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Executive Summary

The objective of Work Package 4 is to design, implement and evaluates game prototypes based on the requirements in the project. This document describes the different game design interventions, the prototypes created and the evaluation efforts done during the first year of the xDELIA project. The ongoing design process consists of three main game designs interventions e.g. workshops. These workshops have produced not only prototypes but also input to new game design interventions.

The first workshop was held in May in collaboration with Work package 3. The aim for the workshop was to gain a better collective understanding of what game design is and how game design features may address financial capability requirements. The issue of the workshop was to come up with game concepts for table top games that implement learning objectives important to financial capability, e.g. making ends meet, planning ahead and keeping track of the personal economy. The participants were divided into groups and each group produced four game concepts. Each group chose one of the game concepts to implement. A group evaluation was done during the test play of the games, as well as a written individual evaluation of each game. The overall result was that the learning objectives got lost in the overall gameplay and should be strengthened if the games were to be developed further.

The first workshop also raised the question of how to create digital games in a participatory design approach, which led to a second workshop held in September. One of the intentions with the workshop was to create a game based on what could be useful in the area of financial capability. The game was supposed act as a mediating artefact that would act as a starting point for discussions of what digital games to create, and how to create them in participatory design approach. The workshop resulted in a game concept focusing on creating awareness of desire and temptation. The game is called First Person Shopper. The game concept was evaluated by presenting it at the six month project meeting. The result was that the concept should rest for a while due to the fact that it was more important to explore behaviour in small constrained games instead of going down the path of consumer research.

The First Person Shopper concept initialized a discussion of designing small games implementing psychological tests. The discussion led to a third mixed workshop in December where some participants were joined in Ronneby and some participants participated on-line. The purpose of the workshop was to explore how to carry out participatory design when designing and implementing digital games. The expected outcome of the workshop was small digital games (called micro games) implementing a psychological test. It was decided to implement the Iowa Gambling Task. Through a brainstorming session 18 game ideas were generated and three of those were implemented in a participatory manner. The micro games where evaluated in an experiment pilot. The results from the pilot give good indications of what actions to take when implementing the full scale study.

The overall conclusion from the design processes during the past year is that the different types of game design interventions have created a collective understanding for the different competence areas in this multi disciplinary setting that xDELIA is. It has also been apparent that a close and continuous collaboration between the work packages are required to make games relevant for the application areas. The different game design interventions have also produced several ideas for future work. There is the option to develop one or more of the table top games into digital games and the First Person Shopper may be developed into an environment for studying impact of learning interventions on behaviour change. The micro games also have potential to be explored further in terms of what feedback has the most effect on the players’ performance.
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1 Introduction

1.1 Document Purpose and Scope

The objective of this document is to describe what prototypes have been created during the past year and also to explain the process that led to the prototypes.

The document is divided into the following sections:

- **Section 1 “Introduction”**: provides a description of the structure and scope of this document.
- **Section 2 “Table top games”**: describes a set of games developed in a workshop in conjunction with Work Package 3.
- **Section 3 “First Person Shopper”**: describes a game concept that was intended to act as a base for discussion Work Package 3.
- **Section 4 “Micro games”**: describes a set of very small games that implement two different psychological tests.
- **Section 5 “Conclusions”**: Summarises the chain of activities that led to creations of the different game concepts and games.

1.2 List of Acronyms

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<td>BTH</td>
<td>Blekinge Tekniska Högskola</td>
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<td>EC</td>
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<td>FinCap</td>
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2 Table top games

This section describes the first design attempt in the project. A game design workshop was held at Blekinge Institute of Technology (BTH) in Karlshamn, May 12-13 2009. The focus area of the workshop was financial capability of young adult people. The workshop started with an introduction to financial capabilities and capable behaviour.

Financial capability is about what a person needs to handle their personal finances. There are five aspects (Atkinson, 2009b) to consider in financial capability:

- Making ends meet
  - This aspect is about how well a person can get by on their available income. It also considers attitude to use credits or borrow money to obtain better life standard.

- Keeping track
  - This aspect is about how well a person keeps track of their bank balance and bills, for example, having a budget.

- Planning ahead
  - This aspect is about the person’s ability to plan ahead to handle unexpected expenses and drop of income. It also concerns if a person have a general insurance and provision for retirement.

- Choosing products
  - This aspect is about how to collect information, to read terms and conditions on contracts and using suitable advice and information. It also considers evaluating if sources are trustworthy or not.

- Staying informed
  - This aspect is about regularly follow economic indicators such as for example mortgages and interests.

The workshop and the game design aimed at addressing three (Atkinson, 2009a) of the FinCap aspects namely

- Making ends meet
- Keeping track
- Planning ahead

This chapter will present the game design intervention and the created games along with an evaluation of the games. Evaluation and reflections on the game design intervention itself are in the scope of Work Package 6.
2.1 Game design interventions

12 persons from the xDELIA project participated in the workshop and four master students in game design acted as facilitators (Rickard Sandgren, Rickard Remelin, Claes Olson, Peter Löfgren). Craig Linley was workshop moderator and Lee Sandberg took over from him during the evaluation session. As a part of his master thesis work, Richard Sandberg provided for the methods used for generating game ideas and he also provided the evaluation form regarding the designed games.

The objectives of the workshop were to get

- a better collective understanding of the game design process,
- a better collective understanding of how game design features may address FinCap (financial capability) requirements,
- game concepts that may be worth developing further,
- a better understanding of what kind of games may be interesting to develop further,
- to identify key questions in developing FinCap games and
- to explore and better understanding of evaluation criteria for FinCap games

The task for the workshop was to create a simple table top or card game using dices, cards and table top game setups. The games were to implement some of the critical financial capability concepts described in the introductory presentation. Material like scissors, paper, card, dices etc. were available. The participants were divided into four groups. The aim of the grouping was to get everyone involved and to have people and competences spread across the different groups. Each group had one game designer to provide guidance if needed.

The method to create a playable game consisted of five steps:

1. Creation of four game concepts
2. Selection of one of the concepts
3. Implementation of the game
4. Play testing and refinement within the group
5. Play testing and evaluation

2.1.1 Creation of four game concepts

Four different brainstorm techniques were used. Each technique was supposed to generate one idea for a game concept.

Technique 1: Free

- The group choose any technique they know is useful in this context.
Technique 2: Verb, noun, adjective

- Each participant writes 5 verbs, 5 nouns and 5 adjectives on the back of 15 cards. When the deck is prepared each participant draw a card and come up with a game idea related to the word on the card.

Technique 3: Abstract design

- Each participant draws one card with an abstract black and white pattern and one card with a specific game mechanism. The combination of the pattern and the mechanism was to inspire the game design

Technique 4: Random Internet Images

- One person in the group operates the computer. The computer application generates random images from Internet. At the same time, a game related question is shown. The picture and the question trigger ideas for the game concept or goal (Figure 2:1).

2.1.2 Selection of one of the concepts

The outcome from step 1 was four different game concepts. In this second phase the group had to agree on which concept was most feasible to develop further. The choice should be done in respect to how well the concept incorporate financial capability issues like making ends meet, planning ahead and keeping track, but also in respect to how long it would take to implement the game. It was required that the game was finished within the time limit.

2.1.3 Implementation of the game

In the implementation phase the game is manufactured. The requirements of the implemented prototype were:

1. The game must be learnable within 10 minutes.

2. Everything needed to play must be delivered in 3 copies
3. The game must be for 2 or 3 players.

4. The game must specify: logical game space, game pieces/objects, gameplay equipment (e.g. dice, cards, other randomizers), goals of play, game rules, learning objectives, how the game can be evaluated in terms of learning objectives.

5. The game should be able to be completed within 20 minutes.

2.1.4 Play testing and refinement within the group

This phase is important to be able to experience the gameplay. The game must be worth playing and by making the group actually play the game it is possible to refine some game mechanisms to improve the experienced gameplay. It is also an opportunity to reflect over the correlation between learning objectives and learning outcome.

2.1.5 Play testing and evaluation

The games were distributed to the other groups and they got the opportunity to play and evaluate the game. An evaluation form was distributed by Richard Sandgren. (see section 2.3)

2.2 Description of the games

This section presents the four implemented games. The description and analysis of the games is based on learning objectives and two essential game attributes namely goals and rules.

2.2.1 Finance cards

This game is a two player game. The players compete in a hunt of status, good economy, but the players’ health and overall life situation is also taken into account. The goal is to achieve as good quality of life as possible. Unexpected thing happen, for example the house burn down or the player got a heart attack, and then it is up to the players to have made sure they can handle such situation. The players can help or sink the competitor by giving them cards with bad or good things.

