Game Elements

Introduction

Game can be structured by means of game elements. Game elements are like building blocks that are needed for creating the game experience. Not all of them are necessary conditions for the game. Any element that can be found in the game is the game element (Deterding, Dixon, Khaled, & Nacke, 2011). But what elements the games can have and how to use them in game design and in gamification?

Based on literature review following game elements were found. They are listed in alphabetical order. The size of the word reflects how frequently it was mentioned in the literature

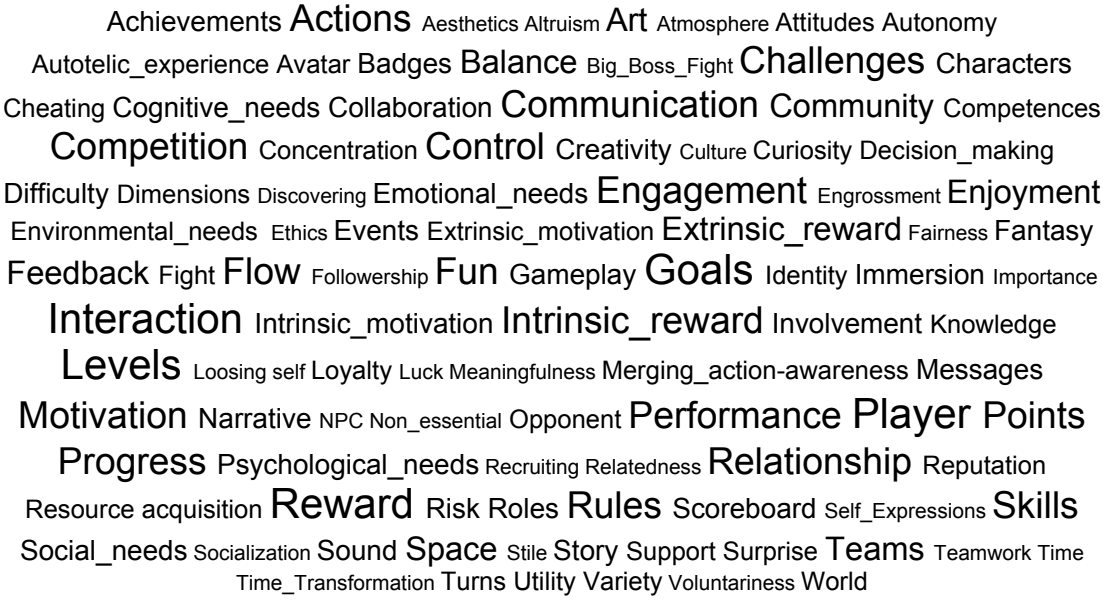

Figure 1. Tag cloud of game elements.

In following section every game element is described in details. Also examples of implementing game elements in educational conditions are introduced.

1 Achievements

Achievements are kind of goals but usually they are the combination from **challenges**, **rewards** and **progress** (Fitz-Walter, Tjondronegoro, & Wyeth, 2011). Usually it is a complex set of game mechanics for tracking the user behaviour in the game. Based on collected information **points**, **bonus challenges** (mini-games) or **time** (different gameplay modes – limited time, higher difficulty, multiplayer, etc.) can be offered. Achievement systems are **reward structures** that provide additional goals and playtime in videogames (Montola, Nummenmaa, Lucero, Boberg, & Korhonen, 2009). This is an easy method to increase the playability (extend the play time) of a game. Examples of achievements are: **tutorial** (try out); **completion** (progress, sub-goals, challenges), **collection** (resource acquisition); **virtuosity** (achieving skills); higher **difficulty levels**; special **play stile** (limited time, avoiding violence); **loyalty** (accumulate play hours); **curiosity** (discovering hidden functionalities); **luck** (get items randomly); mini-games and multi-player (Montola et al., 2009). Players are rewarded by the collection of achievements and by the social status presented to others. To take all this into account achievements are extra layer in the top of game mechanics where all game elements can be combined with each other in many different ways.

Figure 2

2 Actions

Actions are part of the gameplay. Actions are needed for overcoming the challenges. E.g. jump, talk, shoot, pick up, etc.

3 Aesthetics

Game aesthetics is a visual and audio language that is used for presenting game objects in the game environment. It is related with physical aspects like **spatial dimensions** (2D or 3D), **scales** and **borders** but also with the **artwork** and the **style** of the graphics that all together generates special atmosphere (Adams, 2009). For implementing game aesthetics in educational conditions VLE can be designed as game world. Another method is to use single graphical elements for presenting separated game elements. For example, the use of virtual tree for representing the students' progress (Cronk, 2014). The condition of the tree presents how well does the student performs.

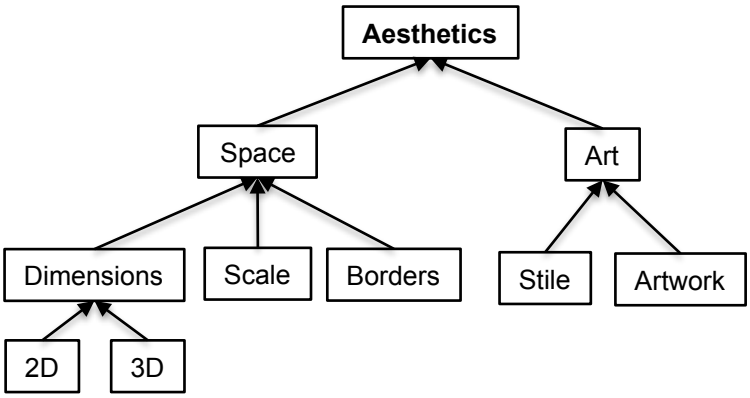

Figure 3

4 Altruism

Altruism is based on the desire to maintain relationships with others. It is related with providing help or gifts (Antin & Churchill, 2011). Gifts are used for attracting new players by the inviters. Altruism can be related with the economical challenges – students can offer items collected during learning assignments (not points and grades) to fellow students.

