are of a younger stage of life are able to learn with this digital game, consequently the maximum age for this experiment was stretched up to 35 years, considering that few enter the industry up until around this age, according to the experience of this thesis’ author (see List of the author’s Restaurant Service Work-Experiences).

The simulated but realistic setting for the experiment was set up with the use of 12 seats at 4 tables, that in pairs were located along two of the walls in parallel (see Figure 1 below). The separate table positioned in the top of Figure 1, titled “Kitchen Output” is where the instructor should be located for the duration of the game-round, while the participant moves in the space between all the tables.
To be able to produce data that can indicate any effectiveness of the use of the serious game “Table Memory”, the participants of the experiment was divided evenly into two groups, a Test Group and a Control Group. These groups of equal size had the intention to be compared to one another, thus the Test Group is designed to be given the chance to use the digital serious game “Table Memory” as practice to be prepared for the “Restaurant Food Serving Simulation”, and hence the Control Group is designated to do the opposite: start with performing the “Restaurant Food Serving Simulation” and not get the chance to prepare with the digital serious game, though instead be directed to play it afterwards. From comparing these two groups, it should be visible if the use of the digital serious game has any effect on the participant’s relevant skills.

To add data to research and increase the extensiveness, the participants were asked to fill out 4 questionnaires throughout the experiment: one for learning about the individual, one to assess the digital game “Table Memory”, one to evaluate the “Restaurant Food Serving Simulation”, and another to reflect on the entirety of the experiment (see Appendix A, section 4 Evaluation).

3.1.4 Hypothesis
This thesis propose the hypothesis that the Test Group of the participants of this experiment will gain an increase of efficiency in their performance in the analog game the “Restaurant Food Serving Simulation” with the usage of the digital serious game “Table Memory” as practice prior, thus collect a score higher than the Control Group in the analog game.
The null hypothesis accordingly states that there will be no significant difference between the groups, meaning that the digital serious game does not increase the effectiveness of the participants in their performance in the “Restaurant Food Serving Simulation”, and that the scores will be more or less equal between the groups.

From what this thesis has touched upon thus far, these questions are formed:

*How transferable would skills gained from a digital serious game be to a real situation?*

- How effectively could a digital serious game increase the training efficiency in addition to traditional training material, in the example of vocational training of the Food Runner-occupation in a casual restaurant context, when compared to the traditional training method?
4 Previous Research - Thesis Pilot Experiment Report

Here this section reports the pilot version of the experiment that was mentioned under previous section 3.1 Method, 3.1.3 Experiment - Restaurant Food Runner Test. Consequently, following text in this chapter was written prior to this thesis and has less established idea of what is being studied.

4.1 Introduction

This chapter holds the report of the pilot version of the experiment that will later be conducted for the master thesis of the author. The pilot was conducted with the purpose to test its procedure out, to find flaws and elements that needs adjustment, in attempt to finalize the way it is executed.

The experiment itself has the purpose to compare two groups of participants’ performance in delivering “food”-plates to tables or seats that are numbered in a certain order. The difficulty of the performance test is to memorize the table or seat numbering and thus deliver to the correct destination, and to deliver as many as possible under the limit of 2 minutes.

The purpose of the experiment though focus on the testing of the computer game Restaurant Runner, which is in a prototype state so far. The game is about just as the title suggests, to run food in a restaurant. It could be called a gamified occupation or a work simulator. The author is curious to find out if the game has any preparatory effect on the participants, if it can prepare them for the performance test.

The performance test is not digital but physical, and is built to simulate a portion of a restaurant, or a miniature restaurant, so to speak. It is in this paper referred to as the Role Play Restaurant Simulation (RPRS), and the digital game mentioned earlier is referred to as the Restaurant Runner Prototype (RRP).

The paper reports on the procedure of the experiment and performance of two participants, which are divided into two groups, the Test Group and the Control Group.
4.2 Expectations and Pre-notes for the Pilot:

The plans have been changed, from traveling to the University of Skövde and use one of the classrooms there (the invitation to participants was sent out too late), to instead use the kitchen in the apartment of the author and conductor of this experiment, which has one table with 4 chairs. The table can be extended and there is 2 more chairs, making the table able to accommodate 6 persons, the number of tables that are required for the pilot, but this way the participant will not be asked to deliver to a specific table, but instead a specific spot on the table.

This is expected to prove to be less reliable data, due to all the factors that will interfere: There is a cat that might disturb the delivering of plates by walking in the way or distracting, the environment is not spacy and open - it's narrow and might make it difficult to move freely; but this at the very least allows to try and set everything up and aid the theoretical part of how the real thing would be executed. This might just be a pre-pilot experiment, but still this is to prepare for the final experiment version.

With the trial execution, flaws and elements that needs improvement and elements that might be missing will become evident, to be learned from and be reformed.
4.3 Experiment Execution Analysis

The Pilot Experiment was conducted on Tuesday 3rd of March, 2018.

4.3.1 Location:
It was conducted in the apartment of the author of this report, which is located in Gothenburg, Sweden, using one kitchen that accommodated one table and 6 chairs. A small balcony-outside-table was relocated to just outside of the kitchen in the hallway, serving as the Kitchen Output, where the instructor of the experiment during the performance test, will be stationed to send the participant from with plates to deliver to the table seats in the kitchen.

4.3.2 Execution:
While finalizing the setup of the experiment, a brief discussion about the use of the stopwatch on the smartphone arose. The idea was to use the stopwatch to simulate the freshness of the “food” to be lost if the countdown was reaching zero, deducting points from the score. But as one of the participant noted, was that this would just be a waste of time, and better if the stopwatch was instead used to keep track on the 2 minutes that the performance test was meant to be conducted over. The instructor realized the small value of keeping track of the freshness of the “food”, considering that the distance from point A to B that the “food” will travel, is minimal - less than 4 meters. It would be a waste of the instructor's attention and time to between each dish reset the time for the freshness, while also randomizing the next destination - the participant would end up waiting for the instructor to perform all the steps between each delivery, that it would stretch the data and become less valid, relying more on how well the instructor can keep up acting as an octopus - to keep up the multitasking.

It was after this realization, that the decision came quickly, to instead only use the smartphone stopwatch to countdown the 2 minutes of the session. A variant would be to have a second stopwatch device, one to start the session time on, and the other to use frequently between each delivery, if that would be performed smoothly by the instructor, but it did not seem necessary in this situation, regarding the environment and the short distance for the delivery.

Starting by dividing the two participants that was available for this pilot, into the two groups. Using the same die that was later used to randomize the destinations of delivery in the performance test, the participant with the highest number got to go first and was therefore assigned to the Test group. Thus the participant started with playing the digital game Restaurant Runner Prototype(RRP). This method of dividing the participants into the groups was only used in this special case with only two participants, not for use in a version that has the purpose of producing reliable data.
4.4 First Participant - Test Group:
A few difficulties emerged during the digital play test - the participant missed the “Map” button in the Instructions section, which are in the beginning of the game. A “Play” button is available throughout the tutorial/instruction section, which seems to be more attractive for the player. It is possible that the participant was more excited to see how the game actually was looking and considered that the developer was present which also is the instructor and conductor of the this experiment.

Due to the miss of the “Map” button, the participant missed the valuable information of the numbering of the tables, and had no general idea of how many tables and in what direction to head. Though this information is also available during the game-play, but was a tad hard to figure out how to use - you walk on it to make the map cover the screen, then due to the fact that the player cannot see the player character anymore, it is confusing and the instructor had to be there to inform that it’s required to simply walk away from the map or to press the “Space” button to remove the map.

As soon as the participant had figured out how to use the map though, it became frequently used, between each order to deliver actually. Meaning that the participant had good use of the Map and thus could find the way much faster. Though this is not the intended use of the map, it’s supposed to punish the player if it doesn’t remember the table numbering and has to go and use the map, by reducing the score points. But it was made clear that when the map was on a distance in-game and the participant had forgotten the position of the table, and had no time to go all the way back to check, this was a good punishment and the participant commented that it was a good challenge especially in this moment.

The instructor had to also explain the game user interface(GUI) - that the top left is the shift time(the time of the game session), that the top right number shows the active table to deliver to, and just below it is a timer of the food’s freshness (when it goes to 0 the food becomes bad and score is deducted), then the number on the bottom right represents the score, and the bottom left holds the speed number.

Finally the 2min actual game-play session was over, and the game is supposed to ask for a name in the end, but did not. Thus it did not even record the score data that the participant had gathered, which was 60 points. It is important that it does, so that the data can be compared between the groups, which is the purpose of the experiment, and with the different names identify in which group they belong, Test- or Control group.

Now when the digital play test session was over, the instructor was supposed to ask the participant to evaluate the session with the prepared questionnaire concerning the digital game. But this was missed and the experiment continued with the Performance test. 2 minutes was given to the participant to deliver as many plates from the kitchen output located just outside the kitchen, to the seats at the table in the kitchen. The positioning of the kitchen output worked out well, as it left the instructor unable to observe the participants.
performance entirely, and thus not disturb the process, as much as it might have if the instructor would be observing.

During the performance test, the participant was fairly fast, and brought plenty of plates back in a good manner so that the instructor and the kitchen output was always filled up with plates to hand out. Though the participant had problems with remembering the seat numberings and especially making errors regarding the second and third of the seat positions. Once the error was made, it was clear that the participant had confused the pattern that the seat positions were ordered in (as shown in Figure 2, image below). Seat number 2 and 3 was in the performance of this participant mixed up. This could be due to the fact that this map (Figure 1) was not properly introduced by the instructor.

![Figure 2]

This can be seen as a successfully designed numbering of the seats on the other hand, proven by the fact that the participant got confused by the illogical numbering pattern. Though
again, if the participant would have been properly prepared with the knowledge about the map being available during the test, it might have changed the performance significantly. When the 2 minutes was up, the participant had delivered 13 plates. The destinations seats were 6 in total each randomized with a 6 sided die, and the order they were delivered in was:

<table>
<thead>
<tr>
<th>Order</th>
<th>Seat/Table Position</th>
<th>Delivered Correctly</th>
<th>Dirty Plates Recycled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>5</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>10</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>12</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>2</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

*Table 1*

As we can see above here(Table 1), out of the 13 deliveries, 7 was Correctly Delivered and thus 6 was Misplaced. Though 9 Dirty plates were Recycled, and the final score was 125 points, which was calculated with 20 points per Correctly Delivered plate, 5 points per Dirty Plate Recycled, and -10 points per Misplaced plate:

\[
7 \times 20 + (-10)6 + 9 \times 5 = 140 + (-60) + 45 = 125
\]

This data was gathered using the recorded video clip and notes from the performance test, where the fact that the instructor was rather insecure was evident. The instructor actually in this clip - during this participant’s session, interferes by having to leave his position and walk into the kitchen to switch window to the image of the table numbering map on the computer meanwhile it’s recording, a step supposed to be done as soon as the recording is started to give the participant the opportunity to re-check the table numbering while in confusion or if forgotten. Also in the end of the session, the participant clearly exclaims inquiringly that the map was supposed to be available for him to use, something that apparently was unclear.
during the performance test, and something that needs to be clearly stated prior to beginning the test.

At this point, the instructor finally remembered to ask the participant to fill out the evaluation forms. From reading the data of the response of the questionnaires, and by looking at the timestamp to distinguish the first from the second participant, it can be understood that the game was according to the first participant: rated very stressful (8/10); difficult to play(6/10); reading the map was annoying; the game was a bit fun (6/10); the game was generally too challenging (8/10).