2.2.1.1 Learning objectives

The game addresses the learning objectives of

- Making ends meet, by forcing the players to ‘live’ on their income and not overspend. It is possible to take a loan, but loans are costly.
- Keeping track, by introducing different types of cards representing different job income, living, insurgences, loans etc. the players have to make sure they know what they have to pay and collect each round.
- Planning ahead, as unexpected situations may occur by the players picking up an event card and the competitor may hand over an unpleasant card that says your house has burned down, and then it is essential to have bought insurance.
2.2.1.2 Equipment

The equipment needed is a board that keeps track of the finances and the quality of life of the players and a deck of cards containing job cards, home cards, event cards, loan cards and cards for insurances of different kinds (see Appendix A).

2.2.1.3 Goal

The goal is to gain as high quality of life as possible by making smart choices. The quality in life consists of good health and a solid personal economy including a good balance between work and leisure.

2.2.1.4 Rules

This is a game for two players. Begin by shuffling all job cards and putting them upside down on the table and toss a coin to decide who will start.

The player who won the coin toss picks up the first job card on the pile. This is that player's job. Put that card down on your side of the table. The other player then continues to go through the deck, card for card, until the next job card comes up. This will be the other player's job.

The players then look at all the Home cards. Both players, starting with the one who won the coin toss, buy a Home card, and places it next to his or her Job card.

All cards, except Insurance cards are shuffled into the deck and placed on the table then each player, starting with the first player, then draw five cards from the deck.

The game starts, when the first player begins his first round. The game ends after 10 rounds or if one player has negative quality of life or finances. At the end of 10 rounds, both players add together their quality of life and finances. The player that has the most points wins the game. One round:

- Draw a card.
- If the card is an immediate event, it goes into effect immediately. This does not count as the card you can play each round.
- Increase your finances by the amount of your salary.
- During a round, you may take a loan or insurance, after any immediate events.
- During the round, a player may play one card that they have on hand.
- If you play a home card, the player automatically sells his old house and gets half its value back in finances.
- If you play a job card, this will replace your old job, and your salary and quality of life will change.
- You may sell objects that you own (homes, boats etc).
- If the player has more than seven cards on hand at the end of the round, he has to discard cards until he has seven cards on hand.
2.2.2 The evil spouse

The game focuses on the everyday negotiation between two persons. One of the persons is trying to spend and the other to save, and at each end of the month they had to successfully pay their bills and other costs. The game forces the players to keep track of their costs and balance their account.

2.2.2.1 Learning objectives

The game addresses the learning objectives of

- Making ends meet, by trying to balance the spending of player 1 with the savings done by player 2.
- Keeping track, by forcing both players to keep track of their savings and spending respectively, to be able to win the game.

2.2.2.2 Equipment

Game circle board, markers, a dice, game cards, paper and pen.

2.2.2.3 Goal

The goal of the game is different for the spending player and the saving player. After four full laps of the game circle the game is over. The player with the highest spending or saving value wins. The players move on parallel tracks, see Figure 2.2.

Figure 2.2 – The evil spouse
2.2.2.4 Rules

Both players put their game piece at the top most checkpoint circle. This is the starting area. The players get 1,000 USD together to start with. The players do not pick a checkpoint card at the first square.

Bring out papers and pens, and start writing down the money. Keep track of all incomes and outcomes at all time.

Roll the four sides dice. The number shown is the number of maximum steps the two players may move together. Example: If the dice shows a four. This means that player 1 may move her piece three steps, but then player two may only move one step with his piece. This is to be decided between the players, if the players cannot decide anything, the result of the dice is multiplied by 100 USD and that sum is to be subtracted from your shared account.

Both players must land on the checkpoint circles in the same move. When both players stand on the checkpoint circle, pick a checkpoint card and read it out loud. These are the bills that have to be dealt with. These bills have to be paid, before the players can leave the check point. The players do not pick checkpoint card when they start. A player may not move out of a checkpoint circle before the other person has finished her move into the same circle.

If you land on a question mark square, take the top card from the question mark-deck and read it out loud and resolve the card before moving on.

When you pass a green square, add 2 000 USD to that persons account. In case of the other player has to draw a cards at the same time, the 2 000 USD is added first.

After four laps of the game circle, you will have completed a simulated full year of incomes and outcomes. The spending player calculates all her/his expenses and the saving player calculates the savings. The player with the highest end value, ignoring positive or negative sign wins.

2.2.3 The wife and the baby

The game spans over eight years and the players have to plan ahead and reach long term goals so they can afford a wife and later afford to have a baby. The digital game starts out with seeing where you are in life. It’s zooming in and start but from your profile. Initially this game version is presented as a board game, using a chess board with eight rows and eight columns. The row on the board goes from one up to eight and the rows equals eight years of your life a head. The player does 8 moves through different states of life.

2.2.3.1 Learning objectives

The game addresses the learning objectives of

- Making ends meet, by forcing the players to balance the opportunities and the risk presented each round.
- Keeping track, by introducing a lot of costs that cannot be avoided, but must be paid each round, for example the baby’s and the wife’s status requirements, along with income from job and investments.
- Planning ahead, as if you would like to have a wife and a baby in the future you have to plan to be able to take advantage of the opportunities presented each round.
2.2.3.2 Equipment

Chess board with eight rows and eight columns, a dice, black and white game coins and markers (see Figure 2:3).

![Chess board with game pieces](image)

*Figure 2:3 – The wife and baby*

2.2.3.3 Goal

The completion or the goal of the game is to bring the family along and get them to row 8 with the highest value of credits. The major issue though is to have all the family members along.

2.2.3.4 Rules

The rows represent eighth years in your life and the columns are the budget category and show you the status you have while moving through the planning for unexpected credits and cost. The categories are:

A – life/family category
B – college loan
C – house
D – luxury
E – transportation
F – investment
G – job path
H – insurance
Starting point is that you have just graduated and have a demanding girlfriend. You would like to have a child, but she wants to be married first. You currently have a college loan for eight years that will cost you 5 points altogether. You may pay it off when you want, but every year you have it you will pay 1 point in interest per loan status level. Your current loan status level is 3. Each turn you will be presented with opportunities and risks. Your familiarity with finance and budgeting tasks will help you make the best use of these opportunities.

You may increase your status in your investments, insurance, house, luxury and transportation by paying +1 per status level per turn. You always have a minimum status of 1 and a maximum status of 3 in each category. Your job and investment status provide income. The status requirements are that your wife requires luxury status of 2 and a housing status of 2 and your baby requires housing status of 2 and a car status of 3.

You cannot get your wife and baby on turn 1. On turn 2, you may get your wife and/or baby automatically. On turns 3-7 you may get your wife and/or baby by rolling one dice once. On each turn you must get the result indicated in the table for that turn.

- Turn: 3 Roll for wife: 1, 2, 3, 4 or 5 Roll for baby: 6, 5, 4, 3 or 2
- Turn: 4 Roll for wife: 1, 2, 3 or 4 Roll for baby: 6, 5, 4 or 3
- Turn: 5 Roll for wife: 1, 2 or 3 Roll for baby: 6, 5 or 4
- Turn: 6 Roll for wife: 1 or 2 Roll for baby: 5 or 6
- Turn: 7 Roll for wife: 1 Roll for baby: 6

Costs (point per turn) and income for wife, baby, car, house, luxury, insurance and investments are all 1 point. The 5 points college loan is costly and for every turn you have this loan you will pay 1 point per status level. Jobs receive 8 points per turn per status level.

Score is kept with coins which are white for credits/income and black for debts/costs. For each year (row), pieces collected in the squares in the different budget categories according to the game play.

The squares are totalled at the end of the game. For example: 5 black pieces are placed in row 1 in the "college loan" column for the principal on the loan, and black pieces placed on the subsequent rows for years when interest is paid. Placing 5 white pieces in the "college loan" will pay off the loan.

### 2.2.4 GOLF – Game Of Life Financial

The game is a short competitive struggle to buy the most property with a varied income and expenses. The challenge is to balance your income and expenses better than your opponents.

#### 2.2.4.1 Learning objectives

The game addresses the learning objectives of

- Making ends meet, by require the players to match income and expenses. A severe punishment is administrated if the players exceed their resources.
- Planning ahead, by having a probabilistic income in the beginning of the turn, then to pay in advance in the game and the last thing in the turn is to pay expenses, which are also probabilistic. Also there are sub goals during the game that grants benefits, so it is in the players’ interest to advance as fast as possible.
2.2.4.2 Equipment

The equipment required is a game board (100 steps), 100-isch income cards, lots of income markers, 100-isch expenses cards, some expenses markers and four player markers.

