FROM YESHBAD

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Imagine you are a student in your final year of high school. Before the summer you need to decide which field of study you are going to choose. You have been to several "open days" in which the perfect picture is being painted and your future is mapped out. Even though you actually want to gain real insights in what to expect from a study so you are able to find out whether it suits you. You have an idea of the direction you want to go in however there are still some options that need to be explored.

Many students get to this point and then just choose one of the options. In order to gain a better understanding of the field of study, and being able to base the important decision of choosing a career on more than a well designed flyer or perfect pitch, a game was created.

Content

Introduction

Industrial Design

As a field of study at the University of Technology Eindhoven there was chosen for Industrial Design (ID). Within this study there are many different possibilities and various subjects which makes it interesting as a game concept. Due to the different aspects of this study, such as creativity, technology and business, it is hard to grasp and get a clear image of. Therefore prospective student could really benefit from playing a game in order to experience various elements. Moreover, two of the students in the team are from ID and are able to give a clear insight in the field of study.

Target group

Students in their last year of high school, students who want to switch study and HBO students are all part of the target group for this game. In fact all people interested in studying the bachelor ID at the University of Technology Eindhoven. In order to gain insight of the image prospective students have from ID, the information available online and in the study guide is reviewed [1].

Besides this, a questionnaire with current ID students is conducted (Appendix A). With the questionnaire insights are gained on the expectations students had and how they have changed now they are following the bachelor courses. Moreover, insights are gained on what ID is in the eyes of current students. The large number of creative solutions is based on the creative independence many students find appealing. This creativity is challenged to the maximum during the final sketch battle. The resemblance of real circuit parts and the actual building of an Arduino circuit originates from the practical approach combined with a bit of theory.

Persuasive profiles

ID is a technical design study so it falls under the beta sector. Betamentality describes four different persuasive profiles in the beta professions sector [2]:

Concrete Bètatechnicians
"What can you make?"
Curious about the world around them and want to know how everything works with a do-it-yourself mentality. Experience science as an adventure and often have parents working in a technical profession.

Ambitious Bèta's
"What can you achieve?"
Interested in the theoretical side of science. Motivated by a career and developing status. Often have an interest in economics as well.

Human oriented generalists
"What significance does science have to humanity?"
Happy with the benefits of technical appliances but no deep enthusiasm for the mechanics behind them. Want to develop themselves and they like to learn/study. Often care deeply about societal and environmental problems.

Non Bèta's
"What significance does science have for me?"
Little interest in science, technical professions appear to be for nerds only. A large portion of this group is female, and without parents in any technical profession. Involved in societal problems.

The study ID is heavily based on the self experimentation of mechanics and the strife to excel. Besides the description of the study this also emerged from the survey taken amongst current ID students. The concrete betatechnicians in combination with a flavour of the Human oriented generalists closely resemble the ideal personality group for ID, and thus for our game. The betatechnicians wants to work with tools and appliances, and want a study which is broadly applicable. The Human oriented generalists focus on creating for users and solving societal and environmental problems through design. Using these perspectives the game integrates the desire to work with appliances in the circuit building with the Arduino. The game offers personal development and learning new skills through talking to various characters and the encouragement of daring to act on a dream, which also makes up the broadly applicable element for the betatechnicians.

Image you are in a street full of weird houses. All kinds of worm-alien like figures roam the streets and in the street various houses and shops can be found. You are stuck in a dream world, stuck in a Lucid dream. And the only way to find your way back to reality is to wake up. You need to find a way to wake up. The dream world seems perfect and pretty besides some shady figures that are slithering around with suitcases full of money and break in equipment. They are 'up to no good'…

And as the name of the game already states, are you?

Game description

Starting the game an introduction movie (Movies can be found in appendix C) explains that you are stuck in a dream world. And the only way to get back to reality is to wake up from this lucid dream. In the street that is full of shops and buildings (visuals in appendix B) you can walk around. A map, at the bottom of the screen shows your location on the street. It also shows a tower with an alarm that you have seen before in the introduction video. The first creature you talk to answers with 'Can't talk now, I have just heard there was a break-in at my house'.

The tower is not part of the street but can be reached through the side roads in the main street. When you walk to the tower as you are curious because it is a tower and it has a weird glow around it, you notice it is locked. When you walk around more in the main street and talk to people you find out information that is related to ID and study association Lucid without this being obvious. This information is disguised as talk that fits the specific creatures personality. The player can ask three different questions to the creatures. (Questions and answers can be found in appendix D) What do you do? And the creature will answer with a theme he is working on or a previous ID project. What are you up to? And the creature will answer with activities that the study association organizes such as a drink or a workshop.

The player can also choose to say 'I'm up to no good' when this happens the creatures react in different ways but most act surprised or non-interested. When the phrase 'I'm up to no good' is said to a shady figure, he will respond with hints on how to break into the tower. If you ask further he will tell you about the items you need to collect. These items are needed to build a device that can help you break in. If you ask how to build the sensor that connects to the dream world to convey your real life actions to results in the dream world he will show you an Arduino circuit that you can build (visualizations of the circuits can also be found in appendix B). In total there are three shady figures that all have their own approach to breaking in, just like students at ID have their own approach to the design process and let their vision guide them. The shady figures are experts on the topic of breaking and entering. The ways of breaking in that are possible are: pushing through the glass by making your own pressure sensor, burning through the glass by heating a circuit with a thermistor and lastly lasering through the glass by directing a real bright light to an LDR while a second LDR is blocked to dim the street lights around the tower.
The next step is to explore the world and find the collectable items. The items are hidden in shops and houses. For each case the stairs need to be collected, to climb the tower and reach the glass. When you complete either one of the three devices and create the right input signal for the Arduino, the Arduino sends a signal to the game. In the electronics store some components can be found such as the resistors. In the shop an information pamphlet is located in which information about reading resistors is shown. Slowly the player learns how to make his circuit complete and what resistor to use. The circuit can be created by trial and error.