Directly after the first questionnaire, another one was asked to be completed next, and this one concerned the performance test as well as the whole experiment. When it was finished, the experiment for this participant was finalized. This form gave the response that this participant: is part of the Test Group; found the test stressful (7/10); was affected by the knowledge of time limit (6/10); was not very affected by being filmed (2/10); had a hard time with remembering the numbering of the tables; not exceedingly fun (4/10); felt that it helped to prepare for the performance test; finds the game to have a low preparatory effect for the performance test (3/10). The questions promoting the participant to describe with their own words was ignored, possibly because of the relaxed environment, and the lack of interest to sit and write, while the participant instead directly could tell the instructor the comments. This would most probably have had better response if the participant was to be left alone for the evaluation, and given an undefined time limit.

4.5 Second Participant - Control Group:

This participant, being the second, thus belongs to the Control Group of participants and get to start with the performance test instead of the digital game play test. This time the instructor had more experience from the previous participant’s session, and hence gave the instructions in a more proper structure in accordance with the list of steps. Specifically pointing at the preparation of starting the recording on the tablet-computer and switch its window to the image of the seat numbering, which this time was properly executed, followed by a quick instruction of its use for the participant - that they can visit the tablet to learn the seat numbering again, but that the instructor will deduct points from the score if it is used, and the participant was told to make sure to show their face to the tablet-camera for the instructor to later be able to analyze whether the participant used the aid of remembrance so score can in that case be affected.

The performance test was then executed and went rather smoothly, the instructor was at this time better at keeping up with all the elements of the game and hence affect the participant in the least - lesser than the first participant’s session.

Mid session, then participant was forgetting or ignoring to recycle the dirty plates (the plates that was delivered earlier and are meant to be brought back for recycling due to lack in amount of plates), and so the instructor had to remind the participant to bring back plates so that they can be reused, as the instructor was running out of plates to hand out. Here the number of plates at least needed for this experiment, became obvious. Basically, the amount
of plates needs to be at least the amount of seats/tables that are available in the test, plus one more plate, so that if all the seats/tables have been served a plate, there is at least one left do be delivered. When the participant then arrives at any table, will be forced to pick up the plate that is already on the table, to replace it with the new one. Here also a possible cheat emerges in the game, because the participant can actually walk out in the saloon and without searching for the correct table, return with the plate they already have in their hand, and make it look like the plate was delivered and an old one was brought back. Though this cheat is avoided thanks to the use of a camera to film the saloon area, and thus in the transcript analysis and the in distribution of score have points deducted due to the use of this cheat.

The participant was doing well, seemingly faster than the previous, and when the timer ended the session, 15 plates had been delivered, 2 more than the previous, therefore actually slightly faster.

<table>
<thead>
<tr>
<th>Order</th>
<th>Seat/Table Position</th>
<th>Delivered Correctly</th>
<th>Dirty Plates Recycled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>9</td>
<td>6</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>11</td>
<td>3</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>12</td>
<td>6</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>13</td>
<td>3</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>14</td>
<td>6</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>15</td>
<td>2</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

*Table 2*

Using the table above(Table 2) it’s obvious that 15 plates were delivered, out of which all was correctly placed, none was misplaced, and 9 was recycled. Scoring 345 points, a great deal higher than the previous participant. The score was calculated using the same amount of
points per action: 20 for Correct Delivery, -10 per Misplaced plate, and 5 for Recycling plate. The math of this is: $15 \times 20 + 0 \times (-10) + 9 \times 5 = 300 + 0 + 45 = 345$ points

This time the instructor remembered to instruct the participant to fill out the questionnaire, this time the one concerning the performance test first. To remind, the participants can be distinguished from each other thanks to the timestamp that was recorded at the completion of each response to the form. This showed that this participant: did not play the digital game prior to the performance test; did not find this test exceedingly stressful (4/10); being timed was barely affecting performance negatively (3/10); was barely affected by being filmed (4/10); was stressed though due to being timed; found the test quite entertaining (7/10); liked to deliver the plates to the tables mostly; did not find anything unclear, or just did not want to write it down; did not get to play the digital game prior to the performance test, and thus did not get any preparatory value; same reasoning as the previous response - did not get to play the digital game prior, and thus was forced by the questionnaire to rate it to the bottom in preparatory (1/10); had nothing else to comment on in the end.

As mentioned in the part of the previous paragraph, the participant was forced by the questionnaire to answer the question asking if they had played the digital game prior to the performance test, and thus if it was found helpful, even if the participant did not get to play the digital game before, the only options of answers were yes or no to being preparatory. No option for the ones who did not get to play it before to choose, and thus was forced to give a negative answer to the question. For the upcoming version of the questionnaire and experiment, this cannot be allowed to reoccur. Simply, a third option needs to be added, for the participant to claim that they did not get to prepare with the digital game, and can not answer the question. Likewise for the following question to rate how well it prepared the participant, who was forced to give the lowest rating. Both of the questions were set to require an answer too, to continue and submit the response. The first of these problematic questions could be left with the requirement of being answered, but must have a third option for the Control Group participants to pass the question, while the second needs to have the requirement removed, leaving the rating of how well the game prepared the participant optional.

Moving on to letting this participant to also play the digital game RRP. Again, as with the first participator, the “Map” button in the instructions section of the game was missed, even though the instructor was closely guiding, leading to a messy start of the test. The participant had a tendency to also reach for the “Escape” button on the keyboard, which ends the application. This happened first when the participant walked on the in-game map, which places a map on top of the game, which the participant then wants to remove, thus reaches for the “Esc” button. After the instructor informs of the use, to either press space or walk away from it in-game to remove the map and continue play the game, many things went wrong for the participant’s game-play.

To in the game walk to kitchen output and pick up food proved to be a challenge, caused by the map function being a bit too narrowly positioned. This showed that an issue occurs when the player wants to check the map while holding a plate, which requires the player to hold down the “Space” button on the keyboard and this is also the way of removing the map, making it impossible or at the very least extremely hard to read the map.
It was shown to be crucial to explain the GUI also for this participant, proving to be a must to add to the game’s instructions section and to be added to the list of steps for the future experiment sessions.

The game play test came to an end and the participant gave a great pointer about the design in the game’s instruction section, to remove the “Play” button, which is very tempting to press. It is better to just force the player to take some time with the instructions, to make sure that they understand how to play the game before they start it.

Further the participant was explaining that the game was too hard, especially in comparison to the performance test, where this participator had almost no issues. The participant actually wound up on the minus side of the score, about -20 points was gathered at the end, proving that the experience was very messy and difficult.

The two different phases of the experiment needs to be balanced out the other way around, meaning that the performance test should be more difficult, though as the participant also noted, that it was well conducted with what was available, but would be much more effective if there was more material, specifically if there was more tables to remember. In contrast, the digital game had too many tables to remember - it was an overwhelming amount when the players was exposed to the map of the table numbering. This is an issue that has already been considered, but it was great that it was underlined, as it was overlooked for the pilot experiment. The idea is to recreate the digital game in the Unity engine, a much more flexible and powerful engine beside the one that the current version was built in, and for it to firstly be more basic, no background interior and such, but solely focused on the mechanic of transporting food from point A to B, A to C, and A to D, etc., keeping the number of tables lower than 10 to remember. This can be increased in future iterations of the game, as long as the mechanics are in place, this will be less of a struggle.

After a good feedback session, the instructor requested that the questionnaire for the digital game RRP to be filled out. Reading and analyzing the data from it, post experiment, reveals that the participator: found the game quite stressful (5/10); did not feel that the game was too difficult to play (3/10); thought that the controls was an annoying element; liked the game a fair bit (8/10); reckon that it was a rather challenging experience (8/10).
**4.6 Analyzing the Instructor:**
The instructor was at many points failing to instruct, the execution was messy and is in need of structure. Between the sessions, between the testing of the digital game session and the role play restaurant simulation session, the questionnaires should have been remembered to be filled out in the right moments, right after each session. This was forgotten at some points and might have lost some valuable data, something that will not be acceptable for the final conduction of this experiment.

One important step and artefact that was missing, was in fact the procedure list, the list of the steps to follow. It exists, but was forgotten in the setup. It was considered, but the instructor in the haste, put confidence in himself to be able to remember each of the elements, leaving the experiment in a messy state. Still managed to conduct it, but in a broken manner, with a bit too much time between the sessions and elements of the study. Affecting the decision was though also the fact that the experiment was pressed by time, and that the list, which would need to be printed, due to the handheld tablet-computer being used for recording the role play restaurant simulation performance, the second computer that was available was used to have the digital game play test on, and the available smartphone was busy acting as a timer for the performance test. The list would need in this case to be in printed paper form, but this was not possible at the moment. This is a point now learned the hard way and a Must in the upcoming version of the experiment.

**4.7 Pilot Conclusion:**
Thanks to the conduction of this pilot, many issues surfaced and were made clear to be identified and dealt with.

Firstly the list of the steps for the execution of the entire experiment, is crucial. The instructor will have many things to consider, thus a physical or digital copy of the list needs to be close at hand for the instructor, to be a backbone of the experiment’s flow.

The amount of plates was made clear to have to be the same as the number of destination seats or tables, plus at least one more plate. That will create an overflow, and force the participant to pick up a plate to be able to place the one that is currently being delivered.

The digital game the Restaurant Runner Prototype (RRP) needs many adjustments to be able to function as a lecture. It needs to be simplified to be more user friendly - it now obviously is in a development state considering that all the functions that are in now are only to test if the game mechanics work, and are adapted to be comfortable for the developer to quickly be able to open, test and close the game.

The evaluation phase after each test session needs to be slightly adjusted and the participants should henceforth be left alone and secluded while filling out the questionnaires.
The pilot showed that the experiment is replicable in the manner it was conducted. Fact is that most materials that were used are commonly found in the household, for example: tables, plates, laptops or tablets, at least one smartphone (these latter tends to have a built in camera), and a die (if not, there is applications simulating dice for the smartphone, which can also be set to any or at least many different amount of possible outcomes).

Only one person needs to act as the instructor and conductor of the experiment, but two or more would help making the flow of the procedure much better for the participants and the data they produce. The important thing is to follow and know the steps all through the process, which again requires the list.

It would be best if this experiment was conducted on a location where more tables and space are available. If this was a requirement, then the experiment would be harder to replicate, considering that not everyone has that amount of tables and space available. Would be if the conductor has access to a school and there could use a classroom, which should be perfect in size if it houses at least 6 tables. Another option is to either rent a café or a restaurant space to conduct it in, but that would require some budget or special access. It is also possible to ask kindly of an owner of such a place if a space can be borrowed for a study's sake, but this can not be expected.

Considering that the participants were colleagues of the same class in the university of the instructor/conductor, and therefore aware of the experiment and the study from earlier, the data is not valid as scientific. If the experiment would have been theoretically completed earlier, and the author by then with a large margin of time could send invitations and have several different dates for participants, which was randomly picked and unaware of the study and its purpose, the data would be valid.

In this case, the data that was collected will not be able to be used to state anything, but was crucial for the experiment pilot to be tested. The participants, being aware and having pre-knowledge about the study, was of great value at this early point. Thanks to their insight, they could give great constructive feedback and helped stabilize the procedure for the larger version of the experiment which will be conducted for the master thesis, later this spring.

The data gathered showed the opposite of what was expected of the experiment - showing that the Test Group that prepared with the digital game prior to the performance test, did better at the game test than the performance test (in which the performance was poor), while the Control Group did great in the performance test and much worse in the digital game test. If this data would be used to scientifically prove anything, it would be saying that the digital game RRP did not help prepare them at all - that it did the opposite and worsened the performance of the participants instead.
5 Results

In this section follows the report on the Restaurant Food Runner Test-experiment, the final version of the pilot experiment (mentioned under section 4. Previous Research - Thesis Pilot Experiment Report), the explanation of the experiment is found under 3.1.3 Experiment - Restaurant Food Runner Test. Within here are the results of the experiment and its elements will be presented, and these results compose the fundamental target of this thesis in the attempt to rule out the null hypothesis, which in turn is found under 3.1.4 Hypothesis.