5 Art

Art is part of the game aesthetics. Art is usually synonym to artwork but it also includes the stile. Mostly it means graphics but also the music and sound effects are art.

6 Atmosphere

Atmosphere is generated with the help of artwork and the style (Adams, 2009).

7 Attitudes

Attitudes are part of motivation (Schultheiss, 2001).

8 Autonomy

Autonomy is the ownership of one's action (Wang, Khoo, Liu, & Divaharan, 2008), related with self expression and creativity (Bunchball, 2010). Also with controlling himself.

9 Autotelic experience

Autotelic experience means doing something on its own sake (Brühlmann, 2013). Autotelic is an entity or event that contains meaning or purpose e.g., meaningful activity. According to Csikszentmihalyi autotelic experience and flow are the same concepts (Csikszentmihalyi, 1990). Experience is autotelic when it is based on **intrinsic motivation** – activity is rewarding on its own. This is the end result of other eight flow dimensions (Csikszentmihalyi, 1990; Tenenbaum, Fogarty, & Jackson, 1999). For some researchers flow has several equally important by-products or indicators: action-awareness merging, losing self-consciousness and time transformation (Beume et al., 2008; Brühlmann, 2013). And according to some references autotelic experience is input or pre-condition for flow (Hamari & Koivisto, 2014). Hamari and others justify it by claiming that intrinsically motivating activity should be pre-condition for the flow.

10 Avatar

Avatar is players representation in the game, players' character (Adams, 2009), part of self expression (Gee, 2014).

11 Badges

Badges are virtual goods that have visual representation. They are awarded to users after completing certain **challenges** or reaching to **achievements** (Antin & Churchill, 2011). Badges can be used for setting the **goals**, sharing information (**feedback**), representing user's **status** or reputation and support **group identity**. Badges are used as **reward** in digital games and in social media environments. They are also common in educational conditions (e.g., achieving smiles for good behaviour). It is difficult to say are the badges intrinsic or extrinsic motivators. In one hand, collecting badges or trophies is similar to collecting points (extrinsic). On the other hand choosing between different badges (selecting challenges to achieve) is rewarding by itself (intrinsic). If the badge is seen as extrinsic reward it may have a negative effect on intrinsic motivation (Antin & Churchill, 2011).

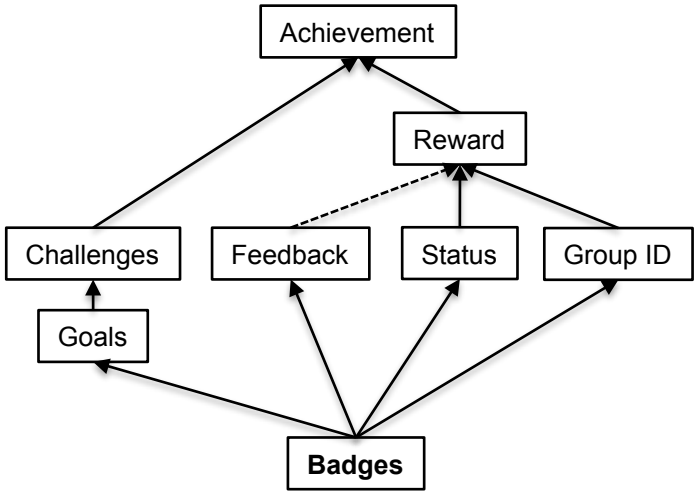

Figure 4

12 Balance

Balance in the games is related with many design aspects like **meaningfulness**, **randomness**, **fairness**, **difficulty** and **feedback** (Adams, 2009). Psychologists focus on finding the balance between difficulty of the **task** and user **skills** to keep them away from the boredom and anxiousness – in the zone of flow (Csikszentmihalyi, 1990). To keep players in the zone of optimal experience the perceived difficulty should be constantly increased during the game (Adams, 2009). Tasks are achievable but with reasonable amount of effort. Game designers focus also on avoiding dominant strategies and balancing the game rules (Adams, 2009). When gamification is used in educational conditions instructional designers have to find balance also between gaming activities and educational content (Johansson, Verhagen, Åkerfeldt, & Selander, 2014). There is a risk that too much effort is put on the play and important information is not achieved (Hawlitschek & Köppen, 2014).

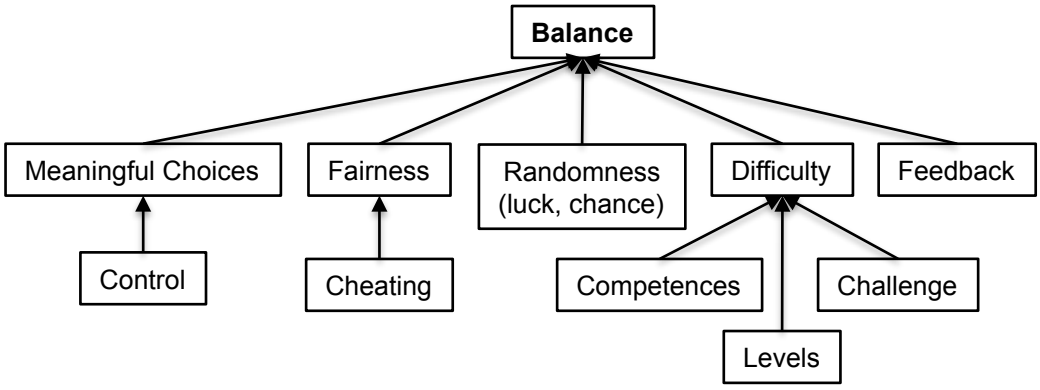

Figure 5

13 Big Boss Fight

Big boss fight is a final, usually bigger challenge in the game.