When the character is standing on the stairs and the signal send by the Arduino comes in, the glass of the tower breaks and you are able to walk up the stairs (animation video 2, can also be found in appendix C). Once up the stairs you conclude that there is another hurdle: another locked door. To open this door you engage, together with another prospective student, in a sketch battle with a current ID student. This sketch battle cannot be lost and after all the effort to break in you succeed. As a reward you see a reflection video that illustrates how similar the game and ID are in real life. It challenges you to dare to work towards achieving your dreams.

In the game you have talked to creatures (people), shady figures (experts) and made choices based on too little information (setbacks during a design process). You used creativity (sketch battle) and stayed close to reality and technical achievability (Arduino circuit). In the video you even reflected. You went through an iterative process as you hit a hurdle and learned about ID in the process. You have made autonomous decisions based on your own approach (talk to many people?; which break in method to go for). All in all you went through a process where you used skills that are very similar to the skills used at ID. Also the process is very similar and only misses some depth by leaving out some competences. Finally you are dared: Can you find the balance between dream and reality? In other words, can you combine creativity and technology as is done at ID?

Development process

During this assignment the objective was to design a serious game to promote a study of the University of Technology Eindhoven and attract prospective students. The team consisted of five people from different backgrounds with different expertises. For this reason it was decided to make use of these different expertises and the theories taught in class in developing a game. The team agreed on creating a game for prospective Industrial Design students that could be used during an introduction- or open day. To ensure flexibility, the team decided to use Unity as the game engine. Iteration started with a brainstorm.
Several concepts were created during this brainstorm, however one was developed further as described in "Iteration 1".

Brainstorm concept Bird & Frog
One player is a bird who wants to go to the moon, however he is the worst of all birds in flying. At the start of the game the player tried flying from a tree but immediately crashed down. The player decides to patch himself with some enhancements to increase flying power. This is repeated several times throughout the game, each time the player is able to fly a bit further due to more experience. The other player is a frog who want to go to the moon as well, however he is focussed on bringing down enemies as the airspace is dangerous. The frog gains knowledge on the duration of the flight and gravity on the moon, while the bird gets information on the enemies (weakness, number of them, etc). This means communication between the two players is important. After the first two phases the players switch roles.

Brainstorm concept Mario ID
In a platform game two players need to collaborate in order to get to the end of the game. Each player chooses a door at the start of the game representing one competency of Industrial Design. Within the level there is a focus on this competency and skills are being thought. Moreover the player needs to use these skills to help the other player progress and vice versa. E.g. an electric circuit needs to be made in the "technology" level in order for the door to open in the "user and society" level.

Conclusion
The concepts for the brainstorm were created by individual people. During the brainstorm session one concept was created from all the different ideas as described in Iteration 1. The progression line stays in roughly the same shape but the segmentation and details are thoroughly changed.

Iteration 1

Introduction
In order to give prospective students a clear view on the bachelor Industrial Design a game was created. It was decided that showing a complete overview of the bachelor would give prospective students the opportunity to find out whether it would suit them, and therefore persuade them to enter Industrial Design. The game should consist of all competencies an Industrial Design student needs; creativity & aesthetics, user & society, business & entrepreneurship, technology & realization and math, data & computing [1].

Concept
Oh my god! You are dreaming and you are stuck here.. The only way to wake up from this Lucid dream and go back to reality is to find your way back to earth.

In a multiplayer game two prospective students are collaborating to find their way back to earth. Each of them play several mini games in which they try to find a solution to the problem using one of the defined skills. In one of the mini games there needs to be calculated how much fuel is needed to fly to earth in a rocket. After completing the calculation the player realises, by seeing the rocket not reaching earth, that he did not take the mass of the rocket and himself into account. After failing to succeed in escaping the planet in each mini game, the two players have to help each other in the last mini game. Due to the fact that they completed different mini games and therefore learned different competencies they are able to find their way back to earth by collaborating.

Conclusion
Within the concept a player had to fail multiple times before actually winning something. Besides this it was noticed to be difficult to integrate each competency in the game since the prospective student does not have knowledge yet in each area. In the game the amount of time is limited to get into depth regarding a specific competency, which makes it less interesting. The game concept would reflect all the competencies needed in Industrial Design, however it would not necessarily reflect what it is like being an Industrial Design student.

Game design analyses
Elements that constitute the game

Below are the elements that constitute the game. A detailed description is given for each element. Some elements are tied to other, which come together in this description. The elements are split between characters, environments and items.

Characters
Dreamer: The dreamer is the playable character in the game. The dreamer's goal is to wake up. The player must use visual clues, have dialogues with other characters and explore the environment to achieve this goal. Movement is restricted to four directions. Armed with an interaction button, the player can start dialogues, enter stores or houses, pick up objects and go upstairs.

Elements tied to the dreamer:
Inventory: The inventory keeps track of the collected items so far. This is crucial for the player as he is required to find the right combination of items. The shady creature hints what combination of items form what solution.