The conduction of the experiment took place during the summer of 2018, between June and September, and managed to gather 16 unique and of a random selection of participants. The participants were divided into two groups, the Test Group and the Control Group(for details, see 3.1.3 Experiment - Restaurant Food Runner Test). The participants were directed to play the digital game “Table Memory”, perform in the “Restaurant Food Serving Simulation”, and to fill out 4 questionnaires with the purpose to evaluate the elements of the experiment, and also its entirety.

5.1 Table Memory - Data

The digital serious game “Table Memory” was played by all the participants twice, with the reason to use the first play-session as a test-round, in which they get a chance to grasp the concept of the game, to then on the second play-session have a better understanding and thus remove any clouding confusion during the game-performance and be able to “beat” their previous score - to get a second chance to increase their score. The results show that this was successful, by indicating that all but one of the participants increased their score on the second play-test of the mobile game (see Table 3).

The data was gathered by letting the participants play through the game until the end with the high score table, which has no actions available for the player (i.e. “Restart” or “Quit”). At this moment, then instructor of the experiment stepped in to take a screen capture of the smartphone’s screen including the high score table. Thereafter the participant is guided back to the start screen of the game again to start their second play session, and the same procedure of collecting the screen capture occurred accordingly.
Table 3

<table>
<thead>
<tr>
<th></th>
<th>E.</th>
<th>D.</th>
<th>Score</th>
<th>Reveals</th>
<th>Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PT1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01TG</td>
<td>8</td>
<td>121</td>
<td>1206</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>02CG</td>
<td>10</td>
<td>83</td>
<td>560</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>03TG</td>
<td>8</td>
<td>23</td>
<td>99</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>04CG</td>
<td>12</td>
<td>54</td>
<td>390</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>05TG</td>
<td>2</td>
<td>60</td>
<td>535</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>06CG</td>
<td>7</td>
<td>48</td>
<td>452</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>07TG</td>
<td>4</td>
<td>68</td>
<td>471</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>08CG</td>
<td>7</td>
<td>125</td>
<td>1166</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>09TG</td>
<td>9</td>
<td>76</td>
<td>736</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10CG</td>
<td>5</td>
<td>47</td>
<td>437</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>11TG</td>
<td>1</td>
<td>54</td>
<td>516</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12CG</td>
<td>8</td>
<td>121</td>
<td>948</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13TG</td>
<td>8</td>
<td>131</td>
<td>1160</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>14CG</td>
<td>2</td>
<td>100</td>
<td>837</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>15TG</td>
<td>6</td>
<td>125</td>
<td>1209</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>16CG</td>
<td>2</td>
<td>152</td>
<td>1361</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>TG Total</strong></td>
<td>46</td>
<td>658</td>
<td>5932</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td><strong>CG Total</strong></td>
<td>53</td>
<td>730</td>
<td>6151</td>
<td>8</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>E.</th>
<th>D.</th>
<th>Score</th>
<th>Reveals</th>
<th>Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PT2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01TG</td>
<td>7</td>
<td>150</td>
<td>1256</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>02CG</td>
<td>7</td>
<td>104</td>
<td>875</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>03TG</td>
<td>5</td>
<td>64</td>
<td>573</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>04CG</td>
<td>10</td>
<td>115</td>
<td>937</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>05TG</td>
<td>5</td>
<td>87</td>
<td>731</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>06CG</td>
<td>7</td>
<td>66</td>
<td>665</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>07TG</td>
<td>1</td>
<td>101</td>
<td>656</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>08CG</td>
<td>7</td>
<td>150</td>
<td>1383</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>09TG</td>
<td>12</td>
<td>83</td>
<td>645</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>10CG</td>
<td>2</td>
<td>74</td>
<td>699</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11TG</td>
<td>1</td>
<td>81</td>
<td>745</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12CG</td>
<td>11</td>
<td>133</td>
<td>1332</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13TG</td>
<td>4</td>
<td>153</td>
<td>1363</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>14CG</td>
<td>5</td>
<td>126</td>
<td>1173</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>15TG</td>
<td>12</td>
<td>158</td>
<td>1305</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>16CG</td>
<td>3</td>
<td>171</td>
<td>1528</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>TG Total</strong></td>
<td>47</td>
<td>877</td>
<td>7274</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td><strong>CG Total</strong></td>
<td>52</td>
<td>939</td>
<td>8592</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

**Explanation of Abbreviations:**
- **PT1** = Play Test 1
- **PT2** = Play Test 2
- **TG** = Test Group
- **CG** = Control Group
- **E.** = Errors
- **D.** = Deliveries
5.1.1 Table Memory - Data Analysis
What we can learn from Table 3 found above here, is that the Test Group (TG) did less errors than the Control Group (CG), although the latter generated significantly more deliveries and thus the highest score. Doing less errors suggests that the TG were more careful, but with the cost of time, contra CG which dared to be less cautious and could therefore claim more points.

By being more cautious and observant though the TG also was able to be more confident, implied by gathering less “Reveals”, which is the in-game aid button that graphically reveals the numberings of the tables. Though the TG more than doubles the amount of “Reveals” in play test 2, while CG improves greatly and only uses the aid once.

Overall the scores say most of it: it indicates a skill increase between the first and second play sessions for both the groups, however also that the TG, which received no opportunity to prepare themselves for this part of the experiment in comparison to CG - which prior to this part of the experiment was performing the “Restaurant Food Serving Simulation” - ‘lost’ to the CG which scored the highest. This potentially demonstrate that the two games, the analog simulation and the digital serious game, are highly relevant to each other. If we trust that by performing in the “Restaurant Food Serving Simulation” acted as practice for playing the digital serious game “Table Memory”, then a transferability is significantly likely.

5.1.2 Table Memory - Data t-Test
A t-Test was performed on the data from the game play sessions to figure out if there is any significant difference between the groups’ skill in the game. Below in Table 4 the values used for the t-Test are available; only the data of the score from the second play session was deemed relevant for this calculation, being the session that they had the highest performance in due to having a relevant practice session beforehand.
The t-Test indicates that there is no significant difference between the groups’ performance in the digital serious game “Table Memory”, which implies that it is highly unlikely that the null hypothesis could be ruled out. In turn, it also means that the likeliness is low that the skills learned from the “Restaurant Food Serving Simulation” are transferable to the digital game, and that it more likely is a coincidence that the CG scored more points.

It should be understood though that the amount of samples for the use of a t-Test is recommended to be between 20 and 30, but for this thesis only 16 samples were collected, thus the data could be misleading.

If we however focus on the difference between the groups’ mean values, there obviously is a difference, nevertheless a rather limited one, which reflects a rather insignificant training effectiveness transfer from the practice gained by the group which had a relevant test prior.
5.2 Restaurant Food Serving Simulation - Data

For this set of data to be produced, a camera was set up to monitor the performance of each participant, making it possible to count the actions and thus count the scores of each participant post-experiment, instead of directly during the conduction.

In Figure 1 (found under 3.1.3 Experiment - Restaurant Food Runner Test) it is visible where the “Kitchen Output”-table is positioned. There behind it (above it on the image) the camera was set up to clearly overview all the other tables and the movement and thus the performance of the participants.

<table>
<thead>
<tr>
<th>Test Group:</th>
<th>Control Group:</th>
</tr>
</thead>
<tbody>
<tr>
<td>01TG</td>
<td>13</td>
</tr>
<tr>
<td>03TG</td>
<td>18</td>
</tr>
<tr>
<td>05TG</td>
<td>15</td>
</tr>
<tr>
<td>07TG</td>
<td>15</td>
</tr>
<tr>
<td>09TG</td>
<td>18</td>
</tr>
<tr>
<td>11TG</td>
<td>18</td>
</tr>
<tr>
<td>13TG</td>
<td>26</td>
</tr>
<tr>
<td>15TG</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>144</td>
</tr>
</tbody>
</table>

Table 5

**Explanation of Abbreviations:**
- **TG** --- = Test Group
- **CG** = Control Group
- **C.D.** --- = Correct Deliveries
- **R.D.P.** = Recycling of Dirty Plates
- **W.D.** --- = Wrong Deliveries
- **U.T.N.M.** = Uses of Table Numbering Map
- **S.** --- = Score
5.2.1 Restaurant Food Serving Simulation - Data Analysis

What can be deduced from this Table 4 is that both the groups did produce the same amount of “Correct Deliveries”(CDs), showing that they are equally fast in delivering. Though the next total of the “Recycle of Dirty Plates”(RDPs) points to a significant fact: the TG claimed more RDPs than the CG, pointing out that the TG had a more ‘on top of it’ performance, meaning that the TG was able to be more efficient with the time and hence be able to do more. This is likely due to the practice gained from the play of “Table Memory” prior, but it should be noted that it might be due to the possible risk that the instructions were not consistent or/and were understood differently by each participant, and that a majority of less confused participants were coincidentally placed in the same group. However, if we put confidence in the instructor and that the experiment-conduction was properly performed, it indicates that the TG performed with higher efficiency.

The “Wrong Deliveries”(WDs) total albeit implies that the CG was more careful not to place the deliveries wrong, than the TG, which could point to that the TG was overconfident. Consequently, by having a higher number of WDs, the TG evidently did a few more deliveries in total, including both the wrong and the correct deliveries.

An outstanding implication is conveyed by the “Uses of Table Numbering Map”(UTNMs) total, specifying an unmistakable insecurity in the CG, by collecting a relatively high amount of UTNMs, something that the TG seemingly was not in need of. However, it should be observed that the weight of this insecurity is due to especially one participant of the CG, who showed high uncertainty, accompanied with only two more than collected a much lower but significant amount of UTNMs.

The asterix(*) located in Table 5, on the Control Group side of it on the score of participant “12CG”, has a story behind it. This participant’s score is altered, but with a reasonable cause: The participant had misread the table numbering map, and read it mirrored(see Figure 1, under 3.1.3 Experiment - Restaurant Food Serving Simulation). Meaning that he or she did realize that one side had the even numbers and the other the odd, but misunderstood from what point on the map to refer to when reading the positions of the tables. The blame falls upon the instructor in this case, for not making this obvious to the participant, however, the performance of the participant indicated otherwise that there was no further confusion. Hence, the scores were seemingly all incorrect, but if the map is mirrored with this in mind, the deliveries all becomes correct ones and the participant proved to be the highest performer of the “Restaurant Food Serving Simulation”-game.

In conclusion, the TG collected the higher amount of score by being more efficient, though seemingly brash, although significantly more level-headed than the CG. With this data in account it can be concluded that the TG were relatively more prepared than the CG for this task, suggesting that the null hypothesis can be ruled out - the data shows that there is a minor difference in the scores between the groups, and that the serious game “Table Memory” hold a mere potential to increase the trainee’s efficiency of the relevant performance.
5.2.2 Restaurant Food Serving Simulation - Data t-Test

Again a t-Test was performed for this data set to test its viability, seen below in Table 6.