14 Challenges

Challenges are game tasks or exercises. Depending on genre games can have physical, economical, conceptual, tactical, logistic, exploration and logic challenges (Adams, 2009). Most of the educational exercises are related with the conceptual and logic challenges. The easiest method to implement game like challenges is to design exercises like quizzes that require active interaction and participation (Cheong, Cheong, & Filippou, 2013). When project or problem-based learning is implemented, students can plan and choose between different strategies. Some organise physical activities combined with learning tasks for activating students (e.g., mobile learning guided tours) (Hansen, 2005). Economical challenges can be related with game-like assignments where students collect items for solving exercises. Those items can be used in the next assignments (e.g., materials for crafting) (Sheldon, 2011).

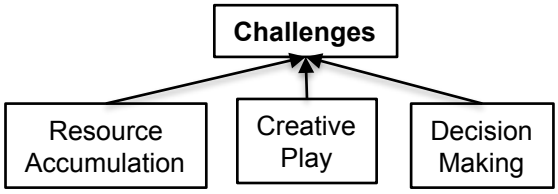

Figure 6

15 Characters

Characters are **avatars** – players' representation in the game world and non player characters (**NPC**) or artificial intelligence agents (AI) (Adams, 2009) and their **roles**. They are important factors in the game **challenges** or **story**. When implementation of the NPC in educational conditions requires game like virtual environment (Duch, Petit, Rodríguez-Carbonell, & Roura, 2013), the avatar design can be related with on-site classroom activities (Sheldon, 2011) or with the design of user profile in the VLE. Avatar can be related with the character growth and game story that can lead to the deeper immersion with the course activities (Sweeney, 2012). Avatar design is part of the self expression (Adams, 2009). Researchers have found that people like to play with their identity (Hancock, Toma, & Ellison, 2007). It may also increase the sense of presence and active participation (Mazlan & Burd, 2011).

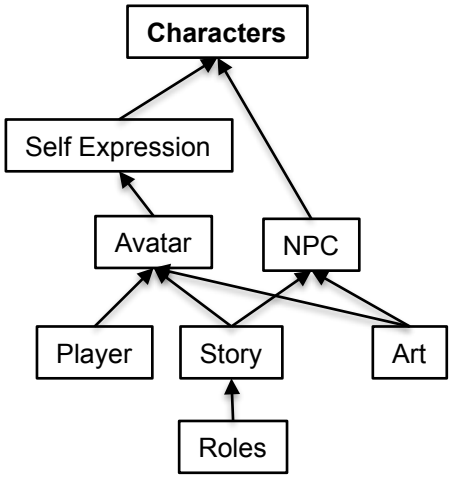

Figure 7

16 Cheating

Cheating is one aspects fairness (Adams, 2009).

17 Cognitive needs

Cognitive needs are intrinsic motivators like achieving goals and feeling competent (Zhang, 2008).

18 Collaboration

Cooperation is a form of **interaction** between two or more players with different objectives (Nash, 1953). The motivation for interaction can be **fun**, participation or **challenge** (Kiili, Perttula, Arnab, & Suominen, 2014). In cooperative games players try to achieve win-win situations (Zagal, 2006). In **collaboration** players join their efforts to manage a challenge that is too difficult to achieve for the single player (Azadegan & Harteveld, 2014). They have same goals. In collaborative games players form **teams** and teams compete with each other or against the game environment. When most of the games are based on competition, the collaboration mode is used in party based interaction models or in role playing games (Adams, 2009). Game-like collaboration models can be used for improving teamwork in learning conditions (Knutas, Ikonen, Maggiorini, Ripamonti, & Porras, 2014) and in workplace (Vegt, Visch, de Ridder, & Vermeeren, 2015). In educational conditions cooperation or group work can be used if more active interaction and participation among students is desired but learning exercises don't provide opportunities to distinguish clear roles. Cooperation and teamwork can be used when the content of the task allows definition of responsibilities and roles (e.g., in project based learning).

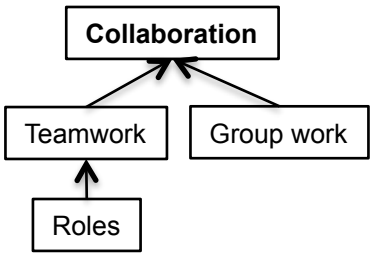

Figure 8

19 Communication

Sharing information, part of socialization.

20 Community

Group of players with the similar interests.

21 Competences

Competences are skills, knowledge and abilities. Different players have different intrinsic skills (Adams, 2009). Measuring the previous competences is strongly connected with balancing the game experience – providing suitable challenges. Game is engaging when player is requested to gain new competence in order to overcome the challenges (Shernoff, Hamari, & Rowe, 2014). Users' skills and increasing the level of knowledge are important factors in competence-challenge balance (Admiraal, Huizenga, Akkerman, & Dam, 2011). Competences can be achieved through different challenges (e.g., physical challenges develop hand-eye coordination, logical challenges develop conceptual thinking, etc.).