2.2.4.3 Goal

The goal of the game is to reach the goal (i.e. buy the most property) before any of the other players do.

2.2.4.4 Rules

Every turn the player draws a number of income cards. On the cards there are numbers that tell how many income markers the players receive, most of them in the range of 5-7, but some extreme values (2, 3, 17 and 18) exist. Every step forward costs one income marker. The player can chose to use everything from all to none of the steps. After the player has spent the chosen amount of income markers on steps forward, he/she has to draw an expenses card and pay the amount of income markers on the card, most in the range 3-5, but also here extreme values (2, 3, 17 and 18) exist. If the player cannot pay the amount he/she has to take the amount of debt markers stated on the card. One debt marker can be removed if one income marker is paid. As long as the player have at least one debt marker all income from the income cards are halved (round up). Every property (a new one every twentieth step) in the game gives an added income of one income marker each turn.

2.3 Evaluation

This section presents the evaluation done. The evaluation focuses on the games themselves as the game design intervention have been evaluated by WP6.

2.3.1 Evaluation intervention

The games where to be test played by the other groups. While two players played each game the other participants viewed and a collective evaluation was done. The evaluation session was video recorded. In addition evaluation forms where handed out by Richard Sandberg, for everyone to fill in for each game.

The form consisted of six questions:

1. Can the game be completed within 20 minutes?
2. Are the rules and game description complete?
3. Are the rules consistent?
4. How original is the game?
5. How effective is the game for learning/training in relation to its learning/training objectives?
6. Do you think this game should be developed further? (Please state why or why not)

In addition the participants could write some general comments.

The respondents were supposed to grade each question from 0 to 4, but most respondents wrote comments instead.

The three first questions did not in general aggregate any difference between the four games. Therefore the sections bellow just summarizes the answers of question four to six and the general comments.
2.3.2 Finance cards

The Finance card game was perceived as rather original as it for example introduces a different way of measuring income/outcome and how you feel. But when it came to how effective it is for learning or training in relation to the learning objectives several persons had some concerns. The learning objectives seem at bit unclear and the randomness of the things that happen to the player were too unpredicted. The perception was that there was not much explicit planning ahead. It was also perceived to be hard to track small numbers in finances and quality of life as the added or subtracted number could be two or four while the steps on the tracking board where ten. The cards also raised some questions about what to expect in the game, for example what happens if you get a card saying your car has crashed and you do not own one?

The game was judged to have potential for further development tough but it has to be tweaked to be more balanced so that the players start out from the same status for example and the randomness has to be controlled. In addition the learning objectives has to be made clearer.

2.3.3 The evil spouse

The evil spouse was perceived to build on old traditions, but spiced with originality. Also in this game the learning objectives were perceived as a bit unclear. The choices and planning were also seen as somewhat random. The game was fun to play and has good potential, but has to be worked with a bit more to be more thorough. The feature to be able to pretend to cooperate, but still pursuing victory was appreciated. The game encourages communication and this was pointed out as a great feature. The participants judged the game as having potential in the area of real personal finance and interaction between players.

2.3.4 The wife and the baby

The originality of the game was judged as high, but as the previously described games the learning objective did not really go through to the players. The game was perceived as being too complex and complicated to learn to be effective. The game must be played at least once before you start to understand the rules. The game was also perceived as pressuring to play in public, due to all the calculations.

On the question if the game is worth developing further doubts where revealed. The game does not seem fun and engaging and the big number of calculations is better suited for computer game and the game was also perceived as odd and demotivating as there is actually only one player. The game was also assessed as a game you might want to play in private. The gender perspective was also objected to.

2.3.5 GOLF – Game Of Life Financial

The originality of the game was perceived as low to medium high. The learning objectives for this game were also perceived as unclear as unidentified consequences were revealed during the gameplay, due to that the game dynamics took over after a few trials. The game shows it is hard to get out of depth but it is dependent on the other player and too random.

The players were forced to make calculations and feel the pain of dept, but the relative depth is a problem. The idea to reduce income while having a dept is interesting, and it was seen as a good penalty. In addition the game was perceived as slow and too repetitive.
The game was reviewed as having a big potential for further development if the learning objectives are made clearer. The numbers should be balanced though.

2.4 Summary

This was the first time we actually put some ideas on paper for games that would tackle everyday economical situations. One game address eight year span. Others played out on a year. Some games where cooperative and other where competitive and one was both to address how important it is in a relationship to have similar goals and interests. The developed games contain interesting ideas, which maybe can be used in other games. Some of the games was quite fun to play as well.

The important outcome of this exercise was to give the xDELIA members a good grasp of what it is like to develop a game and as such this workshop was successful. The participants got a basic understanding of what game design is about and how a game can be developed.

It is important to know the medium of the game well and iterate the design, test and evaluation phases several times and make sure play testing is done for every iteration. We also learned that it takes more than one iteration to get a good playable game.

The evaluation of the table top games indicated that it might be interesting to develop some of them further. The wife and the bay game could for example be inspiration to a more gender neutral mobile game that you can play in private on the bus for example. The financial cards could be developed into a two player mobile phone game where you play with your friend. The GOLF game might be developed into a fully fledged table top game. The evil spouse game might be a social game on Facebook for example.

Another idea that came out of the workshop was to explore if we should repeat this with digital tools instead of paper, pens and dices, since that would bring in other aspects to the process and the games and give the participants good chance to do new games based on the experience of this first workshop. This idea led to the creation of the First Person Shopper concept (section 3).

A third idea is to make games that would focus more on exploring cognitive models and concepts that are needed for the xDELIA project, rather than trying to make games that simulate everyday life for a person. This idea led in the extension to the idea to create small games implementing psychological tests (see section 4
Micro games).
3 First Person Shopper

The background of the creation of the game concept presented in this section is that after the workshop in Karlshamn in May discussions aroused within WP4 how to make digital prototypes in a participatory design approach and the role of WP4 in this work.

The perception of game development in WP3 is that initially small prototypes are created based on learning objectives essential for financial capability. The prototypes are then evaluated in experiments to elucidate what learning outcomes can be obtained from the gameplay, and how the design best should be realized. The results from the experiments are continuously fed into the following prototypes and eventually result in one or more final product. The game/device design in WP2 is perceived as separated from the games in WP3 both in nature and appearance.

The outcome of the discussion was to initially focus on what can be done in the scope of WP3 by having an internal WP4 workshop

1. to get a shared understanding of the game development process and what tools are needed for a participatory design approach,
2. to discuss how we can create a discussion about what kind of games to start with, and
3. to create a game concept of an initial prototype.

The result from the workshop was along with a shared understanding of the role of WP 4 and the game development process a game concept called First Person Shopper. The main purpose of the First Person Shopper was to act as a base for discussion of what kind of games to create and to discuss how to collaborate in the design process.

The First Person Shopper was partly implemented as it acted as a means to get to know the possibilities and limitations of different development tools.

3.1 Game design intervention

The workshop was held in the beginning of September 2009 in Ronneby. The intention with the workshop was to discuss how to accomplish a close and continuous cooperation with the other work packages and to start the discussion of what computer games to create. The decision was to create a game, based on the same basis as the tabletop games, e.g. the inspiration to the games came from the important aspects in FinCap, making ends meet, keeping track and planning ahead (chapter 2), and let the game work as a boundary object (Star, 1990) between work packages to create discussion of what kind of computer games to start with.

The game design intervention started by reading and discussing the cases presented in the introduction to the Karlshamn workshop (Atkinson, 2009a). One of the cases describes a woman called Susie that would like to be able to save money for a deposit on a flat and some other things, but she finds herself buying new clothes instead. Susie has trouble planning ahead and she has problem with temptation, shopping and desire. This case inspired us to make the First Person Shopper where the intention is that the player shall be aware of his/her desires and urge for buying things.

Thereafter a brainstorming session took place. The brainstorming was free and everyone was to express their ideas without negative response. The brainstorming waved back and forth and the participants adapted and introduced new ideas along the process. When everyone was satisfied with the game concept it was written down (Appendix B) and one of the participants started to implement the game as an exercise to try out different technology options.
3.2 Description of the game

The basic idea with the game is to make young adults aware of their material desires. By making the player aware of his or her priorities, wishes and how the perceived price of a product differs, he or she has a better base for planning ahead.

The play take place in a town where boutiques and stores expose products in their shop windows. The game consists of four plus one level.