<table>
<thead>
<tr>
<th>Test Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>64</td>
</tr>
<tr>
<td>3</td>
<td>41</td>
</tr>
<tr>
<td>4</td>
<td>59</td>
</tr>
<tr>
<td>5</td>
<td>54</td>
</tr>
<tr>
<td>6</td>
<td>64</td>
</tr>
<tr>
<td>7</td>
<td>78</td>
</tr>
<tr>
<td>8</td>
<td>76</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>57.75</td>
</tr>
<tr>
<td>StDev</td>
<td>17.42535099</td>
</tr>
<tr>
<td>Variance</td>
<td>303.6428571</td>
</tr>
<tr>
<td>n</td>
<td>8</td>
</tr>
<tr>
<td>Signal value</td>
<td>3.625</td>
</tr>
<tr>
<td>Noise value</td>
<td>108.1495536</td>
</tr>
<tr>
<td>t-value</td>
<td>0.3485745259</td>
</tr>
<tr>
<td>Probability</td>
<td>0.05</td>
</tr>
<tr>
<td>t-Test</td>
<td>0.7325951296</td>
</tr>
</tbody>
</table>

Each group had 8 candidates, meaning that they were 16 in total. Looking at the “Average” (the Mean value), we can see that there is a minor difference just from comparing the two groups’ mean values. However, to see if the data is reliable for telling the difference, the t-Test value is of main interest.

It reveals that it is highly unlikely that the difference seen here will happen again, and therefore the null hypothesis cannot be rejected. As mentioned for the previous t-Test of the “Table Memory”-data, the amount of samples for this statistical test is lower than of the recommendations.
5.3 Questionnaire - Data

The motivation for the use of these questionnaires was mainly to find out if the participants had relevant previous work experience to the restaurant industry, thus to reveal if they already own relevant skills that the games in this study are attempting to test. Because if a participant owns those skills from previous experiences, they will most likely perform better in the tests and be unfairly compared to the people that tend to enter the industry without relevant experience.

A more detailed analysis of the data from the questionnaires can be found under Appendix B.

5.3.1 Pre-Experiment Questionnaire

This questionnaire was the largest of the forms, and the first task of the experiment to complete, with the purpose to identify the participants’ physical and social status, relevant experience with both the restaurant industry and games on smartphones, and it ends on probing for their view on the field of serious games.

Parts of the data is somewhat misleading, due to the misunderstanding of some of the questions, i.e. the misinterpretation of the word “Sober”, although the conductor of the experiment was aware of these issues and have corrected the data, i.e. there was no participant that actually was intoxicated by alcohol during the study, even though there is a few of the answers that indicate that they were.

Furthermore, 50% of the 16 participants had experience in the Hospitality industry, and considered that themselves to have an average amount of experience. During their time in the industry, 75% of the 8 participants had experience that involved the care for tables, which concerns knowing their positions and delivering orders to, and/or cleaning and resetting them.

The average age of the participants was 26.25 years old during the experiment, and 50.3% of the participants currently had some form of employment, while 31.3% were students, leaving only 18.8% possibly applicable under the NEET classification (see 2.5 Not in Education, Employment or Training), however not by age - NEETs are classified to be between the ages of 16 - 24 (Mawn et al, 2017).

When the form was asking for the ownership of a smartphone, one participant stated that he or she did not own one, even though it was known by the author that the individual did in fact own one. Again it is probable that the language or the formulation of the question was misinterpreted. It is visible in the questionnaire raw data that this participant previously also misunderstood the first question concerning the soberness, further indicating a language difficulty.

Because of the misinterpretation, only 15 participants answered the smartphone related questions. However, they declare that most of them play games on their smart device, and that those games tend to be of the genres puzzle, action, adventure, strategy and brain exercise. This suggests that most of the participants are used to playing games that are mentally challenging and sometimes fast-paced, and further it is learned that they do play games as often as in accordance with the general public, with the mean of 5.7 points out of
10. They find themselves above average in being skilled players of smartphone games, and the significant reasons for playing is to pass time and being bored, yet also for fun and to stimulate their brains.

None of the participants had any disabilities - information which was of importance for this study because it requires a generally sound physiology, considering that the analog game-test involve agile movement.

With the final question for this questionnaire, the participants show a high confidence in the serious games and their potential to live up to their purpose to educate and train.

5.3.2 Game Play Test Questionnaire
With the purpose to assess the experience of playing the digital serious game “Table Memory” this questionnaire was directed to be filled out following the digital game play-test. Here we can learn that these participants did not find the game too stressful or difficult, and that a low amount of issues were regarded as annoying. On the other hand they mostly found the experience a rather entertaining one.

5.3.3 Restaurant Food Serving Simulation Questionnaire
This questionnaire follows the performing in the analog game the “Restaurant Food Serving Simulation”, with the reason to let the participants reflect on the experience it provided.

Overall, this test was not considered to be stressful, neither was it considered pressuring to be filmed or work within a time-frame. Most of them though state that remembering the tables were the most challenging task of the test.

5.3.4 Post-Experiment Questionnaire
During this form, the participants were asked to reflect on the entirety of the experiment, to give an overall judgement and to comment on any element.

The questionnaire data reveals that the Test Group of the participants felt that by playing the digital game as practice before the analog simulation, they were considerably more prepared. The Control Group gave mostly positive responses towards the belief that the digital game would have been useful for them to be more prepared and thus perform more efficiently in the analog simulation.

Next it is evident that the experience was entertaining, by the fact that every participant rated the “fun” of the experiment with an average rating above 7 out of 10 possible points, and the majority rated it with the highest amount. They showed enthusiasm indicated by the fact that all but two of the participants took the time to manually add comments concerning what was considered more amusing. No confusion was recorded, but considering that only 11 out of 16 participants did write anything, it might mean that the ones that did not answer did not want to present their confusion in fear of being judged as of a lower intelligence. However, this is just speculation - the data is insufficient to make any conclusive statement regarding this.

Their confidence in the serious games had apparently increased after the experiment according to candidates, of which 43.8% stated to have gained an increase, whereas 18.8%
indicated that they had significantly increased their conviction that games can be used for serious purposes.

5.4 Overall Experiment Analysis

Moreover, the experiment met with few complications, none being a major negative effect on the data validity, although the difficulty to gather participants was apparent, with the cause that the target group age-requirement was set rather low, specifically targeting the young adults and slightly above. The lunch restaurant-café where the conduction of the experiment took place is located in a park, even though it is located in a central and popular location, most of the guests were either parents with young children or pensioners, and thus either too occupied to participate or not of an age that correlates with the target group.

However, the participants was seemingly of a well mixed selection considering its size, and when mainly considering their main occupations, use of games in general and their confidence in games used for serious purposes.

6 Analysis

In this section follows the overall analysis of the results produced by both the pilot and the final version of the experiment, but mainly the latter. Here the highlights of what is considered valuable data are analysed and briefly discussed to further the substantiation of the thesis.

6.1 Pilot Experiment

Firstly, among many things that was realized from the conduction of the pilot experiment, are most prominently the importance of the list of steps for the experiment procedure, to be able to ensure that the instructions were consistent for each participant, and that the digital game that was to be used as training, needed to be redesigned to be less confusing and simplified. This led to the development of “Table Memory” that was used for the final version of the experiment, which is a reimagining of the “Restaurant Runner Prototype” that was utilized in the pilot experiment.

The approach of the questionnaires was also shown to be in need of a redesign, with the reporting from the participants on confusion and faulty formulations. Furthermore, it was learned that the analog game “Restaurant Food Serving Simulation” was in need of improvement in its rules and use of objects.

The participants were only by the count of two, though of high quality for the nature of this version of the experiment considering it being an early stage test-conduction. The participants were colleagues from the same university and of the same research field of Informatics and Serious Games, and were therefore able to contribute with precise and insightful feedback, contributing for a remarkable improvement.
With this in account, and even though the pilot study produced no valuable data to the research, key constructive feedback was gained to be incorporated into the design of the final version of the experiment. This contributed considerably to the success and increased stability of the procedure of the experiment.

### 6.2 Final Experiment - *Table Memory*

If we start by looking at the part of the final experiment that involves playing the digital serious game “Table Memory”, the performances of the two groups are compared to one another. The difference in the amount of the total scores imply that the group that performed in the analog game the “Restaurant Food Serving Simulation” before playing the digital game, the Control Group, were more efficient in the digital game, with the thus assumed cause of transferable skills and task-relevance between the games’ different dimensions - the digital and the analog dimensions. However, the usage of a t-Test to calculate the significance of the data indicating the difference, rendered the deviations insignificant and coincidental.

Considering that the amount of the participants (16) are below the recommendation (20-30) and that about half of the participants were acquaintances of the author, both ex-colleagues from the food service industry and relatives, even though these participants were carefully selected by being considered relatively new to the industry with the motivation of young age, not established in a career, and does not play games more than the average person - with this in consideration, the data might deviate from the standard population. This is a point that needs to be realized for a sequel version of the experiment to produce more standardized and viable data, and from this standpoint it would be of interest to the viability of the data if research would provide data that represents the standard population and can function as a template to compare the participants with, to ensure that there is no significant deviation between them.

Yet, fact is that there is a difference between the groups when playing the digital game, indicated by the difference in their scores, and the cause for the difference is likely due to performing in the analog game prior. This suggests that by first performing in one of the two games used in this thesis before the other, should result in producing a higher result in the following game, and it can be ignored that the two games are from two different dimensions. This is additionally substantiated by the data gathered from the analog game “Restaurant Food Serving Simulation”, in which the Test Group collected the most score, and these participants were performing the digital prior to the analog game.

### 6.3 Final Experiment - *Restaurant Food Serving Simulation*

The analog task of the experiment was more difficulty in keeping a consistency of the instructions for each participant, as the rules were less strictly applied for the first few participants, possibly affecting their performance negatively by making them less informed, focused and prone to do their best. Other notable points are that the instructor of the experiment had issues with the randomizer used to generate random destination for the deliveries during the game. For a few of the first participants, a digital smartphone app simulating the dice was used, and it slowed down the performances of the participants by
consuming unnecessary time to produce the random number: in the haste during the game, the instructor had to provide plates to the participant with one hand to while holding the smartphone in the other to be able to continuously produce random numbers, and with this as cause were unable hold the smartphone upright and suffered from the screen rotating and slowing down the randomization process - the roll of the die - remarkably.

With the instructions concerning the recycling of the “Dirty Plates”, which were the plates that had already been placed out during a session, the instructor could evidently have been more clear. Many of the participants either forgot or ignored this additional task, which would yield more score, or the instruction was conveyed late or missed entirely to be presented by the instructor. Though, the instructor did make sure to follow the list of the steps for the procedure of the experiment for each participant, though might have failed to convey the importance of this specific part of the information clearly. It is possible that some participants were focusing on remembering the table numbers, meaning that the “Recycling of Dirty Plates” should probably be informed either before the instruction concerning the table numbers, or after when the participant can confirm that they feel that they have memorized the table numbers, or possibly even at both points during the instructions to highlight its importance.

6.4 Final Experiment - Questionnaires

From the questionnaires it can be learned that despite these previously indicated issues of confusion and lack of clarity in the instructions, the majority of the participants provide that they are more than satisfied with the instructions and did not find it confusing. Furthermore, half of them had experience from the hospitality industry, which gives them an advantage in this experiment and also makes the data less viable for its purpose. Though, this thesis considers that it is necessary for this experiment to also have this part of the population represented in the mix of participants, in attempt to provide a more realistic representation of the general population.

With a closer look into the raw data of the first questionnaire that was completed by all of the participants as the opening part of the experiment and concerned the subject of occupation among other things, it is learned that out of those 8 participants, which stated that they had experience in the hospitality industry, 3 were found to be in the Test Group contra 5 in the Control Group. This shows an uneven distribution of experience between the groups, showing that the CG indeed has more previous experience than the TG, and thus that this group had the advantage with relevant experience. Though it is also indicating that 2 out of those experienced 5 in the CG did not have the work-tasks concerning tables, meaning that their previous experience might be of the lower relevance to this study, thus the groups could be considered even in relevant experience.