Dialogue system: The dialogue system gives the player an engaging experience when talking to the non player characters (NPC's). The player can ask multiple questions to gain more information throughout the game or to simply learn more about that character. It is crucial that players make use of this information to progress throughout the game.

Non-playable characters: The NPC's help to create and shape the lucid world of the dreamer. These creatures help to convey the player into a fantasy dream setting. The player can interact with these NPC's through the dialogue system. Each NPC has a different personality and story. This personality and story is related to industrial design students: it includes projects the character has been working on, fields that are covered, study association activities and the hasty response when he has a deadline. The relatedness of this information to industrial design is unknown to the player until he watches the final reflection video that explains the similarities of ID with the game to some extend.

Shady characters: The Shady creatures are unique. A creature that has sold his soul to the underworld, and therefore has a few shady tricks up his sleeve. Players can interact with this NPC to learn these tricks, and break into the tower. These tricks are the solutions to bypass the locked tower. Each solution requires different items, which are mentioned in the dialogue. The shady creature can also provide the player with blueprints of the device to be build. This is ultimately the solution of the circuit to be built on the Arduino board. The shady characters resemble the experts an ID student would consult.

Environment and items

Town street: The town street is the main environment of the game. In this environment, the player can roam the streets to enter houses and shops. NPC's will be walking around in this street so the player can interact with them.

Houses and Shops: All houses and shops have different themes. The player can enter most of these buildings to explore the buildings and to find the items needed.

Tower: The tower is a very outstanding building behind the street. With the use of foreshadowing techniques and visual cues the player is drawn towards the tower. The tower can be reached by one of the two alleys in the main street.
However, the tower is locked. Therefore, the player must find an alternative way of getting in- a shady one perhaps. Maybe the character is, just like the name of the game, 'up to no good'.

Collectable items: There are different collectable items in the game. Each item contributes to a different unique device to be built. To reward the player for reaching these sub goals, audial and visual cues are given. Only one complete device is required to break into the tower. By allowing different solutions, the gameplay is diverse. This in return gives players different choices throughout the game, which result in autonomy. Some of the items will represent real items that are required to complete the circuit on the Arduino board.

Arduino: (real life item) Once the required items are collected, the player must build this device on the Arduino board. The Shady character has pictures of these solutions which can be used. The Arduino will transmit a signal once the circuit is complete. The player is then able to continue to the final stage of the game.

Top of the glass tower/Sketch battle: The player reaches the top of the glass tower, but is surprised with one final obstacle: another lock. The dreamer will learn to use creativity to change the dream, but it seems like someone else is controlling the dream as well! No matter the result, the player will always win the sketch battle. As for completing the game, and therefore reaching the main goal, the player is rewarded with audial and visual cues. The player is, at the moment of completion of the game, shown a reflection video that illustrates how much ID and the dream world are actually related.

Game system

Analyse the game as if it were a strategic, experiential system

When the game is viewed as an experiential system [3], it consists of the following objects, attributes, internal relationships, and environment

Object
The player controlling the dreamer.
ID student to play the sketch battle with.

Attributes
The dreamer, including movement, current position and interactions with the environment.
The circuit on the Arduino board.
The drawings on the sketch battle paper.

Internal relationships
The social interaction between the players during the sketch battle form the
internal relationships. The ID student should encourage the player to compete and play.

Environment
The environments in which the game is played, such as the game itself, the
Arduino board and the sketch battle paper.

Analyse the game as if it were a strategic, mathematical system

When the game is viewed as a purely strategic, mathematical system [3], it consists of the following objects, attributes, internal relationships, and environment

Object
The playable and the non-playable characters, such as the dreamer and shady creatures.
Items that can be collected by the player.
Interactive visuals, such as stairs or doors.
The Arduino circuit board.

Attributes
The position of playable and non-playable characters.
The movement of playable and non-playable characters.
The amount of items the dreamer has collected.
The location of the collectable items.
The Arduino will give a signal once the circuit is built.

Internal relationships
The interaction between the position of the character and doors/stairs, which allows for teleportation into or out of a room.
The interaction once the player collects four items.
The interaction between playable and non-playable characters, which allows for dialogues.
The interaction between the Arduino board and the game.

Environment
The environment is the game in the digital world in the context of play.
The environment is the game in the Arduino board in the context of play.
The environment is the game in the sketch battle paper in the context of play.

MDA framework

Hunicke et al [4] describes in his paper "MDA: A formal approach to Game Design and Game Research" a framework which divides the game into three levels. The mechanic, dynamic and aesthetic level all constitute to the final game, but it should be noted that these levels are not clearly separated but rather blended together like a gradient.

Aesthetics
The aesthetics describe the desired emotional responses in the player while playing the game. The following main emotional responses are targeted in our game: fantasy, challenge, fellowship, discovery.

Dynamics
The dynamics regard the interaction of the different elements in the interpretation of the player. The interaction can be computer based, like an AI or simpler NPC character, and can be player based, how does the player and the designated in-game character interact with the virtual world.

Fantasy
The movement of the characters is alien or wormlike and both the appearance of the characters and parts of the environment have the same extraterrestrial vibe. The items, other parts of the environment and music are relatively compliant with pre-existing beliefs of the world which creates realistic atmospheres.

Challenge
It is a task on itself to figure out how to progress the game as there is no explicit goal. The player is on the quest for all the items and the gathering of information on how to use them. The real-life challenges in the assembly of the Arduino and the sketch-battle require an attention shift away from the virtual environment.

Fellowship
The winning conditions are hard to achieve on your own because of unacquaintance with the hardware and the experience gap with the ID student. This is why the sketch battle is done in cooperation with another player.