**Level 1- Binary choices:** The first level means the player makes his/her prioritization of desirable things by choosing between a set of things presented in pairs.

**Level 2- Choose desirable items without price tags:** In level two the player enters a 3D-world where desirable things are exposed in shop-windows. The player must choose everything he/she wants to buy by taking a picture of the items.

**Level 3- Choose desirable items with price tags:** At level three the player gets an amount of money and he/she has to buy the most desirable items within the limited amount of money. Level one to three act as warming up for the final task, level four.

**Level 4- Choose with a skin conductor sensor:** In the fourth level a skin conductance sensor is used on the player's fingertip. In this level the player must choose the item with the highest priority by wanting it so bad that the skin conductance reacts on arousal, e.g. the outcome from this level is one item.

**Level 5- Shopping with a friend:** Level five is an optional level where two players play together. Once again they both get an amount of money to spend. But in this case if an item has a high priority to the player the price on the price tag is less than the real price. The second player sees the real price and vice versa. The players' missions are to make the co-player aware of the price difference.

The final feedback from the game is a kind of simple shopper profile. The game may provide research data of temptation, desires and prioritizations in terms of merchandise.

3.3 Verification process

The game concept was presented for the other project members at the six month project meeting in Karlsruhe and as desired and expected the game gave rise to a discussion. The game raised questions like how we can mirror behaviour by using games, if the game world brings desires comparable with the real world and if we can make small games that detect behaviour and introduce learning interventions to change that behaviour. After a fruitful discussion it was decided that we should not take the path of consumer research, which First Person Shopper can be sorted under, just yet. Instead the idea of building a game around small psychological test came up which resulted in the micro games, e.g. the Iowa Gambling Task (IGT) was implemented (section 4).

3.4 Summary

In summary First Person Shopper fulfilled its purpose by invoking a discussion of what kind of games to start to create and how to collaborate in the scope of WP3. The discussions led to a workshop in Ronneby and the creation of a set of very small games that implement psychological tests described in chapter 4.

In the future the First Person Shopper concept may be used in a study of self-regulation where participants plays the games and then is exposed to a learning intervention and eventually the
participants play the game again. Vohs and Faber (2007) have performed studies that show that by imposing self-regulation the impulsive buying of a person is influenced. It may be interesting to see if the results are the same if the study take place in a game world. It might give indication of whether games can be used to detect potential behaviour change.
4 Micro games

The decision at the sixth month meeting in Karlsruhe to implement psychological tests led as previously mentioned to a workshop. As a preparation for this workshop one psychological test called BART (the Balloon Analogue Risk Task) (Lejuez et al., 2002) was implemented to elucidate how to implement a psychological task in a game. The BART explores how risk taking a person is. The person must pump up a balloon in a computer game and the bigger balloon, the bigger amount of money the player wins. If the balloon burst all the money is lost. The player can whenever he or she wants interrupt the game and take the money.

The BART game was implemented in two versions, one where there is a simple balloon that shall be pumped (Figure 4:1). The other version has a more complex interaction scheme as the avatar has to shoot at the balloon to pump it up and to get a new balloon the avatar has to run towards a mushroom (Figure 4:2). More pictures of the BART games can be found in Appendix C – The BART game.

Figure 4:1 – Simple BART game
The BART games put the scope for the workshop in that simple versions of the psychological tests should primarily be considered.

The BART games will not be discussed further here. They will be a part of a future study and will therefore be discussed in future deliverables.

4.1 The micro game suit

The Iowa Gambling Task is a well-known psychological task which is thought to simulate real-life decision making. Participants are presented with four virtual decks of cards. They are then asked to pick cards from the different decks without interruption until the game is over. Each picked card will earn the player a small sum of virtual money. Sometimes, however, the picked card will present a loss of money, a loss greater than the normal gains. As the game continues, players will eventually realize that some decks are “better” than others and should then be sticking to those decks. Interestingly, players also show, with the help of measurement of galvanic skin response, a clear reaction of stress just by hovering over the “bad decks”, long before they are consciously aware of the fact that the decks are “bad”. Patients with orbitofrontal cortex (OFC) dysfunction, however, are not able to adapt their behavior as a healthy player does. Even though they may be aware of the fact that they are losing money, they still stick to the “bad decks” (Bechara et al., 1997).

The task in such established tests as the IGT is well-defined and the results are well-documented, and an overall goal of building games of this kind of tasks is to explore how we can make games that represent the task in a way that do not contaminate the task nor the result.

We constructed four variants of the task and conducted a small pilot study. The results are a bit ambiguous, but contain vital information in order to make a full scale study. Several potential improvements have been identified in order to improve the experiment.

4.1.1 Game Design Interventions

The research questions posed for the workshop were
• Can we make computer games that do not contaminate a specific, well defined task?
• What factors influence the performance (in this case: learning) in games?
• How can we use a participatory approach to create computer games?
• What questions or difficulties arise from the game development itself?

4.1.1 Task presentation

The task for the workshop was to try out how to quickly make micro games in a participatory manner. xDELIA members were invited to Ronneby for a two day workshop. Three members were also participating via the Internet. After some discussions we chose to implement IGT into several different games with the question of how the feedback of the games would affect the player. The games were to be developed in the program Game Maker 8 (http://www.yoyogames.com/make).

4.1.2 Brainstorming

The subject of the brainstorming was how we could implement the IGT in different ways and still keep the game mechanics intact. The brainstorming method used was one described in Löwgren & Stolterman (1998) called 635. Six participants come up with three ideas each, writes them down and sends them to the next person who will try to improve them and then sends them on. After five rounds of elaboration, everyone have seen and elaborated on all ideas. We used this method as a starting point but a very good discussion began, so we put the method aside and continued to work on the ideas.

4.1.3 Outcome of the brainstorming

From the brainstorming we came up with 18 concepts (Appendix B), from which we chose three concepts of the game to implement: "Mouse game" where you are a mouse who collects cheese and escapes the cat; "Apple game" where you are to pick apples and not let the crows steal them from you; and "Mine sweeper" (which will not be discussed further since it is not strictly IGT). These were chosen because they had the most inconsistency in feedback compared to each other.

4.1.4 Implementation

All physically present participants were divided into three groups with one concept each. In each group there were one person who was knowledgeable in Game Maker. All groups explored their concept and made it more concrete, thus exploring issues with both implementation and the understanding of IGT. When the game was conceptually complete the implementation process began. Of the three groups, one group finished their prototype on time, but with more knowledge of Game Maker all groups could possibly have finished.

4.1.2 Description of the games

In our research version, we want to test how different ways of visualization affect the results of the Iowa Gambling Task. We will produce four different versions of the IGT experiment, meaning four different games with the same core mechanics, but with different visual appearances. We also want to test how and if feedback affects the results, which is why we in some of the games will present
feedback very similar to that of the original IGT game, and in some games leave no feedback whatsoever. These games are henceforth called “micro games” since they are very small and only involve some game mechanic aspects such as task, rules, goal, graphics etc. First, we want to use the original version as a reference. We, therefore, created a game identical to the classic IGT game, meaning a card game with four decks of cards and feedback in the form of a bar which shows both earned money and money loaned from the bank. The second game is identical to the first game, the classic IGT game, with one very important change: the feedback. In this game, instead of presenting to the player the status of his or her endeavors, we show no feedback at all. This will let us determine whether or not feedback is a crucial factor in the performance of the IGT. This test has been conducted with elderly people (Schneider et al., 2007), but to our knowledge never tested with younger subjects.

The third game is identical to the original IGT game in regards to core mechanics but differs completely in the visualization. In this game, instead of using decks of cards, we present to the player a number of apple trees and the task is then to collect apples from these trees. The purpose of this game is thus to determine whether or not visual appearance affects the outcome of the game at all. The apple tree version of the game also presents to the player feedback in the same manner as the original game with no additions or subtractions.

Lastly, the fourth game is also a variation of the original Iowa Gambling task game regarding visual presentation. Once again, instead of cards, this game uses a mouse which is supposed to collect cheese from four different holes in a wall, i.e. nothing about the core mechanics has really changed but only the visual appearance of the game. It should also be noted that the fourth game, just like the second one, does not present any continuous feedback to the player.

Since the third and fourth game differs from the original game in two ways, there is no way of knowing what element is causing any potential anomalies. Therefore, should anomalies be found where results differ greatly between the games, further studies will have to be conducted in order to draw conclusions regarding the differences in the results. This experiment is thus an excellent pilot study where we, among other things, hypothesize that the visual presentation does not affect the final result of the IGT and where we, if proven incorrect, continue the study to find the relevant elements that does affect the results.