Despite that the CG seemingly has more experience, the TG scored higher in the more relevant and realistic part of the experiment, the “Restaurant Food Serving Simulation”, which is unexpected considering that this analog game is more closely related to a real situation in the industry compared to the digital game. What this could suggest is that the use of the “Table Memory”-game as practice before the analog one was successfully providing relevant training for its recipients. However it is likewise reasonable that there exists another
level of unevenness in the experience of the participants - the experiences of the hospitality industry might vary in quality and quantity. By analysing the first questionnaire further, it is visible that those who stated to have relevant experience, are rating their experience to be of average quality and quantity, with the mean of 5.13 points out of 10.

What further on is an interesting point learned from the first questionnaire, which indeed is expansive but relevant, is that most of them are regular players of smartphone games, with a general interest for fast-paced and brain exercising types. They tend to play rather often, a bit more than the general public according to their self-rating, which also demonstrate that they are rather skilled players. With these implications of a gaming habit, it can be deduced that these participants might be more prone to learn through this method of using a digital game in additional to the instructions in general, as gamers have been proved to generally be better prepared for learning (Bejanki et al., 2014). The CG also on this point has the majority of participants that are relatively experienced to the habit of games, though only by one participant more. Although, these implications did not contribute with any substance to that the gamers of this experiment were any better learners than the non-gamers.

The participants all agree that the experiment and its elements were not overly stressful and did not point to any noteworthy issues, but they all admitted that the element of the analog game which involved remembering the table numbering structure, was the most difficult task. This complies with what was mentioned earlier in the thesis, according to the experience of the author of this paper, that most new food runners and servers of a restaurant tend to initially struggle with learning the table numbering map and often fail to deliver to the proper tables (see 2.4.1 Food Runners). This provides credibility to one of the main problems presented in this study, which point out that employee turnover rates might be affected by this difficulty.

Overall, the experiment was perceived as an entertaining experience, and those who did not play the digital game prior to the analog, the Control Group, stated that they believe it would have been beneficial to use this digital game as preparatory practice.

Finally, the expectations on the Serious Games field was increased for close to all of the participants, suggesting that they found the experience of the experiment educative, entertaining and of considerable importance. A desired outcome, even though the data produced was not able to pose a rejection of the null hypothesis.
7 Conclusions

1.1 Summary

At this point the data has been presented and analysed, and the relevant knowledge that have been extracted are summarized in this chapter.

First of all, the results does not provide the means to reject the null hypothesis, on the basis that the t-Tests rendered the data unreliable, by having too small deviations in the performances of the groups. However, the data shows at least that a difference in the performances exists, and suggests that there is a strong relation between these two games used for this final experiment, even though they operate on the digital and the analog dimensions, which is suggested by the fact that each group was performing the best in the second game - independent on whether it was the digital or the analog game - therefore it is concluded that they learned from one and could apply the gained skills on the other, and vice versa.

The implications of the t-Tests though are strengthened by the fact that there is an unevenness in the relevant experiences of the participants, whereas one has more than the other, and the quality and quantity of the experiences are unspecified, thus uncertain.

On another note, most of the participants did in general have a habit of playing games on their smartphone, which concentrates the knowledge gained from this experiment in favour for an audience that does have the gamer characteristic, and excludes those who does not tend to play mobile games.

Else, the study has shown that the task of remembering a table numbering map is a highly difficult challenge, contributing to the statement of the author of this thesis which points this out from his own experience in the field of food service.

The procedure of the whole experiment went well, but the instructor needs to be more confident and strict when providing the instructions, to leave no space for confusion and mistakes that causes the data to falter in viability, which was an issue according to the instructor’s self assessment.

Considering these points, the conclusion of this thesis ends on that the experiment is still not fully developed, considering the instructor to not have been able to deliver the required quality instructions for the conduction of this experiment, but finally gained this calibre after when the conductions of around half of the participant-pool were completed. Therefore this experiment at this point is enhanced and can be considered in a final stage for future conduction. Hence this concludes that the experiment conducted thus far was of constructive practice for an upcoming attempt, and that the amount of participants needs to be increased to be at least between 20 and 30.
In the attempt to answer the Research Question, which writes:

*How transferable would skills gained from a digital serious game be to a real situation?*
- *How effectively could a digital serious game increase the training efficiency in addition to traditional training material, in the example of vocational training of the Food Runner-occupation in a casual restaurant context, when compared to the traditional training method?*

The data claims that there definitively exists a transferability for learned skills between the digital and analog dimensions, although the data is also proven to be unreliable, which leaves the answer to convey that there is potential, but further study is needed.

For the follow-up question, the digital serious game in question (“Table Memory”) produced results that indicated that it had a strong relation with the analog game (“Restaurant Food Serving Simulation”), which in turn is designed to be of relevance to the industry of casual restaurants. The results that the experiment produced were unreliable and thus made it difficult to measure and provide an exact figure on how much the game affected the training. Further, this thesis lack validation that the analog game is a realistic simulation of a real situation in the casual restaurant setting. However, the analog game is developed by this author, who has a relatively long experience in the field (5 years), although no other reference for the validification of the analog game is recorded in this thesis, thus it is unreliable to conclude that it is realistic in the face of the industry.

Furthermore, the data showed, by the difference in the scores between the groups, that the digital game increased the effectiveness of the training material. Even though it is a minor deviation it exists, and hence this thesis argues that it can be considered significant and needs to be further investigated.

### 1.2 Discussion

It is hard to argue with the results of the t-tests, which basically removes the risk of chance being involved in the calculations - the results claim that the data is unreliable. Though, this thesis argues that there is a spark in the results, so to speak, that indicate potential and require further examination and execution of the experiment.

If the participant-pool would have been of larger proportion, the first few participants could be used to give practice for the conductor and the procedure of the experiment, to then be excluded in the results if any errors would be deemed to affect the data. This way the participant contribution data would be more reliable, but it would also be desired to ensure that the selection of participants can represent the standard population.

As Namee et al. (2006) mentions in their article about their food safety simulation Serious Gordon, that on one hand games produced by academics, who have no understanding of
games design, are boring, while on the other hand, game designers who have no understanding of the educative aspects, are likewise destined to fail. They write that it:

“[…] is not to privilege one arena over the other but to find the synergy between pedagogy and engagement in digital game based learning”

(Namee et al., 2006, p. 2).

Considering this the author found himself to be in a unique position, as an experienced educator in the specific occupation of food running, and also own the academic understanding of the science and art of game design. Therefore equipped with great attributes to approach this problem area with. The author argues with the basis of real life and actual first hand experience of the field. The evidence of this credibility is found in the end of the References-section, where all the relevant work reference are detailed, including contact information and location. The thesis argues that this is credible in the level of a personal resumé, which an individual uses for applying for jobs.

During the research a project called “Studio Ludum”(Dannberg, 2017) was found that are currently working with this problem area, in the University of Skövde, which is called “Games as Tool for Establishment” (which is roughly translated from swedish: “Spel som Etablarringsverktyg”). Their vision is to create a tool to help NEETs in their process of transitioning into adult-life, a tool which to provide the participants with both a digital and physical space, that though are closely related.

The author of this thesis has an aligned interest with this project - in creating a tool that can help young people, like NEETs, to make the important transition. Insufficient knowledge is collected from their project, but seemingly it is more of a social platform, rather than a game which this study instead focuses on. A game like “Table Memory” though currently suffers from lacking financial support and thus a scarcity of marketing and attention in general, which would help to test and establish its application on the field. The author of this thesis argues that if this tool that Dannberg is proposing was intended to act as a platform, then the game developed by this author could be used in conjunction with, or inside the digital space of this work-establishment tool.

Possibly a collection of games could be provided to such a platform, which then the participants can enter to train themselves in a field, to this way gather knowledge and skills from the training to thus strengthen their confidence to face the transitioning into adult life.

The NEETs could benefit from the likes of a game like “Table Memory” (when in a final stage), if it can provide an increase in training effectiveness in addition to the traditional methods. With the example of the casual restaurant industry, which tend to have low requirements of experience to enter and are an excellent starting point for young people (Urban, 2013), this digital game has the potential to make the initiation of an employment in this sector less difficult, and more attractive considering it using game features. It’s easy to assume that most people today that are classified as NEETs, tend to be playing video games which thus are likely to be attractive to this group of individuals.
Thus, there is a need to increase the motivation for NEETs to enter the transitioning of their adult-lives, and that the Casual Restaurant industry is in demand of higher quality staff that is more prone to continue their employment rather than quitting their job (DiPietro & Bufquin, 2017). With this as foundation, this thesis proposes that a serious game could contribute with a bridging effect to these two problem areas, with belief that it can help them realize that they can ease each others problems, not entirely, though possibly dampen the intensity of the issues.

An underlying problem for the NEETs and young people of today could also be that the work-life is not attractive to them, growing up while being fed images on how the nature of work-life was and are for the former generations - as a spectator but never as an active member - and resulting in them being without the desire to be an active member, and to continue observing it from a distance. However, these younger generation did in general grow up with video games as a familiar phenomenon, which this thesis argues could then take these people a step closer to being active and potentially lead the majority of them to gaining an interest for becoming a fully active member of the work-market. The games developed with the purpose to provide vocational training could metaphorically be referred to as “cushions” for the transitioning from the comfortable upbringing into the often harsh nature work-life. The “cushion” effect would be provided by in a playful way let the player interact with the tasks of a job, to let them experiment and learn if the job is something that they would be interested in or if they should explore more to find what is attractive to the individual player.

It is possible that the participants, being voluntary and random, sympathised with the conductor and gave responses accordingly, meaning that they gave positive responses specifically in the questionnaire to not negatively affect the conductor, who have designed the game and the experiment. Instead of being honest, there is a risk that they therefore wanted to ensure to contribute the conductor with positive feedback, and delivering optimistic responses, in the act of attempting to be polite and useful to the conductor.

1.3 Future Work

A continuation of this researching would be desired, about how the serious game can become more effective, to see if there is any design methods that can be applied. It is not only a game that is motivated by competition, but also by the learning outcomes. Therefore a more extensive research on the matter of the design of the serious game would be aspired, so that the game can become more identified and thus more established.
The thesis conclusions point to the need to produce evidence that the participants of the experiment are of a low deviation from the standard population, by using the data from the questionnaires which can be redesigned to incorporate questions that identify if the characteristics are relevant. This would add to the viability of the results that the experiment can produce, however, it might be rather farfetched to do such an extensive selection of the participants, which simply could suffice by being random.

Noteworthy is that the Restaurant Food Serving Simulation-design needs to be validated by professionals from the relevant industry, which it at this point is not. It basically is one person’s perspective of the industry, whom though has relevant first hand experience(see End of References). This calls for validation, thus to give this analog game credibility of its industry relevance, visiting schools that educate in the matter and highly experienced employees of restaurants would be one of the next steps in this work.