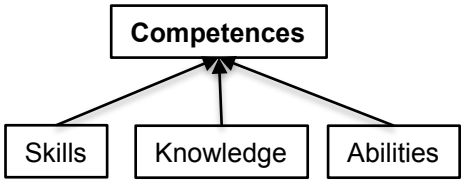

Figure 9

22 Competition

Competition is the easiest way for implementing gamification, for example, through asking participants to collect points and to list them in scoreboards but not all games are based on competition (e.g., simulators). Also learning activities can be designed as a competition or fight. For example debate between two students or teams can be designed as a fight (Sheldon, 2011). Although comparing students by learning results is not seen as a good instructional design, Game Theory and Competition Based Learning are used for increasing the students' involvement (Burguillo, 2010). Some instructional designers use graphical elements for avoiding publishing students personal learning data but still implementing friendly competition among students (Cronk, 2014).

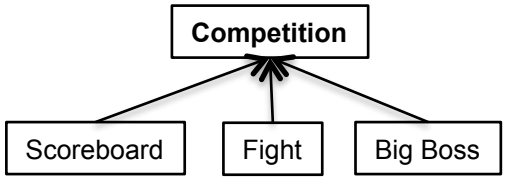

Figure 10

23 Concentration

Concentration can be a condition for generating the flow if it is related with avoiding distractors (Fu et al., 2009; Moneta, 2012). Some describe it as one of the flow outcomes - total concentration on the activity appear during the flow (Jackson & Marsh, 1996). Meaningful tasks (reasonable options and choices), clear goals and feedback support concentration (Salen & Zimmerman, 2004). According to Csikszentmihalyi intense concentration (together with absorption) on the task is a flow (Admiraal et al., 2011; Csikszentmihalyi, 1990). When the complete concentration is required users don't have cognitive resources for irrelevant information (Kiili et al., 2014). They stop worrying about other issues in everyday life (including self and time). Experience is enjoyable if the concentration is needed (Sweetser & Wyeth, 2005). For supporting the concentration extrinsic and intrinsic **motivators** can be used. During the longer activity concentration decreases (Pekrun et al., 2010). For supporting the concentration environment should provide diverse opportunities (**variety**). At the same time participants can develop the ability to stay focussed on any task in hand (e.g., practicing yoga). The permanent concentration is similar to the addiction. Although the compulsive qualities are similar concentration is different from the addiction because participants has control over the outside forces (Salen & Zimmerman, 2004).

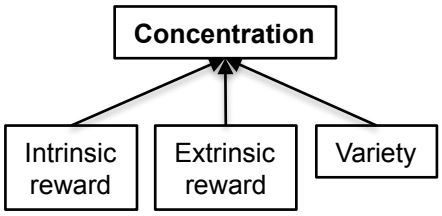

Figure 11

24 Control

Potential for control is one of the flow enabling factors (Csikszentmihalyi, 1990). At the same time participants can sense being in control as an outcome of flow. It is also called the paradox of control where user has a sense that she has a control in an uncertain situation (Salen & Zimmerman, 2004). A sense of control is experienced without the need of applying it (Jackson & Marsh, 1996). While feeling the sense of control participants stop worrying about the failures and this feeling is liberating. Some authors state that control can be the requirement and also the outcome in the model of flow – providing conditions for the control (chance of failure) can generate the flow and when flow has achieved participants feel the sense of control (Kiili, 2005). In most of the references control is described as input dimension for the flow. It is described as the ability to exercise control over the activity (Csikszentmihalyi, 1990). It is believed that control (by taking actions) keeps the flow alive if it was generated with the help of other factors (Brühlmann, 2013). Some researchers use the term of **autonomy** - the ownership of one's action (Wang, Khoo, Liu, & Divaharan, 2008) in parallel with the concept of control (Brühlmann, 2013; Fu, Su, & Yu, 2009; Jennett et al., 2008). Autonomy is related with self **expression** and **creativity** (Bunchball, 2010). The control is more generic term because it can involve the control over the self or others (power) (Pintrich, 2003).

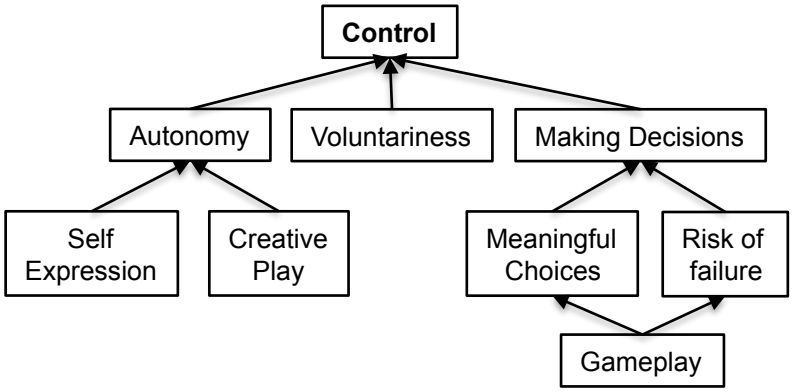

Figure 12

25 Creativity

Creative play is related with the possibility to design game elements from smaller items like weapons and vehicles to entire game words like game levels. In the construction and management game genre main challenges are based on creativity (Adams, 2009). Creative play is similar to the problem- or project-based learning or to inquiry-based learning where the starting point (problem or idea) is set but the outcome can be different – depending on the selection of content and methods.

26 Culture

Culture and cultural aspects are pat of the game world (Adams, 2009).

27 Curiosity

Curiosity is one of the entertaining (Malone, 1980) and motivational factors.