Since the four games differ from each other in regards to visualization and feedback we can present them in the following manner:

1. The original Iowa gambling task game with discrete response to the choices.
2. The original Iowa gambling task game with continuous overview of the achievement as well as discrete response to the choices.
3. The mouse traps game with discrete response to the choices.
4. The apple trees game with continuous overview of the achievement as well as discrete response to the choices.

Or in another, more visually informative, manner (Figure 4.3):

<table>
<thead>
<tr>
<th>Game</th>
<th>Original IGT</th>
<th>Mouse trap</th>
<th>Pick Apple</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Continious feedback</strong></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Findings from this study might also be used as input in more complex games later on. Conclusions about visual presentation as well as feedback will, for example, be most valuable in xDELIA when we design new games.

### 4.1.2.1 Gameplay

**Task:** Iowa gambling task

**Rules:** The games must be played individually and no communication during the play is allowed. The game must be played to the end.

**Goals:** The goal is to gain as much money as possible and get the top score at the high score list.

**Experience:** The intent is that the players will feel competitive towards each other and by this be motivated and experience the game as fun.

### 4.1.2.2 Learning

**Learning objectives in the game:** The player is supposed to learn which alternative is the most beneficial and will result in a higher total amount of money.

**Transfer:** None

### 4.1.2.3 Technology

**Appearance:** The four games differ in visual appearance (Figure 4:4). The first two are almost identical to the original Iowa Gambling Task game, with the exception of one not having any kind of feedback while the other has a bar-like feedback display similar to that of the original. The third and forth game differ from the original in regards to visual representation. Instead of decks of cards, the play now controls either a mouse which is looking for cheese in holes in a wall, or a boy trying to collect apples from a couples of trees. The idea is thus to test whether or not the difference in visual appearance has any effect on the outcome of the games. Pictures of the game scan be found in Appendices E, F and G.
Feedback: Continuous overview of the achievement and discrete response to action. The continuous overview of the achievement is represented by two bars. One bar shows how much the player has borrowed from the 'bank' and the other bar shows how much money the player has gained in total. The discrete response to actions is presented to the player by the amount of money, lost or gained, appearing above the chosen alternative.

Interaction media: Mouse

Interaction is not one of the elements that will be studied at this point. Instead, we will leave this area to future investigations. Because we do not want to study interaction (except from the perspective of changing the feedback), it is important that this element does not change between games. There is therefore no real difference in interaction style in any of the game. Whether the game objects are decks of cards, trees of apples or mouse holes, the idea is always to interact by clicking the mouse on the game object, from which point the player receives feedback in a very similar manner between the games. However, they differ in one aspect, the mouse and apple games have a press interaction. That is, the discrete feedback is only shown as long as the player presses the mouse button, while in the IGT games the feedback are shown until the next card are chosen.

4.1.3 Evaluation Interventions

The evaluation study is guided by two hypotheses:

- Hypothesis 1: The appearance and graphics of a simple game, as the games implementing the Iowa gambling task, does not influence the performance in the game.

- Hypothesis 2: The representation of the feedback of achievements influences the performance of the task in a game such as the games implementing the Iowa gambling tasks.

In order to verify these the games need to be tested in the same manner as each other.

The pilot study was executed with fellow colleagues and volunteering students. Our colleagues were tested in either groups of two or one by one in the case where that seemed appropriate. The students
tested had the study introduced to them in the form of a competition, where the winner (the one with the most points at the end of the game) won a movie ticket.

The participants must answer a questionnaire of demographic data, some questions about their financial preferences and emotion regulation strategies after they play the game (Appendix I). This construction of the experiment will let us evaluate which one (if either) of the hypotheses are correct, and also guide the future study. If no difference is found between the two games with continuous feedback and also no difference is found between the two games without continuous feedback, H1 is confirmed. If the same difference is found between the two original IGT and between mouse and apple game, H2 is confirmed. Depending on the outcome we will have grounding for the next experiment.

Before the test/task started, each group of participants recieved a brief description of the game. Since verbal communication was supposed to be kept to a minimum, the game description was presented in text form to minimize contamination. In this way all participants recieved the exact same information and therefore had the exact same starting conditions. The text-based description in the original version looked like this:

"Pick cards from the four decks. The cards will have different values, some positive and some negative. Your goal is to get the highest score possible. You will not know when the game is going to end and you must play until it ends. The decks are not of equal value, it is up to you to figure out how to make the most profit by choosing the most profitable deck(s). Please pretend that this is real money so do not take the task lightly."

### 4.1.4 Evaluation Results

We tested the four games on 17 participants (four on each game and one extra in the IGT with feedback). Mean values for each game can be seen in Figure 4:5. The results are evaluated by looking at how many "good" draws minus the number of "bad" draws for episodes of 20 draws in the log file (Appendix H). A good learning curve starts on a negative number (since before encountering a loss the "bad" decks are perceived as good decks) and goes towards a more positive number. A comparison with the results from Bechara et al. (1997) is that their subjects had a continuous positive trend and were above the zero line at trial 41-60 (one SD).

Because of the small number of participants qualitative data have also been gathered (and since much is from our colleagues, more will be gathered). Individual assessments are made to understand the results. In the next section the factors that we have found that could have been affecting the results are discussed. For an example of data collected, see Figure 4:6.
4.1.5 Confounding factors

As mentioned we gathered data of what the participants observed as problematic, but also what we observed as problematic during the study. The most important factors we found are listed below:

4.1.5.1 Language

- The game content was presented in English but most participants were of Swedish heritage. This might be noteworthy, come the real study. However this seems necessary because we plan to test the full scale study on international as well as Swedish students.
4.1.5.2 User group

- **Education** - All participants were of a certain range or spectrum of educational degrees. The variation of participants was therefore not optimal. A full scale study should not only include academics but rather the full spectrum of people varying in age, gender, job, ethnic background etc.

- **Not used to experiments** - Many of the pilot participants were not at all used to experiments of this kind. This might affect the test subject's anticipation and therefore the result.

4.1.5.3 Instruction

- **Proper reading** - Some of the participants may not have thoroughly read the instruction. Not knowing what to do or not knowing what to expect might lead to a lot of confusing and misdirected attention. As a designer one must make sure the participants have read the instructional information.

- **Excluded instructions** - Because the instructional information felt overwhelming, it ended up without some quite important sections. There was, for example, a motivational section from Bechara et al. (1994) which stated that no matter the player's current status (wins vs. losses), there was always the possibility to turn it all around and win. Since this information was not included in the pilot instructions, people who did badly in the start of the game might have felt discouraged to continue wholeheartedly.

- **Bad English** - There were some grammatical errors in some of the game instructions. It is very important for the study that there are no such errors or similar mistakes. This was reported by several people, some of which had a hard time understanding sentences due to this.

4.1.5.4 Perception of the game

- **Analogy** - Due to the fact that the games (Original IGT) were represented by a computer, some players were suspicious and disregarded the idea that the decks were in fact representing regular decks of cards. This could be because BTH is a technical university and most employees and students have a deep understanding of what a computer can and cannot do, which might contaminate otherwise accepted analogies and metaphors.

- **Game feedback** - When an item was pressed in Mouse and Apple games the feedback was only visible on-click. That is, as soon as the button was released no feedback was longer shown about how much points were given in that move. In both IGT variants the number were shown until next card was chosen.

- **Time limit** - Several participants thought that there was not a draw limit of the cards but a time limit. They tried to be as fast as possible in order to pick as many cards as possible instead of doing smart choices.

- **Game experience** - Since some people are not used to games at all the bar was actually not seen by everybody.

Besides these factors that were problematic for each individual there are also some other disadvantageous with this pilot:

- **Not enough for statistics** - This one is self-explanatory for a pilot study but are briefly mentioned.
Different approaches for different people - The competition part was excluded for the employees for two reasons: 1. More people participate when there are not judged against each other. 2. Because of Swedish regulations it would have been hours of administrating the price to the employees.

4.1.6 Summary and future work

The future full study will have to address these confounding factors in order to be valid. Contact with people who have worked with IGT before is advised, since our data do not match theirs. However, we have no knowledge of how a small sample of their data look like. It is a possibility that some of what we perceive as confounding variables and different data can be explained by individual variances. This has to be investigated further before taking any drastic measures to terminate confounding variables.

Since the original IGT is not competitive this adds another dimension and the results from the real study might not be comparable to others work in the field, they can however still show us interesting results with regards to the importance of feedback.

Although problems with instructions cautious has to be taken in this. A balance between information and stress in the participants must be found.