References

[Accessed on 7 October 2018]

[Accessed 31 October 2018]

Bejjanki V.R. et al., 2014. Action video game play facilitates the development of better perceptual templates. Proceedings of the National Academy of Sciences of United States of America, [online]. Available at: <https://doi.org/10.1073/pnas.1417056111>
[Accessed on 22 October 2018]

[Accessed on 31 October 2018]

[Accessed on 9 October 2018]
Brandão et al., 2012. An overview of the use of serious games in the military industry and health. [online] Handbook of Research on Serious Games as Educational, Business and Research Tools, pp 182. Available at:
<https://www.igi-global.com/chapter/content/64254>
[Accessed on 8 October 2018]

<https://doi-org.libraryproxy.his.se/10.1016/j.ijhm.2016.09.008>
[Accessed on 17 October 2018]


<https://doi-org.libraryproxy.his.se/10.1177%2F1555412009354727>
[Accessed on 31 October 2018]

[Accessed on 23 October 2018]

<https://doi.org/10.1080/15332845.2017.1328260>
[Accessed on 19 October 2018]

Djaouti et al., 2011. Origins of Serious Games. Serious Games and Edutainment Applications, [e-journal], 25-43. Available through: Springer US Online Library
<https://link.springer.com/chapter/10.1007/978-1-4471-2161-9_3#citeas>
[Accessed on 8 October 2018]

[Accessed on 18 October 2018]
<https://doi-org.libraryproxy.his.se/10.1111/j.1365-2729.2012.00489.x>
[Accessed on 1 November 2018]

<https://doi-org.libraryproxy.his.se/10.1080/15256480.2017.1305310>
[Accessed on 15 October 2018]

Kron et al., 2010. Medical student attitudes toward video games and related new media technologies in medical education. [online] *BMC Medical Education* 2010. Available at: <https://doi.org/10.1186/1472-6920-10-50>
[Accessed on 7 October 2018]

[Accessed on 19 October 2018]

Mac Namee, Brian et al., 2006. Serious Gordon: using serious games to teach food safety in the kitchen. 9th. *International Conference on Computer Games: AI, Animation, Mobile, Educational and Serious Games CGAMES06,Dublin, 22-24 November*, [online].Available at: <https://arrow.dit.ie/scschcomcon/23/>
[Accessed on 9 April 2018]

Martis, L., 2018. These are the top 20 most common first jobs people have before moving on to other careers. *Monster Worldwide Inc.*, [online] Available at: <https://www.monster.com/career-advice/article/firstsevenjobs-hashtag-best-of-0816>
[Accessed on 15 October 2018]


[Accessed on 12 October 2018]


<https://doi-org.libraryproxy.his.se/10.1111/j.1744-6570.2011.01190.x>
[Accessed on 1 November 2018]

<https://doi-org.libraryproxy.his.se/10.1177%2F1046878108328087>
[Accessed on 31 October 2018]


<https://doi.org/10.2478/v10202-012-0020-x>
[Accessed on 13 November 2018]

USDA, 2017. Food Service Industry, [online]. Available at:

<https://doi-org.libraryproxy.his.se/10.1007/s10803-014-2333-1>
[Accessed on 31 October 2018]
List of the Author’s Restaurant Service Work-Experiences

Workplace Name: **La Disfida**
Occupation: Food Runner
Duration of Employment: **2013 July - 2014 November.**
Location: 109 Ramsay St, Haberfield NSW 2045, Australia.
Telephone: (+61) 9798 8299 (Australia)

Workplace Name: **Bondi Pizza Parramatta**
Occupation: Food Runner, Waiter, Kitchen Staff
Duration of Employment: **2015 January - 2016 April**
Location: 320 Church St. Parramatta, NSW 2150, Australia.
Telephone: (+61) 9891 9221 (Australia)
Email: parramatta@bondipizza.com.au

Workplace Name: **Hardrock Café Gothenburg**
Occupation: Barback, Food Runner
Duration of Employment: **2016 June - 2017 August**
Location: Kungsportsavenyen 10, 411 36 Gothenburg, Sweden.
Telephone: (+46) 31 - 10 23 30
Email: Goteborg@hardrock.se

Workplace Name: **Rosenkaféet**
Occupation: Barista, Cashier, Dishwasher
Duration of Employment: **2018 March - present (season ending in November)**
Website: [http://rosenkafeet.se/](http://rosenkafeet.se/)
Location: Slussgatan 1, 411 06 Gothenburg, Sweden.
Telephone: (+46) 31 - 80 29 70
Email: info@rosenkafeet.se
Appendices

Appendix A - Restaurant Food Serving Experiment - Method Description

This document is divided into three consecutive phases, which each has detailed steps of instructions within them. The phases are first the Preparation phase, secondly the Execution phase, and thirdly the Evaluation phase.

Phase 1 consists of instructions for what is needed, where it needs to be located, how many and how to handle the participants, and explains the reasoning behind the components’ importance. Being a preparation phase, it also includes

Phase 2 covers the steps of the execution of the experiment, divided into two parts: Part A is the digital game play test of the mobile game “TableMemory”, which is used to prepare for part B of the experiment, the role play Restaurant Serving Simulation - the Performance Test.

Phase 3 is the evaluation point. This section details what to ask the participants, and what needs to be considered for this moment when each participant’s session ends. The evaluation also exists in Phase 2, in shape of a questionnaire along with each participant’s end of game play test, to assess their play-session experience.

1.4 Experiment Method Description

1.4.1 Preparation Phase
In this section all the preparations are detailed and explained to be able to set up the experiment in a replicable manner prior to executing it.

1.1 Location
1.1.1 Two rooms are needed, one smaller to test the mobile game “TableMemory” in, and one larger to do the role play Restaurant Serving Simulation Performance Test in. The size of the room for the mobile game test does not need to be small, but should be a different room from the room or space used for the performance test.

- Experiment Part A - Digital Play Test
  - Needing a small room that is as disconnected as possible, to prevent interference with the participants (though consider claustrophobia).
○ It needs to have space for a chair and preferably a desk, for comfortability.

○ A light source other than the screen of the mobile device should be available.

○ Preferably no light coming into the room from outside of the room, to make sure to have no effects on the participants from other external individuals.

○ Preferred if the room has a door and can close out both external sound and light, otherwise a curtain could suffice for the sake of the light.

- **Experiment Part B - Performance Test**
  ○ A larger room which has space for at least 10 tables, which preferably allows for a distance between one of the tables and the rest, as this single table will be most frequently visited, due to it working as the Kitchen Output which tends to be in a room different from the dining room in a real restaurant.

  ○ A typical classroom would be a good example of size and layout (for illustrated examples of layout - see Figure 1 and Figure 2 under “Part B” found in “2. Execution of Experiment”-section).

  ○ The kitchen output, which is where the participants find each food item, can be located outside of the pretend dining room where the performance test will take place. If this would be necessary, then it is important that the location is not too distant, preferably adjacent to the “dining room”. This means that another room can be used in addition, which could simply be the hallway outside or a small scrub that at least can accommodate two persons and a table. Recommended is that the participants should be secluded from other individuals, including the other participants. Do consider that the data can be kept more “pure”, so to speak, if the instructor is stationed outside of the room, preventing that the instructor can observe the main part of performance in the canteen, where only the camera supervises.
1.2. Artefacts

1.2.1. The physical components that are required in this experiment, are:

- **Experiment Part A - Digital Play Test**
  - 1x Android Device (to run the mobile game the “TableMemory” on)
  - 1x Camera (optional) - for recording of the audio and video of the performance of the participants.
  - 1x Chair - for the participants to sit in front of the computer while playing.
  - 1x Desk (optional) - for giving an ergonomic position while playing.
  - 1x Questionnaire - which is relevant to the game “TableMemory” to evaluate their experience with it.

- **Experiment Part B- Performance Test**
  - 10x Tables (or 1x Table and 6x Seats at a table) - 1x Table to act as the kitchen output - the place from where the food exits the kitchen, and at least 9x tables to be serving destinations - specifically this amount to keep it relatable to the game “TableMemory” which originally uses 9x virtual tables.
  - 10x Dinner Plates - these will be used to symbolize the food dishes which are to be delivered to the correct table. The amount of plates must be at the least equal to the amount of tables, because that way even if every table is served a plate, there will be at least one more to be delivered from the Kitchen Output. It is important that there is enough for the participants to always have plates to deliver for the duration of the test and each of the destinations (tables/seats). Plates that have already been placed becomes “dirty plates” and are to be brought back to the Kitchen Output, placing the plates in a cycle.
  - 1x List of Instructions - for the instructor to follow to make sure that each participant has the same instructions. It will be very important to have close at hand for the instructor to be able to secure the reliability of the test - a list of instructions to be
followed blindly.

- **3x** Maps of the Table Numbering (at least - each with a different numbering pattern) - showing in which way the tables are numbered to get a chance memorize their location and to aid the participants during the performance test.

- **1x** Camera - used to record the performance of the participants, to act as the transcript data which will be analyzed post-experiment. NOTE: laptops tend to have a web camera built in by default.
  - The fact that the video has a time, provides the ability to check if any of the participants delivered the “food” within the “freshness” timeframe.

- **1x** Stop watch(Optional) (or an extra smartphone) - to keep track of the “food”-freshness time-frame of 15 seconds (the time frame depends on the distance from the Kitchen Output to the destination and the judgement of the conductor).

- **1x** Portable Hard-drive - with at least 500GB free for storage, functioning as a second backup in addition to the Google Drive cloud service.

- **1x** Die - the amount of sides it should have is dictated by the amount of tables that is used for the test, excluding the Kitchen Output, as the die will be used to randomize the destinations of the “food”. In the minimum, a 9 sided die is required - if not available, free smartphone apps are available online(e.g. Google Play or App Store).

- **Experiment Evaluation**
  - Note-taking material - laptop/notepad, notebook, pen and paper, audio recording etc. Whatever works best for the situation and is available.

  - **3x** Questionnaires:
    - **1x** to evaluate the Experiment Part A - digital play test of “TableMemory”,
    - **1x** to evaluate the performance test - Experiment Part B, and
1.2.2. The software that is needed is:
- The digital mobile game “TableMemory”. The game is created with the aim to train the player’s memory with relevance to service in a restaurant, focusing on: Memorizing numbered tables’ positions, ability to serve food fast to keep it Fresh, being able to handle Stress and Tempo.

1.3. Participants
1.3.1. For this Experiment the number of participants needs to be Evenly Numbered to be able to divide them into two groups - the Test Group to test the mobile game “TableMemory” prior to the performance test, the Restaurant Serving Simulation(RSS), and the Control Group to test “TableMemory” afterwards instead.

1.3.2. Group every second participant up in the two groups, the Test Group and the Control Group, to keep them evenly spread.

1.3.3. Have one participant per session, this is to prevent that the participants can prepare more by observing other participants that are before and affect the result data, which needs to be as equally treated as possible.

1.4. Technology
1.4.1. Memory Handling

- All recorded data will be uploaded to a Google Drive as soon as the Experiment ends, and then also backed up to a portable hard-drive.

2. Execution of Experiment
When the experiment is set up, by following the list of components and setup instructions of the Preparation phase, the execution will commence as follows below. The experiment is divided into 2 parts: A and B - “A” for the testing of the mobile game “TableMemory”, and “B” for the execution of the performance test - the
Restaurant Serving Simulation.

2.1. **Part A: Game Play Test - Execution Steps**

Here the execution of the Game play test of the mobile game “TableMemory” is detailed and presents a step by step instruction for the process of conducting it.

2.1.1. When everything is in place (preparation details are found in Digital Play Test under Location, earlier in this section), instruct the participant to enter the room where the computer with the game is located, to get seated and comfortable. Explain that they are here to play a game and try to perform as good as possible in the game.

2.1.2. While having the game started, it should ask for a name of the player, in this moment be sure to be present and note down the participant’s player name, to relate the data of the play test with. The choice of name is irrelevant as the participants are kept anonymous, but does help with sorting them in the transcripts. They will be sorted by the time of mobile screenshot capture, bundled with the number of each participant’s session (i.e. participant 1; participant 2, participant 3, etc.).

2.1.3. Tell the participant before leaving them alone in the room, to play the game until she has reached the Highscore frame/page of the game, **twice**. By then the instructor needs to enter and have them perform a questionnaire in which they get to rate and answer questions related to the mobile game.

2.1.4. Now the Game Play Test is over and the participants can take a brief break if needed, otherwise, the performance test is up next. Details on this and its execution steps is found in the next phase.
2.2. **Part B: Restaurant Serving Simulation (RSS) - Setup**

Here follows how to setup the RSS performance test and make it ready to be conducted as designed.

2.2.1. Having the right location, as is detailed under “Location”, found in the Preparation section, the location now needs to be set up.