Discovery
To be able to break into the clock tower the player needs to discover several items which are scattered across the world. The journey of gathering all the items leads the player to a vast amount of unexplored areas.

Mechanics
The mechanics describe the data representations and algorithms of a system. For our game this translates to the elements, their functions and their relations to other elements. The items are closely related to the "elements which constitute a game" but I will name them shortly. In terms of characters there is the main character who can walk around, talk to NPC's, enter buildings and pick up items. The other characters are all basic NPC's, most of them talk about ID. The shady character displays suspicious behaviour and gives information on how to break in. The scenery consists of the buildings, some of which are enterable, some items in the foreground, the sky and the tower in the background. The building are also displayed in a silhouette map which tracks your movement. The items are located in the building are stashed in your inventory. When constructing the items in the Arduino, a signal depending on the solution will be sent to the game which allow you to break in. The real life elements, in this case the Arduino and sketch battle are an important and refreshing mechanic.

Self determination theory

According to the self determination theory the player of the game needs to feel autonomous, he needs to feel competence and to be able to relate to the situation and character. [5]

When comparing the introduction to the game and the introduction to the target group, it can be seen that they are set up similarly. The game character is made relatable. The player has control over the character but is in a bizarre situation that he does not have control over, a lucid dream. At the same time he has to find out how to wake up and make a decision on how to achieve this. Similarly the student has to find out about studies and make a choice. The character runs into situations that are very similar to situations an ID student encounters: he makes a choice for an approach (autonomous) and picks the most fitting way to break in, he talks to experts and hits hurdles on his way to success. Due to the hidden similarities with ID, the game is relatable for current ID students as well. If a prospective student can relate to the current ID students this means he will enjoy the kind of people at ID. This can help make the study choice. This relatedness makes the game more enjoyable as well. During the sketch battle the student can work together with another prospective student and relate to this student.

The student experiences competence because of the small goals that are reached in between: figuring out new information about breaking in and collecting items. By trial and error the player gets to build his own circuit and experience competence by learning something new (only little people have worked with Arduino before). Later on, by participating in a sketch battle,which cannot be lost (as sketch battles can never be lost), competence is also experienced. This is ensured by reassuring the student after the sketch battle that he did very well.

Autonomy is experienced by the player because of the freedom of choice. The player figures out himself that the alarm is the way to wake up. The game tries to prime the player by means of sounds and visuals (a tower, an alarm sound, the tower scrolling with the background, the tower not being part of the main street) just like the game tries to persuade the player to pick the 'Up to no good' choice when talking to shady figures by making them do something illegal (up to no good) and the title of the game. Even though the game has elements that persuade, the player needs to draw his own conclusions and is free to choose his approach to breaking in. This gives the feeling of autonomy, the player feels in control. The set-back is a situation where the player has less control, but this is a good lesson for the player and the sketch battle solution enables the player to be really creative and draw anything he wants (back in control).

Engagement

Prensky (2001) mentions "fun" as one of the twelve elements that makes games the most engaging pastime [6]. Since "fun" is only one of these elements, this section describes to what extent 'Up to no good' meets the twelve elements that make games engaging.

Games are a form of fun
Prensky describes "fun" as something that gives us enjoyment and pleasure. 'Up to no good' provides enjoyment and pleasure by means of the social part where a student can think outside of the box (sketch battle) and by combining this with a new kind of controller: physical actions (actually building something, in this case a circuit, through trial and error) as controler for the game.

Games are a form of play
Prensky lists three definitions of "play". The first definition says that play is something one chooses to do. The second definition says that play is utterly absorbing, and the final definition says that play promotes the formation of social groupings. Whether 'Up to no good' meets the first definition of "play" depends on whether players will choose to play the game. However, it does meet the second and the third definition. The game asks from players to explore and get to know details, in order to find the components the player needs to be immersed in the game (as later described under immersion). The player is persuaded to join a social grouping: ID students.

Games have rules
The rules of the game are set by allowing and not allowing certain actions. The arduino circuit, for example, cannot work before all components are collected in the game.

Games have goals
According to Prensky, goals provide motivation. The goal of 'Up to no good' is to wake up from the lucid dream. Smaller goals are defining how to wake up and collecting items. The main (non-communicated) goal of the game is to reflect on one's attitude and find out if ID is a study that fits the player.

Games are interactive
The player character reacts to the player's actions. The game even goes as far as reacting to what kind of circuit the player has build in real life. The game could only be more interactive by anticipating the player and basing its difficulty levels on this.

Games are adaptive
Prensky says that games are adaptive if they make use of Flow theory. 'Up to no good' makes use of the flow theory as later described under 'Flow theory'.

Games have outcomes and feedback
The game provides outcomes and feedback by means of videos, a set backs and an eventual win.

Games have win states
The game is won after finishing the sketch battle. The player is rewarded with a chance to press the alarm clock and a reflection video.

Games have conflict/competition/opposition
'Up to no good' enables competition through the sketch battle even though a sketch battle can never really be lost or won as it never truly finishes. The game does not enable conflict or opposition.

Games have problem solving
The problem the game presents is on how to wake up from the lucid dream.

Games have interaction
During the sketch battle players are working together to battle a current ID student (non-digital).

Games have representation and story
Prensky argues that representation and story help create emotion. In this case the story is much relatable to the ID student and the situation the student is in (picking a study). Being stuck in a lucid dream is a story that is actually even possible in real life. The actions within the game are logical when following the storyline.