28 Decision Making

Making decisions is central part in all game challenges (Costikyan, 2002). Even shooting games are related with the decisions like run or attack. In the strategy games all challenges are related with decisions. Players are forced to make decisions in order to proceed. Decision-making is part of the interaction. In some genres decision-making is related with moral choices (ethical aspects of the game). Researchers have found that games can teach making decision (Prensky, 2007) because they generate safe environment for failing. Business simulators are classical examples of using games for learning decision-making through authentic tasks (Kiili, 2005). Games teach to take risks (Prensky, 2007). Usually, players fail with the mission several times before they reach to the goal. Although teachers have access to educational patterns like Three Bears, Mission Impossible and Mistake (Bergin et al., n.d.) that try to reduce the students' fear towards failure, traditional schools are punishing and discouraging students for failures with negative grades.

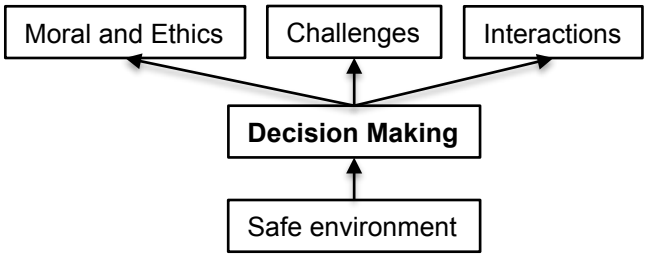

Figure 13

29 Difficulty

Difficulty is one factor of balance that is needed for autotelic experience (Csikszentmihalyi, 1990). The difficulty of a challenge can be presented in several ways. **Absolute difficulty** refers to the skills that are needed for solving the challenge (e.g., how many hits are needed before the opponent falls down). **Relative difficulty** is related with the power that is provided to the player (e.g., what is the players health level – how many hits he can take). **Perceived difficulty** is affected by the player's previous experience (how skilful she was before starting the game). For balancing the game's perceived difficulty it should increase during the game because users' skills are increasing (Adams, 2009). One method for increasing the difficulty is implementation of **time pressure** or limiting the time that can be used for next challenges. Another method to change the difficulty level is to change the energy or intelligence level of non-player characters (NPC's). In educational context management of difficulty of the learning is widespread. It can be achieved through scaffolding, ordering the study content by the complexity or by specifying the difficulty of exercises.

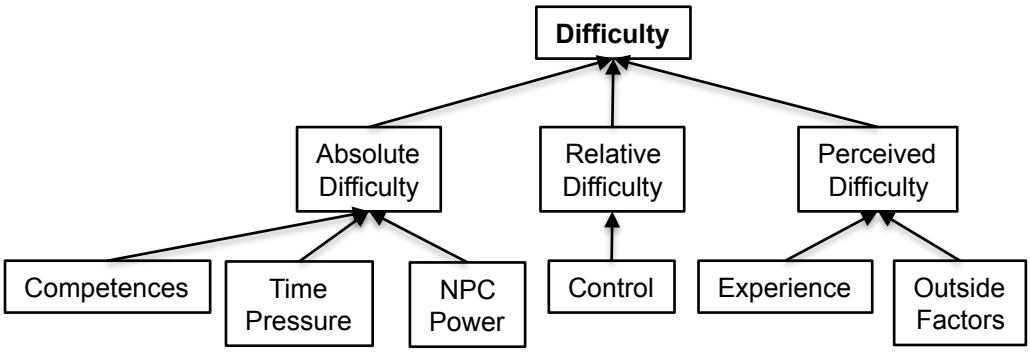

Figure 14

30 Dimensions

Dimensions are spatial aspect of game graphics and world(Adams, 2009). E.g 2D, 3D, 2,5D.

31 Discovering

Discovering is example of challenges or achievements (Montola et al., 2009).

32 Emotions

Games are good for creating emotions among players. Those emotions can be created through **gameplay**, **storytelling** or **socialization** (Adams, 2009). Positive emotions like **surprise**, **curiosity** and **thrill** are good for motivation. Some players are motivated by the possibility of feeling control over the process. Others like games because they are safe environment for feeling negative emotions like **agony**, **frustration**, **greed** and **fear**. Unpleasant emotions can be experienced as pleasurable if they are needed for completing the task (Ermi & Mäyrä, 2005). Emotions arise as a response to stimuli. Emotions can be **intrinsic motivators** for starting the interaction and they can be also the outcome of the interaction (Zhang, 2008). Emotions can be generated through the intensive interaction between students or through social factors like recognition (liking, commenting, etc.) (Koivisto & Hamari, 2014).

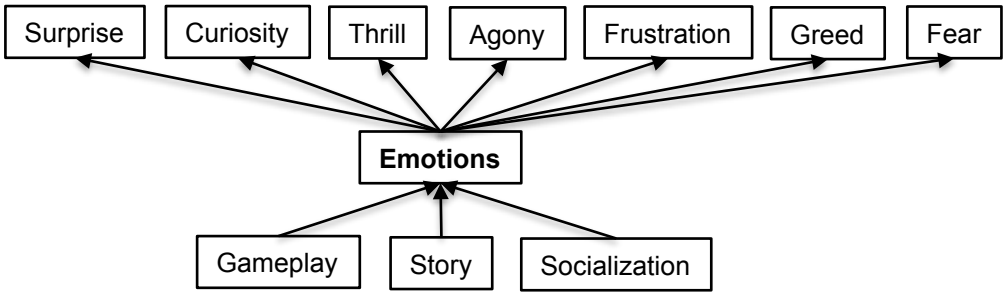

Figure 15

33 Engagement

Engagement is to keep participants active with the assignment or activity. It can be generic indicator of involvement (Brockmyer et al., 2009). According to some researchers engagement is the lowest level of involvement and immersion (Brown & Cairns, 2004). In digital games engagement can be achieved through factors like: **fun**, **socialization**, **identity**, **challenges**, clear **goals**, **rules** and **feedback** (Cheong et al., 2013). Engagement is achieved when the users'

preferences are met (e.g., game genre or challenges are suitable for the player) and when the controls and feedback correspond in appropriate way (Brown & Cairns, 2004). Engagement can cause losing the sense of time.