2.2.2. Follow the list of Artefacts found under the Preparation chapter, to know what items are needed and what goes where.

2.2.3. If the least amount of 10 tables are available, then set them up in a similar fashion of what is shown in Figure 1 (below).

![Figure 1](image-url)
2.2.4. If there is not enough tables available, one table is an option, simply making sure there is 9 destination positions, see example in Figure 2(below).

![Figure 2](image)

The setup in either case needs to try to replicate the figures, but they only acts as way pointers, examples of recommended layout, but this won’t obviously apply to every situation, environment or location.

2.2.5. The order that the Seats or Tables are numbered in will be dictated by the different table/seat numbering maps(listed under “Artefacts” in the Preparation section. These images above can be used as a template to move the numbering around on, to then be printed or set up to be available during the performance test session. Note though that the pattern should be somewhat illogical or the difficulty of the challenge has the risk of being too low.

2.2.6. Place a stack of at least 10 plates in the middle of the Kitchen Output table, this pile will be for the instructor to grab a plate from and place out beside the stack to have the participant pick it up.
2.2.7. On the other side of the stack the “Dirty plates” will be placed, which in turn the instructor can add to the stack in the middle, to create a cycle for the plates, so that they go out again if the participant is doing good and will deliver more than 9 plates during the 2 min test.

2.2.8. Place a 9 sided Die or a smartphone with a Dice-app running (note that the sides need to match the amount of destination tables/seats) on the Kitchen Output, available to the instructor - in a bowl or a cup would be recommended, to ensure that it won't fall off the table during the test.

2.2.9. Set a timer to be ready to countdown 2 minutes.

2.2.10. Set a stopwatch (optional - the video transcript will show if the participant delivered the “food” fresh or not) so that it can be reset to that specific time repeatedly without wasting any time on resetting it during the test (for example start a stopwatch application on a smartphone and set the time). Consider the distance though from the Kitchen Output to the tables or seats in the canteen - if the distance is less than 5 meters, consider if the use of the time limit for the freshness of the “food” is necessary for the situation. If not, skip this step.

2.2.11. Put the camera in a higher position so that it overlooks the destination area, preferably overlooking from a bird’s perspective and if possible even the Kitchen Output. Make sure that the camera has a good light condition, produces clear visuals and captures the audio as well.

2.2.12. Place a map of the Table Numbering in the room, preferably not in the kitchen output, it is best placed so that the position of the map is distinguishable through the camera, like in form of a printed paper attached to a wall or lying on a surface. It’s important to be able to for the camera to see if the participant are looking at the map so that the transcript can be easily analysed and score can be applied properly.

2.2.13. Now the setup is ready and the participant can enter to test their performance.
3. **Part B: Restaurant Serving Simulation (RSS) - Execution**

This is the phase where the participants will test their performance in serving “food”, testing their memory, ability to locate, and navigational skills.

Have each participant, one at a time, **perform** the role play Restaurant Serving Simulation (RSS). This is how the simulation will be conducted:

3.1. Make sure that the participants do the test one by one, no other participants should be observing and preferably no other external individual other than the instructor, who ideally should also not be able to observe the performance completely. The instructor and the kitchen output could be stationed outside of the pretend canteen room.

3.2. Inform that the performance will be **Timed**, that they need to try and get as many plates delivered as they are able to within the 2 minutes session, and that they will be told to stop when the test is over, but remind them that this of course is voluntary and can be stopped at any time.

3.3. Let them know that from now on the test will be conducted in a higher tempo, to simulate a portion of the high tempo in an actual restaurant. At this moment, the instructor should try and raise their voice slightly and speak extra clearly, to increase the participant’s focus, and also increase the tempo of the instructions.

3.4. Instruct them to memorize the **Table Numbering** system by showing them the map and explaining the system they are ordered in.

3.5. Instruct them to **Deliver** the plates, one by one to each table depending on the **number** given.

3.6. Explain that the each plate has a lifespan of 15 seconds from the moment they are in the kitchen output till when the participant grabs it. (NOTE: The lifespan’s 25 seconds will have to be adjusted according to the distance between the kitchen output and the destination area. If the location is narrow and the distance is minimal, less than 5 meters for example, then the freshness element could be discarded because the participant will for sure be able to easily perform a delivery under 10 seconds. In larger location-cases it though would help to keep up the focus of the participant).

3.7. Explain that actions which use extra time not only waste time, but also **costs score** - actions like asking again which table number, again needs to look at the map, by placing a plate incorrectly, or letting a dish lose its freshness. This needs to be told to the participants to induce in them an increased motivation.

3.8. Also encourage them to pick up “dirty plates” on the way back to the “kitchen”, this will help to increase their score. These “dirty plates” are the
ones that are already placed out on the tables, and by having the participants bringing them back on every round of delivery puts the plates in a cycle where they come back to the kitchen output to become “fresh food”-plates again. They need to bring it to the kitchen output and put it in a pile on the other side from where the “fresh food” is being pushed out.

3.9. **Start the Experiment - Start the 2 min Countdown, and Start the Recording**
Don’t help them any further, but have information about the current destination table ready to be repeated and also let them look at the map if needed.

3.10. Put out one of the plates, roll the 9 sided Die and call out the table number that the die shows. Important to note is that the table/seat number needs to be recorded, thus if the performance test is filmed, and the recording also captures the audio, it needs to clearly pick up the call out of the instructor, ensuring a reliable transcript.

3.11. End the experiment after **2 min** of performance.
4. **Evaluation Phase:**

When the experiment tests are over and done, lastly it is important to gather the participants’ opinions of this performance test and the experiment in general, to see if there are any adjustments are suggested for the execution process, and it also indirectly suggests reflection in the participant.

Following test covers the basic ideas of which the questions are based on. These questions are provided in a digital questionnaire which is created in Google Forms.

### 4.1. Questions for Game Play Test

4.1.1. Did they feel stressed?
- Ask to rate from 1-10 (1 = Disagree, 10 = Totally agree)

4.1.2. Was the game difficult?
- Ask to rate from 1-10 (1 = Disagree, 10 = Totally agree)

4.1.3. Was any element of the game annoying?:
- Controls, Graphics, Design/Structure, Character, Sound, Navigation, or nothing?

4.1.4. Was the game any fun?
- Ask to rate from 1-10 (1 = “So Boring”, 10 = “Great Fun!”)

4.1.5. Was the game Easy or Challenging?

4.1.6. Ask to rate from 1-10 (1 = “Too Easy!”, 10 = “Too Challenging!”)

### 4.2. Questions for Performance Test

First check if they did play the digital game prior to the performance test, to help identify the groups:

4.2.1. Did they play the mobile game “TableMemory”?  
- Yes/No?

Questions concerning the performance test experience:

4.2.2. Did they feel stressed out?  
- 1-10 rating of “Disagree” - “Agree”

4.2.3. Was it annoying knowing that they were being timed?  
- 1-10 rating of “Disagree” - “Agree”

4.2.4. Was it annoying that they were being filmed?  
- 1-10 rating of “Disagree” - “Agree”

4.2.5. Was there any part of the experiment that was distinctly stressful?
- Give the options:
  - Being timed
  - Being filmed
  - Being watched by the instructor
  - Being alone as participator
By having no teammate
- Remembering table numbering
- Remembering specific table to deliver to
- Other - Let them describe themselves

4.3. **Questions about the experiment as a whole:**

4.3.1. Was it any fun?
- 1-10 rating of “No fun.” - “Great fun!”

4.3.2. Any part of the experiment that was more fun?
- Don’t require, but give them the opportunity to comment or share any part that was amusing to the participator.

4.3.3. Was anything unclear?
- Don’t require, but give them a chance to explain if there was any confusion during the experiment.

4.3.4. Did they feel that the digital game prepared them for the role play simulation?
- Make sure to ask if they did play the digital game before. Give them the option to answer “Yes”, “No” or “Did not play the digital game first” to this question, but in the following question let them rate how well it prepared them from 1-10 rating of “Disagree” - “Agree”

4.3.5. Ask them to rate how well the game prepared them, from 1-10 of “Not at all” or “Very Prepared!”
- This one can not be required of the participant to answer, if the participant is in the Control group - they did not get to prepare with the game.

4.3.6. Anything they would like to comment on?
- Now in the end just let them freely add whatever they feel like commenting on or share whatever they want here, but do not require them to, this is optional. It needs to be optional, otherwise it won’t be a voluntary and pure response.
Appendix B - Questionnaire Data Analysis

Pre-Experiment

Are you in a Sober condition? Not intoxicated by alcohol?
16 responses

This is most probably due to a miss in reading the questions - a lack of experience with english language, I would assume with the fact that many of the participants had neither swedish or english as native language. In my experience with the participants, I did not find or would not assume that any of them were intoxicated. 3 of the participants simply misunderstood the word “Sober”, and believed that it means “being drunk”. Actually I remember, not who, but that one of the participants (possibly even a few more) were asking about this question, being confused about what “Sober” really means.

With this I would say that all participants were 100% sober and that this is false information due to a misunderstanding in translation and possibly the question was not well phrased and could be designed to be more clear.
Interesting that the selection of participants actually are evenly split in relevant experience.

Most participants that have experience in Hospitality considered themselves to be around average in their experience, in fact the mean is 5.13 points out of the 10 possible.
When are you born? (Age when taking the test)

- 38 - 1/16 Participants
- 31 - 2/16 Participants
- 30 - 1/16 Participants
- 29 - 2/16 Participants
- 26 - 1/16 Participants
- 25 - 4/16 Participants
- 23 - 1/16 Participants
- 22 - 1/16 Participants
- 21 - 1/16 Participants
- 20 - 2/16 Participants

The Mean of their Age would be 26.25 years old. Most of them were under 30, in fact 12 out of the 16, while only 4 were above.
What is your current main Occupation?

16 responses

- 31.3% = Students
- 12.5% = Unemployed/Searching
- 12.5% = Employed
- 6.3% for each of the remaining responses

This data does not show specific information about the participants, however it does show that the majority of them are students, though if the individually entered options of “work”, “CAFFE”, “restaurant supervisor”, “full time employee”, “City hall employer, I work [...]”, and “Flight attendant” which all seem to be a form of employment, thus is added up with the amount of the preset alternative “Employed”, we end up with 6 times 6.3% plus 12.5%, which equals 50.3%. Therefore the graph is misleading, because of the option for the participant to add individual alternatives manually, and just over half of the participants have some form of employment.

Do you have a Smartphone?

16 responses

- 93.8% = Yes
- 6.2% = No

I am aware that the participant that answered “No” on having a smartphone, in fact has one, considering that the person was contacted via this medium specifically. Therefore 100% of the participants have a smartphone. It could be that this participant chose incorrectly with the cause of stress, from the test itself or any other external and unknown reason.
What brand of smartphone do you own?
15 responses

[This question was only available for those who answered that they have a smartphone]

46.7% = iPhone; 13.3% = Sony, Samsung, Motorola; 6.7% = Huawei, Honor; 0% = Nokia

Here we can see that iPhone is the most popular among these participants, and if we look at operative system, still most of them use Apple’s iOS.

How much do you use your smartphone per day?
15 responses

[This question was only available for those who answered that they have a smartphone]

[1 = Barely Considered - 10 = Can’t let go of it]

Most of them consider themselves to be using their smartphone fairly much.
Do you ever play games on your smartphone?
15 responses

Less than expected were playing games on their smartphone. Was expecting much more than half of them to be playing, however, at least most of them do.