Regarding the research questions a few things can be said:

- How can we use a participatory approach to create computer games?
  
  We can use a participatory approach in order to create small computer games. However, our experience is that everybody needs to be physically present in order to facilitate good communication between experts and non-experts. Further work on this is needed and will be continued during the project.

- What questions or difficulties arise from the game development itself?
  
  The defining of the problem before implementing it is a big issue. The problem needs to be understood on an algorithmic level in order to properly solve this issue. Another issue is the one of communication. In order to create a game together the communication must be on a level everybody can understand and discuss on. This is hard when going from very abstract things (e.g. game concepts) to concrete (e.g. sorting algorithms).

But some things remain to be explored:

- What factors influence the performance (in this case: learning) in games?
  
  This is still unanswered but the full-scale study will hopefully bring some answers.

- Can we make computer games that do not contaminate a specific, well defined task?
  
  Since the results are inconclusive we must wait for the full-scale study. But as we have seen when working on this "well defined" can mean different things in psychology literature and in game design. A future question for development of (micro) games could be "How well defined must a task be in order to implement a game, without contaminate the task?".
5 Conclusions

The design process during the past year consists of a chain of activities. The workshops, collaboration between the physical meetings and the prototypes have all contributed to the progress. The design of the table top games resulted in a discussion of how to create digital games where participatory design permeates the design activities from idea to implementation. This discussion led to the creation of First Person Shopper that in turn invoked a discussion about implementing psychological tests in small constrained games. Through the different prototypes we have increase our understanding of the requirements in Work Package 3. All of the prototypes have generated new ideas, for example, to develop the table tops games further into digital games for web or mobile phones; to explore how the First Person Shopper concept can be developed into a tool for studying impulsive buying and how to extend the micro game study to discover how feedback influence the performance in games.

The overall conclusion from the design processes is that we have gained experience in how to carry out participatory design in a multidisciplinary research environment. We have also tried out how to let participatory design permeate the whole design process from game design to implementation and evaluation. The different types of game design interventions have also created a collective understanding of the different competence areas in the project. It has also been apparent that a close and continuous collaboration between the work packages are required to make games relevant for the application areas.
6 Appendix A – Finance Cards

Action cards required to play the game Finance Cards

Job card: A Job card gives you an endowment at the beginning of the game (essentially a pile of money), provides you with a initial quality of life, and a constant Salary each round.

Home card: Every player buys a home in the beginning of the game, and can replace it with a new house if he got one on his hand.

Event card: There are two kinds of events, immediate and normal. Immediate events take effect immediately when a player draws it, and affects only the player drawing it. Normal events are taken up to the player's hand and can be played used by the player or given to the other player.

Insurance card: These are just reminders of an insurance that you have; that are not to be put back in the deck. Insurance can be bought at the player's turn, and protects against certain event cards.

Home insurance: You do not lose any money if your house burns down. Costs 10% of the house each round.

Health insurance: You don't lose any Quality of Life from a heart attack. Costs five money units each round.

Vehicle insurance: You do not lose money if you lose your vehicle (boat, car, etc.). Costs 10% of the value of the vehicle each round.

Loan card: You can borrow any amount of money. You have to pay 20% of the loan amount each round.
Appendix B – Fist Person Shopper

Game Design

First Person Shopper

xDelia prototype 1.0
Document version 1.0
## Document Contents

1 CONCEPT DOCUMENT 1

1.1 INTRODUCTION 1
1.2 GAME ANALYSIS 1
1.3 GAME PLAY 2
1.4 STORYBOARD 3
1 Concept Document

1.1 Introduction

The basic idea with the game is to make young adults aware of their material desires. By making the player aware of their priorities, wishes and how the perceived price differs, he or she has a better base for planning.

The game consists of four plus one level. The first level means the player makes higher prioritization of desirable things. In level two the player enters a 3D world where desirable things are exposed in shop-windows. The player must choose everything he/she wants to buy by taking a picture of the item. At level three the player gets an amount of money and he/she has to buy the most desirable items within the limited amount of money. Level one to three act as warming up for the final task, level four. In the fourth level a skin conductor sensor is used on the player's palm. In this level the player must choose the item with the highest priority by wanting it so bad that the skin conductor resistant, e.g. the outcome from this level is one item.

Level five is an optional level where two players play together. Once again they both get an amount of money to spend. But in this case if an item has a high priority to the player the price on the price tag is less than the real price. The second player sees the real price and vice versa. The players' missions are to make the co-player aware of the price difference.

The feedback from the game is a kind of simple shopper profile. The game will provide research data of temptation, desires and prioritizations in terms of merchandise.

1.2 Game Analysis

<table>
<thead>
<tr>
<th>Game Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Game Elements:</strong></td>
</tr>
<tr>
<td>● Taking pictures</td>
</tr>
<tr>
<td>● Collecting desirable objects</td>
</tr>
<tr>
<td>● Evaluation of perceived value in relation to salary</td>
</tr>
<tr>
<td>● Exposing desires</td>
</tr>
<tr>
<td><strong>Game Content:</strong></td>
</tr>
<tr>
<td>● Realism</td>
</tr>
<tr>
<td><strong>Theme:</strong></td>
</tr>
<tr>
<td>● Financial awareness</td>
</tr>
<tr>
<td><strong>Style:</strong></td>
</tr>
<tr>
<td>● Blend of real and abstract</td>
</tr>
<tr>
<td><strong>Game Sequence:</strong></td>
</tr>
<tr>
<td>● Linear Storyline</td>
</tr>
<tr>
<td><strong>Game Reference:</strong></td>
</tr>
<tr>
<td>● One of the cases from Adele Akenson’s document “Case Studies in more Detail” are addressed in the game.</td>
</tr>
<tr>
<td>- Case: Susie is going to university next year and wants to save some money from her part-time job to pay for her deposit on a flat and buy some essential homewares. The trouble is, there are so many parties being organised and she just ends up spending everything she saves on buying new clothes and going out. She never has anything left over.</td>
</tr>
<tr>
<td>- Susie has low levels of financial capability in terms of planning ahead.</td>
</tr>
<tr>
<td>- Needs that might fit this problem: temptation, shopping, desire, practicality</td>
</tr>
<tr>
<td>- Verbs Susie needs to improve the extent to which she is: future focused, determined, realistic</td>
</tr>
</tbody>
</table>

Charlotte Sernertsen, Ola Hilborn, Lee Sandberg, Janette Eriksson
First Person Shopper

Sept 2009

<table>
<thead>
<tr>
<th>Game Technical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technical Form</strong></td>
</tr>
<tr>
<td>• 3D graphics (Level 1 – 20 graphics)</td>
</tr>
<tr>
<td><strong>View</strong></td>
</tr>
<tr>
<td>• The player will experience the game from a first-person view</td>
</tr>
<tr>
<td><strong>Platform</strong></td>
</tr>
<tr>
<td>• Adobe Director/Web</td>
</tr>
<tr>
<td><strong>Device</strong></td>
</tr>
<tr>
<td>• PC</td>
</tr>
<tr>
<td><strong>Sensor</strong></td>
</tr>
<tr>
<td>• Skin conductor sensor</td>
</tr>
</tbody>
</table>

1.3 Game Play

An essential part of the game is pictures of items that young people think is desirable. Therefore 20 persons from the target group (18-29 years old) takes 5-10 pictures of what they want to buy. The pictures are then categorized in ten groups. The categorization of the pictures results in ten different pictures representing each category.

Level 1: The ten pictures are exposed in pairs and the player has to choose which item he/she prefers. The result from this level is a priority list of items. 
Comment: choices, priority list, time will be recorded.

Level 2: At this level the player enters a town where items are exposed in shop-windows. It is not only the 10 pictures from the previous level that are disposed. Different items from the 10 categories are exposed, some more desirable than others (example different kinds of mobile phones). The player gets the instruction to choose everything he/she really wants to have. The items do not have any price tag. The mission is to collect items by taking pictures of them.
Comment: The number of items collected will tell us something about the player. The player activities will be logged.

Level 3: The player enters the same town, but this time the items have prices attached to them. The player gets an amount of money to spend. The task is to make the money last and yet get the most prioritized items. The player takes pictures of the bought items just as in the previous level. (It might be possible to borrow money, but the player will then be punished by money loss.)
Comment: The activities will be logged.

Level 4: A skin conductor sensor is put on the player’s palm and it registers the player’s arousal when he/she looks at different things. The player must only collect one item from this level and it is the degree of arousal that determines if a picture is taken or not. When the player wants something he/she has to work up an arousal.
Comment: The activities are logged. It would be desirable to be able to discern how much the player wants different items, but it depends on what data we can get from the skin conductor sensor.