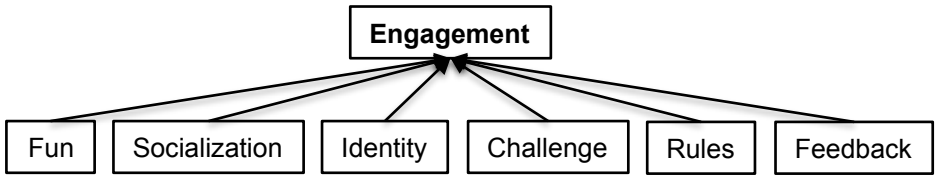

Figure 16

34 Engrossment

Engrossment is one of the involvement levels (Brown & Cairns, 2004; IJsselsteijn, Kort, Poels, Jurgelionis, & Bellotti, 2007).

35 Enjoyment

Enjoyment is a positive feeling of pleasure caused by doing something we like. In general when our motivational needs are fulfilled we feel enjoyment (Zhang, 2008). The easiest way to experience the enjoyment is to conduct **intrinsically motivating activities** (Csikszentmihalyi, 1990). In educational conditions enjoyment can be achieved through **demonstration of competences**, **creative** accomplishments and school **performance** (Shernoff et al., 2014). Flow is a widely accepted model for measuring the enjoyment (Sweetser & Wyeth, 2005) because participants feel the enjoyment while being in the flow (Csikszentmihalyi, 1990).

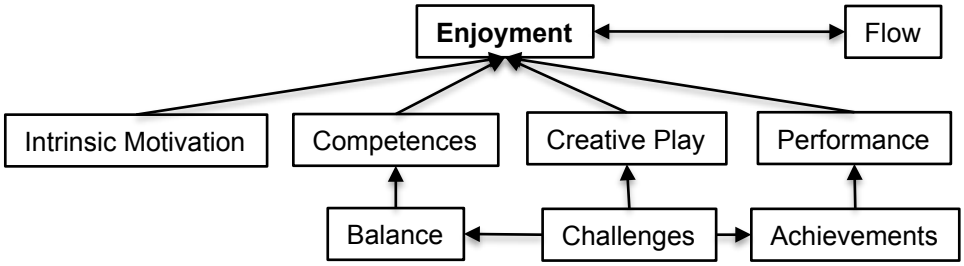

Figure 17

36 Ethics

Ethics and ethical aspects are part of the game world (Adams, 2009).

37 Events

Events are part of game rules (Adams, 2009).

38 Extrinsic motivation

Extrinsic motivation comes from outside. Users are interested in participation for achieving external rewards – money, grades, **points** or **badges**. The task is not satisfying enough and external incentives are needed for increasing the users satisfaction (Farzan & Brusilovsky, 2011). Examples of extrinsic motivators are reward and **reputation**. It is recommended to provide

external motivators for boring tasks or to tasks that have low value from learner's perspective (Kapp, 2012). Extrinsic motivator is for example participating in activity for achieving a grade. Intrinsic motivator is participation for fun (Eickhoff, Harris, de Vries, & Srinivasan, 2012). Extrinsic rewards can undermine intrinsic motivation (Hamari et al., 2014). This may depend on the type of external reward. For example if money is used as extrinsic reward for solving certain tasks, intrinsic motivation decreases when the flow of money stops but tasks are still due. But if the positive feedback is used as external reward, it has positive effect on intrinsic motivation (Deci, 1971).

Although users' intentions and conscious goals have clear impact on the motivation, sometimes it is difficult to distinguish, what the moving factors are. Sometimes the motivation is based on unconscious needs and below conscious control (Pintrich, 2003).

39 Fairness

Fairness is part of the game balance (Adams, 2009).

40 Fantasy

Fantasy is one of the entertaining factors (Malone, 1980)

41 Feedback

Feedback is the reaction to the players' actions. One part of the enjoyable game experience is instant and rich feedback (Adams, 2009). This helps user to understand is she failing or succeeding (Beume et al., 2008). Feedback can be provided with the help of visual and audio elements. For example through numeric values like **points** and **levels** in the **scoreboard** or symbolic values as **progress** bars and **location** indicators and **badges**. Or through text based and audio **messages** that are related with the gameplay or game narrative. Compared to the games, educational systems have difficulties with providing feedback. Sometimes students have to wait for days or weeks before they get feedback to their assignments. And sometimes teachers are not able to collect feedback from all the students. The easiest way to provide fast feedback is to design game-like virtual learning environment (VLE) that provides automated feedback to typical activities. Positive feedback stimulates learning (Muntean, 2011).