Immersion

Brown and Cairns [7] describe three stages of immersion or engagement: 1. Engagement 2. Engrossment and 3. Total immersion. The level of immersion depends on the timeframe and is controlled by barriers that need to be removed before the next level of immersion can be experienced. To lower the barriers to engagement, the gamer needs to invest time, effort, and attention. The barrier to engrossment is game construction which is when game features combine in such a way that the gamers' emotions are directly affected by the game. The barriers to total immersion are empathy and atmosphere. Empathy is the growth of attachment and atmosphere the development of game construction. To ensure the highest level of immersion the sensory, challenge-based and imaginative components of Emri and Mayra [8] were used as well. Regarding the sensory or atmospheric elements of the game, highly congruent sound and visuals were used. To create the perceptual impact on the user the game uses a large tower as subconscious motivator. Empathy or imaginative richness in the game is realised by the background story and the transition from the virtual world to the real world to do the Arduino task and sketch battle. Finally the challenge-based aspects in cognitive and motor aspects are realised in the mental plan building and construction of the Arduino blueprint, and the building of the Arduino circuit and the sketch battle respectively.

Flow theory

While immersion focusses on the involvement of the player, flow theory focusses on the enjoyment of the experience by perfectly balancing skills and challenges, and entering deep concentration. The following activities contribute to flow [9]: 1. Having clear goals. Even though the goal start out vague, when the player find a blueprint and starts looking for the items the goal is very clear. When this first goal is completed and the player is inside the tower, a clear second goal arises in the additional lock and following sketch battle to open it. 2. Enabling actions that can be adjusted to skill level. The player is allowed to choose between the different blueprint options, of which some are harder than others. When the choice appears to be too difficult, the option to switch to another solution is always open. In the sketch battle a larger skill adjust can take place in the adapting nature of the ID student. 3. Providing feedback on score or progress made. With the use of the inventory and the blueprint the player can easily keep track of the progress. A possible improvement here is the addition of a flashy progress bar. 4. Possessing visual and auditory information or cues that aid concentration and impede distraction. The music is always supplementary and never distractingly loud or different. The calm backgrounds and the cartoon level of detail facilitate concentration and impede distraction.

Knowledge, skills and attitude

Games are great at creating situational models of the knowledge on hand [10, 11] because expert aspects are integrated in the situation. Mental skills are easily learned with this situation model, practical skills are not greatly positively impacted as the game does not show any exact procedures. The following aspects are applicable [10]:

Knowledge - "Knowing the situated understandings"
The player has to make a plan in order to break into the tower and set the alarm clock. Having various options to achieve this goal, using the Arduino components, teaches the player he has to create a strategy. After creating this strategy the components have to be found at the different locations in the game. This harbors the lesson that the student will have to explore the game world and investigate all possible locations to find the right components to achieve the goal. When all the components needed for the solution are gathered the circuit has to be build. Within these elements of the game students gain knowledge on various elements such as communication, cooperation and unexpected set-backs.
When the player climbs up the tower to set the alarm he encounters another lock, this resembles a set-back. This set back occurred even though everything appeared to be going well. In order to break into the second door creative thinking and problem solving is needed. These elements are integrated in the game in the shape of a sketch-battle.
During the game the player gains information on electronics, arduino and industrial design. The last of these being secretly implemented by discussing parties of the study association and previous student projects as if the NPC's are ID students working on these projects. After the player succeeded in building the circuit and completing the sketch-battle the will see a reflection video. In this video the game is being compared to the bachelor ID.

Skills
During the game the player trains skills such as problem solving by making the plan. Creative thinking by sketch battling and choosing one of the three ways of breaking in. Communcation and collaboration by means of sketching. The player is triggered to talk to experts (shady figures) and be pro-active.

Attitude - "Powerful entities"
The powerful entity with which the player comes in contact in the games is situated in the reflection video in the end. The concept of following your dreams will create happier and more successful students as it will guide them to their true calling and provide unlimited creativity.

Knowledge and skill retention
Text based knowledge decays over time but the situated understanding of the model which is created in games is persevering through time. When games are supplemented with conventional instruction methods the knowledge outcome is highest. For the game the conventional methods exist along the lines of "meeloopdagen", open days and the website of the TU/e. The effectiveness of combined games and conventional instruction is about 50%-60%.

Gameplay influence on attitude
Several persuasive elements inspire the change in attitude towards the daring to act on dreams, which is central to the game. It is known that games are fantastic at facilitating a change in attitude, effectiveness is close to 100% [12]. The effectiveness of the knowledge attitudes is explained by the formerly mentioned engagement theory and the self-determination theory, and by the following persuasive design.

# Persuasive design

Story Structure

Suspense can be caused by uncertainty about the outcome and can be evoked even when readers know how the story will end [13]. Foreshadowing is applied in forms of the silhouette of the large clock tower and in the behaviour of the criminal NPC who is trying to break in. In the introduction video the alarm clock that is seen in the tower is also specifically shown and heard. To trigger the player tell the NPC's he is up to no good the game is even named 'Up to no good'. This creates some feeling for how the game is supposed to end, but it is by no means clear. As a result both suspense and curiosity will be evoked.

The game follows the dramatic arc and starts with a build up of the action during the search for all the different parts needed to break into the clock tower. Especially the betatechnicians will be fascinated by the different parts and their function. When the player finally enters the tower the action reaches a climax as the battle with the ID student, to gain entrance to the clock in the tower, commences. After the battle a special designed video will be played as a form of resolution and reflection. The aim of the reflection is to check whether the player finds himself suited for the ID study, but also to generate a transformation for daring to act on a dream. The human oriented generalists will most likely be more susceptible to this message as they are focussed on personal development and philosophical views while the betatechnicians need some more time. Discussion after the completion of the game between the two different groups prospective students will increase the understanding and retention of the message.