Level 5: This level is similar to level 3, but it adds another dimension to the game. At this level two players work together. The task is to buy the highest prioritized items and yet make the money last. The price tags on the items are dependent of how much the player wants it. The more desire the lower price. But when the player buy such items the real amount is withdrawn from the money pot. The two players shop together. The task is to make the co-player aware of the differences in perceived price and the real price.
Comment: This level has to be evolved. An idea is to use a skin conductor sensor once again and if we can know how much the player wants different items, we can regulate the price dependent of the arousal. In addition it would be possible to make the player purchase automatically when the arousal level is high enough. Then the player have to keep calm to be able to make the money last.
1.4 Story Board
Appendix C – The BART game
9 Appendix D – Game ideas for IGT

Game Ideas for the Iowa Gambling Task

(red titles are implemented)

**Standing caveman**

1. Standing Caveman
   * Items: 4 piles of rocks
   * Actions: choose a pile to borrow
   * Caveman gives a rock to level
   * Score: life points = - reliability
   * Save, shaping, trim diet

**Mouse searching for cheese**

2. Mouse searching for cheese
   * Items: 4 holes in the wall
   * Actions: choose a hole of cheese
   * Score: life points = - reliability
   * Find more cheese, cheese in a room
   * Total score: life points

**Goldminers**

2. Goldminers
   * Items: 4 rivers/holes to use your gold miner
   * Actions: choose a hole
   * CS: finding gold/ damming equipment
   * TS: use gold

**Formula 1 racing**

3. Formula 1 racing
   * Items: 4 times on a race track
   * Actions: replace a tire
   * CS: finishing a round = gain points
   * TS: losing tires
### Hunter

<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carry wood</td>
<td>Carry them over</td>
</tr>
<tr>
<td>over a bridge</td>
<td>(or loose them)</td>
</tr>
<tr>
<td>Four carts</td>
<td></td>
</tr>
<tr>
<td>which</td>
<td></td>
</tr>
<tr>
<td>each</td>
<td></td>
</tr>
<tr>
<td>contains</td>
<td></td>
</tr>
<tr>
<td>a number</td>
<td></td>
</tr>
<tr>
<td>of logs</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Change score</th>
<th>Number of logs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank</td>
<td></td>
</tr>
<tr>
<td>health on</td>
<td></td>
</tr>
<tr>
<td>bad cart</td>
<td></td>
</tr>
<tr>
<td>Gain on</td>
<td></td>
</tr>
<tr>
<td>good</td>
<td></td>
</tr>
<tr>
<td>Lose money</td>
<td></td>
</tr>
<tr>
<td>on medical</td>
<td></td>
</tr>
<tr>
<td>bills</td>
<td></td>
</tr>
<tr>
<td>Gain money</td>
<td></td>
</tr>
<tr>
<td>for guilds</td>
<td></td>
</tr>
</tbody>
</table>

### Logs

<table>
<thead>
<tr>
<th>Objective</th>
<th>Item</th>
<th>Action</th>
<th>Change score</th>
<th>Number of logs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carry wood</td>
<td>Carry them</td>
<td>Carry them over</td>
<td>Tank</td>
<td></td>
</tr>
<tr>
<td>over a bridge</td>
<td>over (or loose them)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four carts</td>
<td>which</td>
<td>each contains a number of logs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tank</td>
<td>health on</td>
<td>bad cart</td>
<td></td>
<td></td>
</tr>
<tr>
<td>health</td>
<td>Gain on</td>
<td>good</td>
<td>Tank</td>
<td></td>
</tr>
<tr>
<td>on</td>
<td>Lose money</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>medical</td>
<td>Gain money</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bills</td>
<td>for guilds</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Part time job

Pick part time jobs to work at for the day.
- McDonalds
- Janitor
- Shop caddy
- Politician
- Bad stuff: Angry customer
- Gum on the floor
- Kidnapped by pirates for ransom
- "I am not a"
- Gain money for incidental days
- Go money for pay deduction, extra cleaning equipment, ransom and bribes
**Minefield**

- **Items:** Minefield
  - Click on "\$100" or "\$500" to earn money.
  - Click on "\$1500" or "\$2000" to lose money.
- **Actions:** Change items in field.
- **Outcome:** Item of standard location.

**Angles**

- **Items:**
  - Item
  - Angle
  - Push button
- **Actions:**
  - Push button
- **Outcome:** Height

**The Motor Maid**

- **Items:** Cars
  - Actions: Ticket the cars (parked on the wrong place)
  - Change score: you get money if you are right otherwise you get money
  - Total score: balance in numbers

**Water Tank**

- **Items:** Water tank
  - Action: Click on water line
- **Outcome:**
**Pirate ship**

- **Items:** pirate ships
- **Action:** shoot ships
- **Change score:** treasure sinks or golden coins is added to a pile
- **Total score:** pile of money

**Apple trees**

- apple trees
- shakes trees: the apples fall down
- get apples: you save apples

you have just a pile of apples
you don't see exactly how many apples fall down, just more or less.

**Colours**

- **Red:**
  - display: and die on screen
  - click on red

- **Green:**
  - display: go on screen

**Swimming**

- **Object:** Make the fastest swim you can

<table>
<thead>
<tr>
<th>Item</th>
<th>Four streams in which you can swim</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action</strong></td>
<td>Choose stream 1-4</td>
</tr>
<tr>
<td><strong>Change score</strong></td>
<td>You either move forward 1 or 27 meters or backwards 15 or 25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total score</th>
<th>You have markings every ten meters to keep track</th>
</tr>
</thead>
</table>
**Beat your opponent**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective:</strong> Beat your opponent</td>
<td></td>
</tr>
<tr>
<td><strong>Items:</strong> Punches and Kicks</td>
<td></td>
</tr>
<tr>
<td><strong>Action:</strong> Hit or kick your opponent</td>
<td></td>
</tr>
<tr>
<td><strong>Change score:</strong> Sound effects</td>
<td></td>
</tr>
<tr>
<td><strong>Total score:</strong> More bloody/bloody</td>
<td></td>
</tr>
</tbody>
</table>

**Iowa Game 1 (The outcome differs between game 1, 2 and 3):**

Iowa 1: game 1

Items: make a bid for interest and win the. There are 4 vendors of interest thing. Each vendor pay with a. Choose the vendor distribution (not enough to make money)

Choose to take the hidden price from one of the vendors

Change score

You see the highest bids of all vendors in each round.

Total score

You see your...
Iowa Game 2

Item:
- see game 1

Actions:
- see game 1

Changes can:
- you do not see the bids of the other vendors but he sees one you choose.
- You see the immediate price for each product purchased so far.

Iowa Game 3

Item:
- see game 1

Action:
- see game 1

Change score:
- your score
- total score
- you do not see the total price you have to bid bandwidth so far.
Appendix E – Micro game: Cards

Pick cards from the four decks. The cards will have different values, some positive and some negative. Your goal is to get the highest score possible. You will not know when the game is going to end and you must play until it ends. The decks are not of equal value, it is up to you to figure out how to make the most profit from by choosing the most profitable deck(s). Please pretend that this is real money so do not take the task lightly.
Appendix F – Micro game: Pick apples
Appendix G– Micro game: Mouse trap
### Appendix H - Example of log file