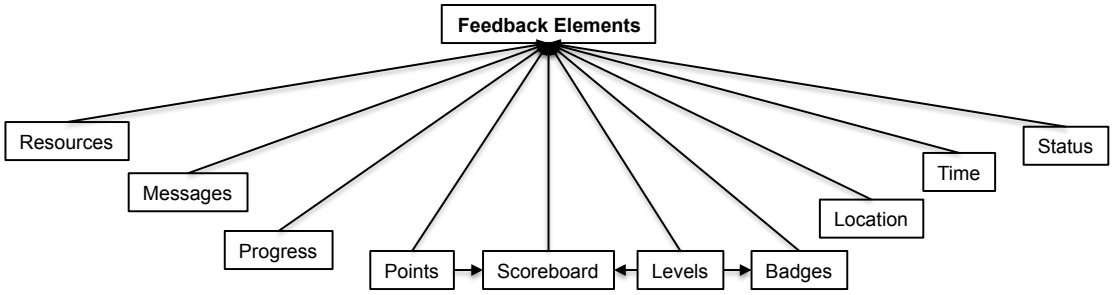

Figure 18

For generating the flow it is important that activities provide immediate and clear feedback. Unambiguous feedback allows checking the **progress** anytime. It gives information about how far is the user from achieving the goal (Csikszentmihalyi, 1990). Clear feedback is supporting the concentration – it keeps the participant focused and helps her to perceive consequences of an action (Kiili et al., 2014). If the participant has to wait for the reaction too long she loses the interest. Delayed feedback can lead also to misconceptions.

42 Fight

Fight is a format of competition (Sheldon, 2011) and interaction.

43 Flow

When participants concentrate on the task in hand so deeply that they lose the sense of time and stop worrying about other things. This kind of state of mind is called a flow or **optimal experience** in the level of mind and body where the user absorbs to the activity and feel deep enjoyment (Csikszentmihalyi, 1990). According to Csikszentmihalyi the ultimate objective of each individual is to be **happy**. This happiness can be achieved through the pleasure and enjoyment. **Pleasures** like food, sex, sleep, travelling, rest, items, and people are important for keeping the satisfaction on the same level but they don't increase the happiness because people are forgetting them. Despite the enormous amount of achievements many people are still unsatisfied because after every achievement they desire something new and more. **Enjoyment** in the other hand is the feeling that is generated during the pleasurable experience if one is concentrating on it. If people put effort on achieving something, it increases the level of enjoyment and also develops the participants' consciousness. For increasing the quality of life one needs to set goals and try to achieve them. At the same time the most important objective is activity itself not the outcome (Csikszentmihalyi, 1990).

Different people in all over the world use similar expressions when describing the moments when they felt enjoyment. In most of the cases this is related with overcoming challenging activities or situations. Because the task in hand is so challenging participants have to concentrate fully on it. This kind of concentration does not allow them to think about other aspects of life. They stop worrying. People are happy when they organise their consciousness. Order in the consciousness means acting according with clear objectives and focusing on the objective so deeply that they are forgetting everything else. All participants describe this feeling and process as something that is happening almost automatically - like being in the flow. (Csikszentmihalyi, 1990)

Csikszentmihalyi lists 8 aspects or properties (flow dimensions) that are required for creating enjoyable experience: 1) clear goals; 2) clear feedback; 3) balance between challenges and skills; 4) control; 5) concentration; 6) action-awareness merging; 7) losing self consciousness; and 8) time transformation. Positive state of mind can be presented as ninth aspect – autotelic experience (Csikszentmihalyi, 1990).

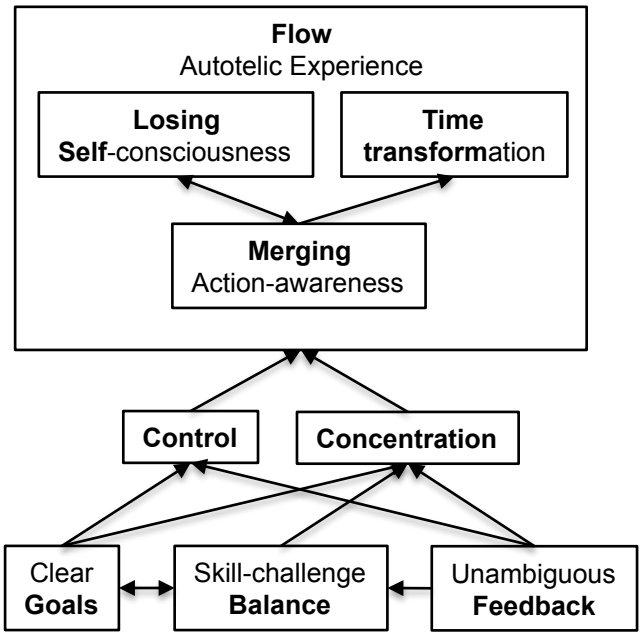

Figure 19

44 Followership

Followership is desire to follow and to be guided, one of the intrinsic motivators (Zhang, 2008).

45 Fun

Fun is something that feels amusing or entertaining or enjoyable. Fun can be generated with the help of **challenges** (clear goals), intrinsic **fantasy** (e.g., emotional involvement e.g., through competition) and **curiosity** (sensory e.g., visual effects and cognitive e.g., desire to know) (Malone, 1980). From the perspective of the challenge the concept of fun is similar to the flow. User is bored if the task is too easy or in stress if the task is too difficult (Beume et al., 2008). To feel the fun users have to be in the channel of flow. Also the aspects of fantasy and curiosity support the theory of flow. One possibility to keep participants in the flow is to provide conditions that generate fantasies and curiosity. To guarantee the higher level of involvement, participants have to learn how to find intrinsic motivators – how to generate intrinsic fantasies and increase the desire to know (Csikszentmihalyi, 1990). People play computer games for different reasons. Mostly they are played simply for fun. Games can have entertaining elements like: **gameplay** (engaging challenges and actions); **aesthetics** (beautiful graphics, animations and sounds); **harmony** (holistic picture created with the help of different game elements); **storytelling** (being a character in the story and making decisions); **risk and reward** (e.g., gambling or competition); **variety**; **learning** (e.g., how to play the game); **creativity** (e.g., producing new things); **self-expression** (e.g., avatar customisation); **immersion** (focussing on the challenges or story and losing the real world) and **socialization** (playing and communicating with others) (Adams, 2009).