Persuasive impact

Engagement (partly by immersion), credibility and relevance make up the attitude towards the virtual representation as seen below [see figure], and increase the impact of persuasive gameplay on a macro level [14]. Engagement is explained in the paragraph before. Credibility is achieved by using a solid and effective story arc, and by a high congruency of the aesthetics elements which are partially based on real life associations. The relevance is already high as prospective students are trying to figure out whether they like the study. An increased interest is generated by creating relations with the teamplayer or socializer[15, 16] during the sketch battle. It also makes several concepts more important by introducing important aspects and other solutions which the player might not have yet considered. The purposefully slower video in the end after the sketch battle has the goal of reflection on the game. The player will be more affected by the game with the use of this deep learning/flow paradox, meaning he will reconsider the game, the inspirational message and study choice extra thoroughly. As mentioned the betatechnicians will view this as a broadly applicable tasks and the human oriented generalists will view it as personal development.

Persuasive Gameplay Experience Model (Kors, 2015)
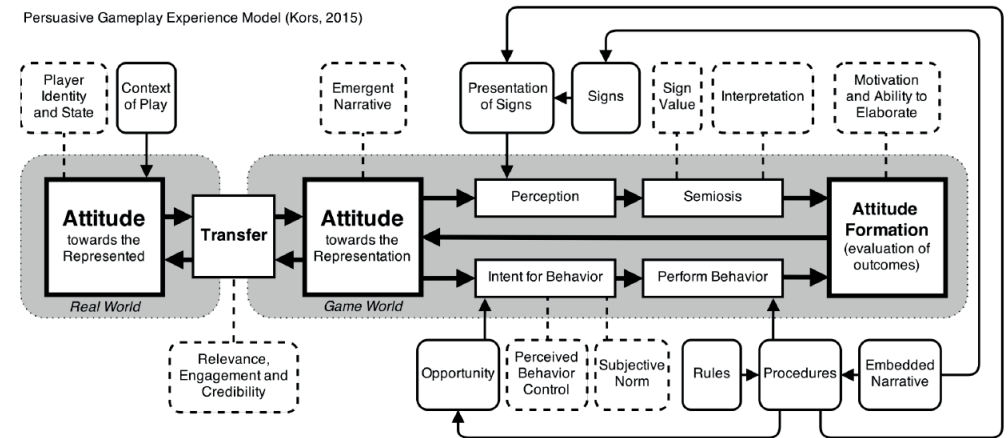
Reinforcement

The game makes a little use of operant conditioning. When an item is picked up a satisfying sound will be played. A deeper reinforcement is the information the player gathers from the shady NPC's. The final video encourages the player to keep dreaming and dares him to act out these dreams, it is the final positive reinforcer in the game.

The pattern of items in the game follows the trend of variable ratio. The number of items is known but the locations are varied. This schedule is best for maintaining behaviour so the player will be assured to finished the search for all items. The overarching core reward is the tower with the alarm which is visible in the distance, it is rare and very long-term.

Intrinsic motivation
Intrinsic motivation theory describes three main factors in curiosity, fantasy and challenge [17].
Challenge is applicable to goal of the game which is personally meaningful for the student as it is an indication for his study preference. The outcome of the game is uncertain as there are many applicable solutions and even real life tasks. Some solutions are harder which create a higher difficulty and the sketch battle difficulty is adaptable by the ID student. This way it is challenging but also considerate of their self esteem.

Fantasy elements are rich and intrinsic, meaning they are related to the skill which is being used. The student searches for components with which to build the Arduino circuit. The general inspirational message of the game about daring to act on a dream is constructed with metaphors in the game. This more philosophical message and the diversity in solutions makes the game difficult to predict. At the same time the references to the dream are very much in line with reality: Lucid is the study association of ID and the interactions that are encountered in the dream world are very similar to the ones happening at industrial design.

Curiosity mainly taps into the cognitive aspect. The knowledge structure is complete, consistent and relatively parsimonious. The feedback from the game the player receives is surprising in the sense that it is unknown what the goal is, so any information is unexpected but useful to construct a goal on their own.

Human motivators
Dr. Steven Reiss proposes 16 basic human motivators of happiness, these are discussed in source [18]. In games players encounter emotions which are closely related to these main underlying motivators, and thus the theory can also be applied to games. The following motivators are closely resembled in our game:

Power
The player wants to influence the outcome of the game. The battle for waking up gives you a feeling of empowerment considering the game wants to keep you asleep. Being victorious in the real life elements will harbor the largest gain of the power motivator.

Curiosity
The ending and course of the game are uncertain due to the creativity the player needs, and the philosophical and real-life elements of the game. The quest to search all the parts encourages the curiosity motivator further.

Saving
The player collects and saves items throughout the game to find a solution to the dreamy problem. The saving motivator has an extra real-life element in the assembly Arduino parts which is congruent with the in-game items.

Vengeance
Vengeance, or assertiveness exists against the game which has imprisoned you in a different dimension (captured by ID) and against the ID student versus whom the player has to sketch-battle.

Tranquility
The philosophical component of the dream versus reality challenges the player's state of mind. The creativity in the apparent dream world stimulates prospective students to let their dreams adrift in future problem encounters.