What types of games do you tend to play?
9 responses

Puzzle games seems to be the most prominent of these genres, which shows that most people are looking to stimulate their problem-solving skills, looking for challenge, or maybe simply relaxation. This shows also that these participants are suitable for this specific experiment, which could seem bias, considering that it is a brain-training game are used in the experiment. Though the game is less of a puzzle, and more leaning towards an action-brain-exercise game.
6/9 of the responses were from 5 points and up, indicating that most of them tend to spend more time playing on their smartphones. This also makes them prone to be used for this experiment, with the cause that most of them seems to be quite familiar with playing games and thus more likely to perform better than those who don’t play often. On average they deemed themselves to be at 5.7 out of the 10 possible.

How often do you play games on your smartphone?

Do you consider yourself a skilled player of smartphone games?
Another point indicating that the participants are prone for this experiment - most of them consider themselves to be rather skilled gamers. The mean lands on 6.33 points out of 10.

When you play, why do you play on your smartphone?

[If they play games on smartphone - Multiple choices available per participant]

Most of them play games on their smartphone because they are bored. The second reason is because it is fun and a way to pass time.

Do you have any disabilities?
3/16 Participants answered “No”, while the remainder of the participants decided to not answer this question, which as described in the description of the question to be left empty if the answer is “No”. Thus it is not absolutely clear if anyone was having any issues with their movement that might affect their performance negatively, due to the fact that most of them might have missed to read this description and avoided to answer because it was an optional question, or they actually decided to leave the field empty to state “No”.
Do you believe that games can be used for education and training purposes?
16 responses

It seems that the majority has confidence in Serious Games, something that again can be considered an angled selection of population for participants, but considering that their knowledge of this experiment is next to none, only knowing that it is an experiment that includes playing a mobile game.

However, this suggests that 93.8% of the participants are positive towards the potential of Serious Games.
**Game Play Test**

Did you feel stressed while playing?

16 responses

![Stress Level Chart](chart1.png)

[1 = No, not at all - 10 = Panicked]

This statistic points to that most of the participants did not find the game overly stressful, even though it is pushing them to feel stressed. Maybe they realized that it’s a different kind of stress, rather than a panic-stress - a stress that is recognized from sports and games.

Was the game any difficult?

16 responses

![Difficulty Level Chart](chart2.png)

[1 = Easy - 10 = Too Hard!]

68.8% rated the difficulty from 5/10 points and down, 0 being “Easy”, indicating that it was fairly easy to understand and not too challenging for the participants. Specifically 11/16 participants rated it from 5 and down, but 11/16 rated it between 3 and 6 points, making it seem like a fair challenge - not too difficult and not too easy.
Was any element of the game annoying?

16 responses

- Controls: 1 (6.3%)
- Graphics: 2 (12.5%)
- Design/Structure: 1 (6.3%)
- Characters/Objects: 0 (0%)
- Sound: 1 (6.3%)
- Navigation: 1 (6.3%)
- Nothing Really: 10 (62.5%)
- the time: 1 (6.3%)
- tingarna blockerar: 1 (6.3%)
- siffrorna när man spelar: 1 (6.3%)

Multiple choices available per participant

[On second last response it should say: “having sound is always nice”; The last response entry, translated from swedish, says: “The fingers blocks the digits when you play”]

Here it is quite clear that most of them, 62.5% does not consider any element of the game annoying, in hope that they were honest. The rest found the time, the lack of music/sound annoying, and the fact that their fingers were blocking the view of the screen while playing, because when you play you are constantly moving your fingers on the screen to play, though if the memory is working as it should, they should not need to read too much on the screen and this should not be an annoying thing. This issue simply comes along with games that are made for touch screens and is hard to avoid.
11/16 participants rated the game with points above 5, with most rating it 7/10, showing that the experience was rather appreciated.

Obviously all of the participants have faith that they will become better if they play more, something that might be considered inevitable. At least this shows that they believe that if you spend more time with something, you will generally get better at it. This can also be understood that they find that there is room to grow in this game, despite its simplicity.
Restaurant Food Serving Simulation - Performance Test

Was this test stressful?

16 responses

[1 = Not really - 10 = Was Panicking]

It's rather clear to be able to deduce from this graph that the majority of the participants did not feel too stressed by this test, although a few did find it quite stressful, rating it 7 and 8 out of 10.

Was it annoying knowing that you were being timed?

16 responses

[1 = Not at all - 10 = Very annoying]

Most did not find it disturbing that they were being timed, and this could be with reason that they enjoyed the challenge - that they were expecting to race against the time and therefore were not annoyed by it. Though one showed that he/she did not like timed challenges.
Luckily for the data’s sake, most of them were not affected at all by being documented - they all actually rated it less annoying than 5, which indicates engagement and that most of them was not nervous due to this potential disturbance.

Was there any part of the experiment that was distinctly stressful?

[The empty response labels should say:
- 3rd response (43.8%, 7/16 participants) - “Remembering table numbering”,
- 5th (12.5%, 2/16 participants) - “Being observed by the instructor”,
- 7th (12.5%, 2/16 participants) - “By having no teammate”,
- 10th (6.3%, 1/16 participants) - “Mixed wich side was wich, mirrored the tables”]
Remembering the table numbering is obviously the most difficult of the elements of the test, which is also the core of the task - what the experiment is exploring.

**Post-Experiment**

Did you get to play the mobile game "TableMemory" prior to the physical serving test?
16 responses

![Pie chart showing 50% Yes and 50% No responses.]

Considering that there was two groups, and this question is only to differentiate them when filling out the questionnaires, and thus in the questionnaire give follow-up questions according to their answer here, this is an expected result. If there would have been unevenness in this graph, it would show confusion or incorrect conduction of the experiment.
How well do you feel that the game prepared you for the physical serving test?

8 responses

[Available only if they answered that they played the mobile game prior to the physical test, thus only 8/16 participants]
[1 = Not really - 10 = Fully prepared]

It seems that they were generally positive against the idea that they were well prepared for the physical serving test, thanks to playing the mobile game before doing the test. But this only suggests that their confidence is high in the game as training. It might as well be the fact that this question itself is suggestive, making them more aware of it.

Do you think the mobile game would have helped you to be better prepared for the physical serving test if you got to play it prior?

8 responses

[Only available to the participants who answered that they did not play the mobile game before the physical test, thus only 8/16 participants]

This implies that they trust in the usefulness of the mobile game and its potential to be used for training, thanks to that they were given a chance to play the game after the physical test, to be able to deem if this could have been useful for them or not.
A fun fact is that they all claimed to be enjoying this experiment, providing me as the author and designer with confidence that this is not torture for the participants. It is highly likely though that they did not want to disappoint and hurt my feelings, which is entirely irrelevant for this study, but a tendency of polite individuals. Though no negative feelings can be recalled so it is also likely that they did enjoy partaking in the experiment - I myself would find it a bit exciting to test my abilities.

Any part of the experiment that was more fun?
14 responses - optional and manually written inputs
1. “Practical test”
2. “The randomness”
3. “It was right.”
4. “The time limit.”
5. “When the reality came into the gaming platform”
6. “Serving the real plates was funny”
7. “The mobile game”
8. “Not really”
9. “Playing is fun”
10. “The second round on the phone because I improved”
11. “Physical table test”
12. “Det var väldigt annorlunda och jag gillar nya saker så därför.” (translated from swedish: “It was very different and I like new things so that’s why”)
13. “Playing the game after the physical test.”

Funnily enough, most of them actually took time to write something here, would expect that in general people skip the part where one has to write down their opinions, especially if they are allowed to skip it, which would allow the experiment to be done faster, but despite this,
they still put in the effort. This indicates in my understanding that they did enjoy the experiment.

Any part of the experiment that was more boring or annoying?
8 responses - optional and manually written inputs

1. “No” (⅜ participants)
2. “Nothing at all”
3. “no”
4. “No.”
5. “Not really”
6. “Graphics blinking signs and stuff are annoying and strong color combos”

Not much was considered annoying according to these inputs, though one thought that the graphics was a minus concerning how they behave - blinking and having strong colour contrasts and bad combinations. This is for sure something that could be considered annoying, and appreciated that this is mentioned. The graphics though has the least effort behind them, considered irrelevant for the sake of the experiment, but this can still be an affecting element to the data.

Was anything unclear or confusing?
11 responses - optional and manually written inputs

1. “No” (3/11 participants)
2. “no” (2/11 participants)
3. “yes but that was the point as well i guess”
4. “No.”
5. “Everything was perfectly clear”
6. “Not, actually i think it was very well prepared”
7. “If you could pickup the plates in the mobile game.”
8. “good instructions”

Overall it seems that the experiment was without confusion, according to the responses here above. Though the 3rd response believes that confusion was part of the experiment, which is not the idea. The goals should be clear, but the challenge is on the memory, which was intentionally clouded, so to speak, by adding elements like bringing back “Dirty Plates”, with the reason to increase the difficulty and produce a more realistic simulation of the job of Food Running. Thus, one could say that confusion is part of the test, but the terminology should rather be “increased difficulty”. However, this might not be what this participant meant, but without his/her specification it would be complicated to deduce.
Referring to the earlier responses regarding their confidence for serious games (last question under “Pre-Experiment” section), where 62.5% responded “Yes” and 31.3% “Of course”, which together makes up 93.8% of the participants - it can be understood that the confidence in Serious Games’ potential has not been wavered. 43.8%(7/16 participants) felt an increase while 18.8%(3/16 participants) experienced a significant increase, meaning that 62.5% of the participants gained increased confidence, while 31.3%(5/16 participants) felt no change, and 6.3%(1/16 participants) felt a decrease.

This adds up to be similar if not the same positive opinions gathered from the last question under the “Pre-Experiment”-section, as mentioned earlier. If it is assumed that the decreased response here is the same participant as the one that did not show confidence in the related question, and that the rest is the participants with the same confidence from earlier, then again, 93.8%(15/16 participants) still has confidence, according to the results even more, in the potential of Serious Games.

Though, it is just as plausible that the participant that first did not show any confidence towards Serious Games, is in this current question responding that there has been “No change”. It might as well simply be that one of the individuals had confidence prior to the experiment, and experienced a decrease after, and reported so.

If any change in your expectations of games for training and education purposes have occurred, feel free to describe here:
4 responses - optional and manually written inputs

1. “It mentally prepares you for real life situation”
2. “Yes, it better get a training by kind of a gaming for real job. <<<this will help more easy to do the job perfectly”
3. “I think games are a nice way to learn”
4. “Jag tror att man kan utveckla spel till att förbereda inför arbete inom fler områden!”
   (translated from swedish: “I believe that one could develop games to help prepare for work within several areas!”)

There might have been misunderstanding of the question, due to wanting to end the test or unclarity in the design of the question. However, these are appreciated inputs, and shows confidence in the subject, though, they do not answer the question, leaving it unmotivated why one of the participants (noticed in the previous question) felt a decrease in his/her expectations for Serious Games.

Do you want to receive the published research results?
10 responses - optional and manually written inputs

10 of the participants showed interest in receiving the results when this thesis is published, though only 7 of them provided email addresses to be contacted on, while 3 simply wrote “Yes”. It still is highly appreciated that 62.5%(10/16) of them are interested in the results.

Anything else that you would like to comment on?
7 responses - optional and manually written inputs

1. “Det var skoj :D” (translated from swedish: “It was fun :D”)
2. “Absolutely fun”
3. “I expected more from the author or the game designer, who can come with more games like , for diverse fields. I believe this will help the individuals overcome the difficulty in job in there real life situation.”
4. “Nice preparation of the experiment!”
5. “I thouht it was nice that the hosts were really calm, it helped remembering.”
6. “Tack !”
7. “very fun. thanks for letting me participate”

Overall very positive attitudes are visible, suggesting that this was an enjoyable experience. I am under the impression that what the 3rd response are pointing at, is not that more was expected from the author and designer of this experiment, but that in general more games like the one that was used for this experiment, should be produced - which is an utmost appreciated input.