<table>
<thead>
<tr>
<th>1. High Single Risk 100 2100</th>
<th>62. Low Single Risk 60 3560</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Low Single Risk 50 2200</td>
<td>63. Low Single Risk 60 3560</td>
</tr>
<tr>
<td>3. High Single Risk 100 2400</td>
<td>64. Low Single Risk 60 3750</td>
</tr>
<tr>
<td>4. High Single Risk 100 2600</td>
<td>65. Low Single Risk 60 3950</td>
</tr>
<tr>
<td>5. High Single Risk 100 2800</td>
<td>66. Low Single Risk 60 3950</td>
</tr>
<tr>
<td>7. Low Spread Risk 50 3100</td>
<td>68. Low Single Risk 50 3650</td>
</tr>
<tr>
<td>8. Low Spread Risk -50 3100</td>
<td>69. Low Single Risk 50 3700</td>
</tr>
<tr>
<td>9. Low Spread Risk 50 3100</td>
<td>70. Low Single Risk 50 3800</td>
</tr>
<tr>
<td>10. High Single Risk 100 3250</td>
<td>71. Low Single Risk 60 3900</td>
</tr>
<tr>
<td>11. Low Single Risk 50 3400</td>
<td>72. Low Single Risk 50 4000</td>
</tr>
<tr>
<td>12. High Spread Risk 100 3580</td>
<td>73. High Spread Risk -200 3580</td>
</tr>
<tr>
<td>13. High Spread Risk 100 3750</td>
<td>74. High Spread Risk 100 3850</td>
</tr>
<tr>
<td>14. High Spread Risk -150 3800</td>
<td>75. High Spread Risk 100 3950</td>
</tr>
<tr>
<td>15. Low Single Risk 50 3700</td>
<td>76. High Spread Risk -300 3750</td>
</tr>
<tr>
<td>16. Low Single Risk 50 3850</td>
<td>77. High Spread Risk -350 3800</td>
</tr>
<tr>
<td>17. Low Spread Risk -60 3880</td>
<td>78. High Spread Risk 100 3850</td>
</tr>
<tr>
<td>18. High Single Risk 100 3900</td>
<td>79. High Spread Risk 100 3850</td>
</tr>
<tr>
<td>19. Low Spread Risk 50 4050</td>
<td>80. High Spread Risk 100 3750</td>
</tr>
<tr>
<td>20. Low Single Risk 50 4150</td>
<td>81. High Spread Risk -300 3450</td>
</tr>
<tr>
<td>21. Low Single Risk 50 4250</td>
<td>82. High Spread Risk 100 3450</td>
</tr>
<tr>
<td>22. High Spread Risk 100 4400</td>
<td>83. High Spread Risk -300 3300</td>
</tr>
<tr>
<td>23. High Spread Risk -300 4300</td>
<td>84. High Spread Risk -250 2700</td>
</tr>
<tr>
<td>24. Low Single Risk 50 4650</td>
<td>85. High Spread Risk -200 2600</td>
</tr>
<tr>
<td>25. Low Spread Risk -50 4100</td>
<td>86. High Spread Risk -200 2700</td>
</tr>
<tr>
<td>27. Low Spread Risk 50 4300</td>
<td>88. High Spread Risk 100 2380</td>
</tr>
<tr>
<td>28. Low Spread Risk 50 4400</td>
<td>89. High Spread Risk 100 2850</td>
</tr>
<tr>
<td>29. High Spread Risk 100 4580</td>
<td>90. High Spread Risk -350 2400</td>
</tr>
<tr>
<td>30. Low Single Risk 50 4700</td>
<td>91. High Spread Risk -200 1950</td>
</tr>
<tr>
<td>31. High Spread Risk -50 4750</td>
<td>92. High Spread Risk -250 1900</td>
</tr>
<tr>
<td>32. High Single Risk 100 4800</td>
<td>93. High Spread Risk 100 1450</td>
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<tr>
<td>33. Low Spread Risk -60 4900</td>
<td>94. High Spread Risk 100 1650</td>
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<tr>
<td>34. Low Single Risk -250 4650</td>
<td>95. High Spread Risk 100 1650</td>
</tr>
<tr>
<td>35. High Spread Risk -50 4900</td>
<td>96. High Spread Risk -100 1500</td>
</tr>
<tr>
<td>36. Low Spread Risk -200 4700</td>
<td>97. High Spread Risk -300 1500</td>
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<td>37. Low Single Risk 50 4750</td>
<td>98. High Spread Risk 100 1350</td>
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<td>100. High Spread Risk 100 1350</td>
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<td>40. Low Single Risk 50 4550</td>
<td>101. High Spread Risk 100 1350</td>
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<td>41. Low Single Risk 50 4650</td>
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<td>42. Low Single Risk 50 4750</td>
<td>103. High Spread Risk 100 1350</td>
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<td>43. Low Single Risk 50 4850</td>
<td>104. High Spread Risk 100 1350</td>
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<td>44. Low Single Risk 50 4950</td>
<td>105. High Spread Risk 100 1350</td>
</tr>
<tr>
<td>45. Low Single Risk 50 4800</td>
<td>106. High Spread Risk 100 1350</td>
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<td>46. Low Single Risk 50 4900</td>
<td>107. High Spread Risk 100 1350</td>
</tr>
<tr>
<td>47. High Spread Risk 100 4750</td>
<td>108. High Spread Risk 100 1350</td>
</tr>
<tr>
<td>48. High Spread Risk -250 4000</td>
<td>109. High Spread Risk 100 1350</td>
</tr>
<tr>
<td>49. High Spread Risk -50 4200</td>
<td>110. High Spread Risk 100 1350</td>
</tr>
<tr>
<td>50. High Spread Risk 100 3950</td>
<td>111. High Spread Risk 100 1350</td>
</tr>
<tr>
<td>51. High Spread Risk -350 3200</td>
<td>112. High Spread Risk 100 1350</td>
</tr>
<tr>
<td>52. High Spread Risk 100 3500</td>
<td>113. High Spread Risk 100 1350</td>
</tr>
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<td>53. Low Single Risk 50 3300</td>
<td>114. High Spread Risk 100 1350</td>
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<td>55. Low Single Risk 50 3500</td>
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<td>57. Low Single Risk 50 3700</td>
<td>118. High Spread Risk 100 1350</td>
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<td>58. Low Single Risk 50 3800</td>
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<td>59. Low Single Risk 50 3900</td>
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<td>60. Low Single Risk 50 3900</td>
<td>121. High Spread Risk 100 1350</td>
</tr>
<tr>
<td>61. Low Single Risk 50 3980</td>
<td>122. High Spread Risk 100 1350</td>
</tr>
</tbody>
</table>

1650 HighSpread: 40 HighSingle: 3
LowSpread: 10 LowSingle: 40
Appendix I – Micro game experiment

Informed Consent form

Introduction
We shall conduct an experiment where you play a small game and answer some questions afterward. The experiment is conducted as a part of the XDElia project. Questions about the intent of the experiment and about the project itself will be answered after the experiment to avoid contamination. That is you might play the game differently if you know the purpose of it.

Confidentiality
The information will be kept confidential. Data will be stored securely. The data may be written up and published however no reference will be made which could link you to the study.

You can at any time quit the experiment by telling the researcher that you don’t want to participate anymore.

Contact Information
If you have questions at any time about the study you may contact Jeanette Eriksson, at jeanette.eriksson@bth.se


Consent

I have read the above information. I agree to participate in this study.

Participant’s signature:

Date:
Demographic data

Age: __________

Male [ ]  Female [ ]

Occupation: ________________________________

Highest degree: ________________________________

Mother tongue: ________________________________

Native country: ________________________________
We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When I want to feel more <em>positive</em> emotion (such as joy or amusement), I change what I’m thinking about.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>2. I keep my emotions to myself.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>3. When I want to feel less <em>negative</em> emotion (such as sadness or anger), I change what I’m thinking about.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>4. When I am feeling <em>positive</em> emotions, I am careful not to express them.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>5. When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>6. I control my emotions by not expressing them.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>7. When I want to feel more <em>positive</em> emotion, I change the way I'm thinking about the situation.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>8. I control my emotions by changing the way I think about the situation I’m in</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>9. When I am feeling <em>negative</em> emotions, I make sure not to express them.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>10. When I want to feel less <em>negative</em> emotion, I change the way I'm thinking about the situation.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
Financial Questionnaire

1. How competitive are you? [1 = not at all competitive, 7 = very competitive]

   1   2   3   4   5   6   7

2. If you were to receive a 10% raise, what would you do with the extra money? (Prioritize the statements below from 1 to 6, 1 being the most important)

   - I would spend the money on something that I have always wanted but could never afford.
   - I would spend the money on stocks (High risk investment)
   - I would put the money in the bank (Low risk investment)
   - I would spend the money on increasing my standard of living.
   - I would spend the money on travels.
   - I would spend the rest of the money on something else.

   Please state what else you would spend your money on here:

3. If you would win 1 million kr on the lottery, what would you do with the money?
   (Distribute the money, in percentage, on the following posts)

   I would spend ________% on something that I have always wanted but could never afford.

   I would spend ________% on stocks (High risk investment)

   I would put ________% in the bank (Low risk investment)

   I would spend ________% on increasing my standard of living.

   I would spend ________% on travels.

   I would spend ________% of the money on something else.

   Please state what else you would spend your money on here:
Appendix J – References

Atkinson, A, 2009a Case studies in more detail http://xDELIA.fzi.de/index.php/WP3_game_workhop_%28Karlshamn_May_2009%29 (retrieved 01/03/2010)


YoYo Games, ”Make”, <http://www.yoyogames.com/make>, (retrieved 08/03/2010)