Social contact and status
Social contact exists in the cooperation with the other player to defeat the ID student in the sketch-battle. The completion of the game, the successful assembly of the Arduino and winning a sketch-battle from a current student are all achievements that will boost social status.

Improvements

Currently, the game merely consists of all resources and macros to set up the design we have documented in this report. What still needs to be done consists of: populating the game world with NPCs and building interiors, both of which can range from slightly to very interactive. Most of this comes down to dropping down a prefab in Unity, adding a copy of an interaction script and filling in a few fields according to the design specifications. Macros for showing cut-scenes still need to be made, and the design for the endgame has to be detailed within the engine context to make implementation manageable. Finally, the game needs to be playtested properly and tweaked on the feedback. After this, we can claim to have a serviceable realization of our design ideas.

Besides the additions in the game to make the game playable and appear as it is described in this report a few more improvements can be made.

A progress bar can be added to show the player how far in the collection process he is. These continuous small predictable rewards provides immediate and frequent feedback and hereby motivate the player to keep going.
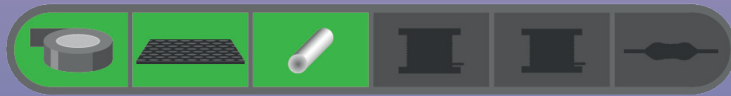
The difficulty level of the arduino circuit should be based on the experience of the player, ensuring that the game stays challenging but also manageable within time.

As the game is mostly aimed at the exploring player [15] the game can use more exploratory elements such as small animations behind windows and in stores. In stores also more items should be able to be picked up to ensure that there is enough to explore (not too much more items, as this increases the timespan of the game drastically).

A fun dynamic that can be added to make the game more challenging and surprising is adding a time limit and giving the components that need to be collected personality traits. The resistor for instance offers resistance and therefore gets lost.

To make the game, which is in storyline already very relatable, more relatable to the player the player should be able to customize his character. This way the player can relate better to the character. Plus choosing what to wear and how to put your hair is fun because it gives the player more control. This leads to increased autonomy.

To ensure that the player learns about its possibilities regarding interaction he should be placed in a situation where there is no other option when starting the game. This can also be achieved by a mini tutorial which might be more fitting to the game than just handing the player random knowledge. Giving the player a mission that incorporates all different kinds of interactions; right at the first shop he is in, during the introduction, convinces the player to try out different interactions. The player needs to learn a door can be opened, he can talk to NPC's and he can pick up items.

Personal reflection

Leo

Although I have read up on matters of serious games before, the course neatly filled in the most important blanks for me. Considering the vast amount of information floating around on the subject and the, often subjective, nature of the material, having a clear cut course on it was certainly a welcome change. Although the theory seems generally useful, I did find myself somewhat hard pressed to actually apply it. This is partly due to the flexible nature of most theory, while it is flexible, I find myself forcing conformity to a rigid interpretation rather than allowing it to shape mutually. My primary takeaways from this course are the general thought pattern to take when learning more about the subject, rather than the contents itself, and I have deepened an interest in making games with purpose.

From working on a game development project for a second time, I learned that it might be a good idea to step outside of my role as a programmer more often. As it stands now, my communication could use more experience from other perspectives, as well as the degree to which I can contribute to the earlier phases of development. I intend to attend "Design for Games and Play III" and take a more design-centered role.

As with the first game project, scoping came up as an issue again. Between the long time it took to come up with a concept, the fact that the end of the quartile should land on the second iteration, and our low experience with the tools used, we clearly over-scoped. This would be less of a problem, if the game as a whole was suitable for a vertical slice, sadly this is not really the case. As lead programmer, I also found that a lowered amount of passion for the project and no real secondary programmer to bounce ideas off was a severe detriment to productivity and efficiency of implementation. In such a situation, it is better to keep the team informed of realistic estimates rather than optimistic ones.

Floris

The second course of the game design traject focusses more on the serious and educational aspect of games. This is a subject which is personally very appealing to me. In my masters I am looking forward to working with VR in, probably, a serious game setting. I think it is fascinating to read scientific literature instead of books which have been written ages ago, it really makes the field of expertise feel alive and present-day.

On to the specifics of the project. From the last course I still remember that I find the distribution of work on a game very challenging. This is due to the role divisions which usually take place which also make hard to create a good timeline. While the different iterations were well manageable in this particular project, I still experienced some hardship later in the development process. A solution which I think of now would exist in the production of simple placeholder art to use in the game. This makes it easier to develop the game since you have a feeling of where it is going and eases the timeline. I still need to think of some other solutions as I think a problem is that the expertises are quite far apart, which makes it harder to have a clear overview and plan.

Regarding the tasks, I helped a bit with the coding, did most of the sound effect and focussed on the theory of the course in the game and report. I originally aimed at picking up a larger part of the coding but this didn't go as smoothly as hoped so I picked up my slack by picking up other tasks. I always try to keep a good schedule and turn up the pressure when things are not progressing, but for the reasons mentioned before I had a challenging tasks in that in this sort of project. The take-away from the game is partly the plan to do extra self teaching if skills are needed. I started a bit late this time and could have arranged this better and more effective. The application of the theories on the game was nice exercise and really gave me a deeper understanding of the concepts. I feel like the development of a general framework which regards all the different aspects of persuasion, engagement etc might be useful for the following development of games. In the following development of games I would like to be more allround busy with the development, even though this might result in a less efficient or good end result I feel like I could learn a lot from combining the different views and the switching between these.

Marisya

During the course "Design for Games and Play II" I learned how to implement persuasive elements into a (serious) game. At the start of the project I expected to learn how to work with Unity and how to implement the theories learned during the lectures in a game.

The design process started with deciding a study and therefore a target group. Working in a group with different backgrounds made us able to look at the concept and design from different angles since everyone has a different expertise. During the process it was decided to create a game that could actually be used during an introduction day for

Industrial Design. In order to achieve this goal we had to use all the different expertises in the group. Michelle and I, as Industrial Design students, focussed on the concept of the game, implementing persuasive elements in the concept and creating all the artwork. The other members of the group focused on developing the game in Unity, creating a dialogue option and animating the characters. Due to this reason I was not able to focus a lot on creating the game in Unity. I was not able to keep up with the group members who already had this knowledge, therefore I decided that I had to learn how to work with this program at my own pace and focus on my expertises in this project. For this reason I created all the different interiors of the shops and houses, the characters and the animation video in which the glass of the tower breaks and the character is running up the stairs. Focussing on my expertise did not mean I did not learn new skills. While creating the visuals for the arduino circuit I learned more about the different electrical components, how to read a resistor and the arduino circuits. Besides this, I had never created an animation in After Effects before. Moreover I was able realy understand the theories learned during the lectures and implement this in the game.

Within the course I liked the combination between learning theory and being able to implement this right away in the group project. Working in a group with different backgrounds worked well, however communication was not always easy since everyone uses their own expert terminology. In the future I would like to work in a smaller group, this would make me able to work on all different aspects rather than dividing the tasks and focus on some. I am confident I will be able to use the theories learned in future projects.

Michelle
In "Games and Play I" I learned many useful theories when it comes to game design. I had the luck to be able to implement these in my project and within this course. During this course I expanded my knowledge and learned some new theories that connect to the previous theories.

In the previous course I enjoyed working on the game design, the story and the artwork (and a little bit of code) and therefore I aimed for this to be my function within this team as well. By focusing on the story and game design I ensure that I have the opportunity to directly bring the new knowledge into practice.

I noticed that just like last course the game included physical elements and input (Arduino) and social elements. I believe those elements to be fitting to my approach to game design and fitting to my vision that is focused on fun and social life, play and learning. I aim to think outside the lines of the digital box and set high expectations for myself. Together with Marisya I focused on the game concept, the story, the art and the background of the target group. This teamwork went very well and we incorporated lots of theory and small details into the game.

The game references to Industrial design secretly through word-play and we had a lot of fun designing the game. The artwork, video's and details (circuits etc.) were a lot of work but this would have been worth it if we would have been able to fully finish the game.

We worked out a game concept that I believe to be a good concept. And because there is no 'kill' the player is free to explore the world without consequences. The player starts in a safe zone. But the player has no ideas about the control and that is where our concept should be improved: How can we, with subtlety, teach a player that he can interact with creatures, doors and objects? In class we discussed tutorials and 'almost death' scenario's where the player does not have another option. But in this free and explorative game I find it hard to define how to 'teach' this to the player. I believe in this case I can learn from existing games and therefore I should do some research.

The plan to research games can also help me communicate with the team. In the team a few hard-core game fans used hard-core game terminology which I do not know. Even though I know the persuasion theories and fun theories, making games involves more terminology that I need to look into to fully understand what everyone is talking about.

Even while writing this, I have no idea on what the game looks like in the programming file. Even though our continuous effort to ask the team to report on the progress in the programming the reports are ensuring us that the game will be done in time. Now the game only has to be fused together but a lack of time hinders us from doing this. The concept of the game after the midterm stayed very constant and our split in two teams should have enabled us to have everything done in time. Sadly this is not the case. I believe if the game would have been programmed using placeholder sprites, at the same time Marisya and I were creating the final art, there would have been enough time to make it

work. Next time I want to see the progress of my team members working on another part of the design as I can than make a reasonable estimate on the achievability. Further more I want to make use placeholder sprites until the final artwork is done.

Emre
After the first course I already started looking at games differently. I was recognizing more development choices. In the second course this knowledge is increasing with more theory, such as persuasion and the reward system. The second assignment was a great way to start thinking about reward structures in games. It was interesting to create a serious game concept that could possibly help patients recover from serious disabilities. At the start of the course I thought it was difficult to create fun serious games. I still do think it's very challenging, but possible, especially with the theory provided.

I felt like we the main project was too restricting. Developing a game that would help convince students on their study choice was a difficult task. What learning goals are important, how difficult should these goals be and how do we meet the expectations of the student. As a group, we had multiple creative minds that all had different ideas. That made the brainstorming very creative, but time consuming. Throughout developing the game, we changed a few concepts, which led to less time to develop the game.

I helped a bit with the coding and focused on animating the characters in Unity. I did not even know it was possible to create cool and smooth animations without the use of sprites in Unity. This was a fun skill to learn and practice. It was great to see cool characters drawn by other group members come alive. A big downfall was that we had too much ambition and confidence in developing complete game. One of our group members spend a lot of time in coding the backbone of the game to drive all the features we thought of, but in the end, we were short on time to put the game together. In the end, it would have been better to create a simple demo game that outlines and sells the main concept of the game.

Ultimately it has been a good learning experience, both theory and practice wise. I think it was too ambitious to try and create a complete game from scratch (including the artwork) with the amount of time that we got for this assignment. Therefore, keeping better track of time and development will be key for the next project. As someone who's still relatively new at developing games, I've learned new skills and knowledge for the next project.

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