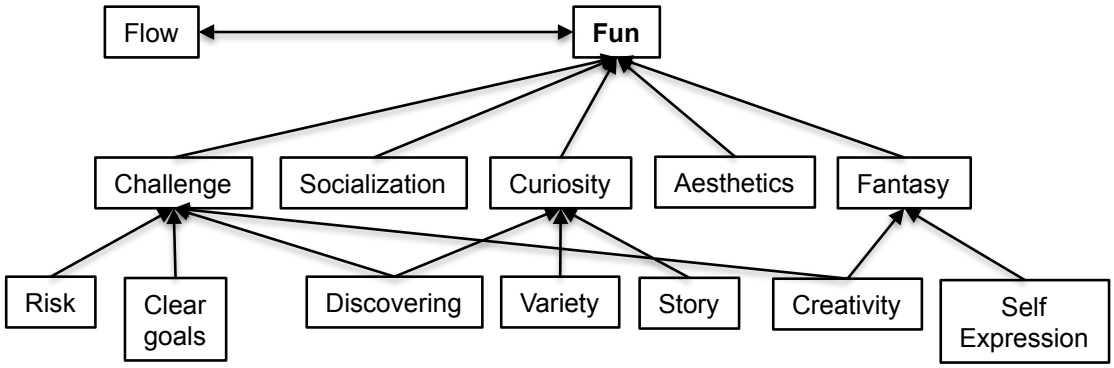

Figure 20

46 Gameplay

Gameplay is a central concept of games. This term is frequently used in the literature of game-related research although there is no consensus what this exactly means. For some it is simply playing the game (Jennett et al., 2008). Some use it as a synonym for game rules (Rollings & Morris, 1999). Some authors narrow it down to the interaction and engagement (Adams, 2009). In all cases the essence of the gameplay is the **challenges-actions** relationship - what challenges the game has and what actions the player can take to achieve the goals. Some actions can be prevented in order to make the game more challenging. This is frequently done in school conditions for educational reasons (e.g. solving two-line equation system with the help of matrix instead of using adding or replacement methods). In game design it is recommended to start from designing the gameplay in order to make the game as **engaging** as possible. If the challenges and actions are not engaging then interesting story and beautiful graphics do not help (Adams, 2009). In the educational field the instructional designers focus too much on the study goals and content. The level of engagement of the learning activity is often considered as the last thing. One possibility to increase the students' involvement is to start course design from planning engaging learning activities.

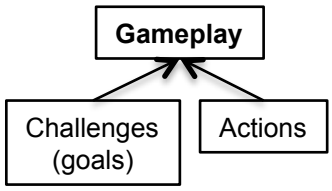

Figure 21

47 Goals

Every game has goals. This is the same in education – exercises and assignments have goals. Course goals can be presented as game goals. Goals can be related with game challenges or based on the story. Some games have open-ended goals. Learning tasks can be open-ended too e.g., in problem-based learning. Combining learning goals with game goals is the easiest method to gamify the education. This is also used in other forms of game based learning (Gee, 2011).

Goals are clear when participants know what they are supposed to do. Objectives can be set in advance or defined during the process (Jackson & Marsh, 1996). Clear targets generate the sense of certainty (control). Setting clear goals is strongly related with providing meaningful **challenges** and defining clear **rules**. Clear goals increase the concentration (Csikszentmihalyi, 1990).

48 Identity

Identity part of avatar design (Hancock, Toma, & Ellison, 2007) and one of motivational factors (Schultheiss, 2001).

49 Immersion

Sometimes it is difficult to distinguish between merging action-awareness, losing the self-awareness and time. To simplify the model of flow those flow dimensions can be combined and presented with the single element – **immersion** (Sweetser & Wyeth, 2005). The concept of immersion is widely used for describing gaming experience (Ermi & Mäyrä, 2005) but the meaning of the immersion is vague. Several authors have provided different definitions for immersion. According to Sweetser and Wyeth immersion is deep and effortless involvement (action-awareness merging), reduced concern of self (losing self-consciousness) and losing sense of time (time transformation). That means it is the same as flow.

50 Importance

Importance is one of the motivational factors (Pintrich, 2003).

51 Interaction

Interaction occurs when two or more elements have effect on each other. In games interaction is taking place between the player and other game elements like: **challenges**, game **world**, user interface and other **players**. Interaction with challenges is defined by the **gameplay**. Interaction with the game world is designed through **interaction models** and **feedback**. Interaction with other players is defined by the **competition models** (Adams, 2009). Videogames have standard interaction models: multi-presence (player can act in different parts of the game world), avatar-based (player is part of the game world), contestant model, party-based, etc. Competition modes are: single player competition against game environment, competition between two or more players, cooperation of two or more players against the game environment and team based competition (collaboration in teams and competition between teams) (Adams, 2009). Similar interaction and competition modes can be used for designing learning activities (individual, team or group assignments). Researchers have found that gamified activities have better results in practical learning assignments (Domínguez et al., 2013).

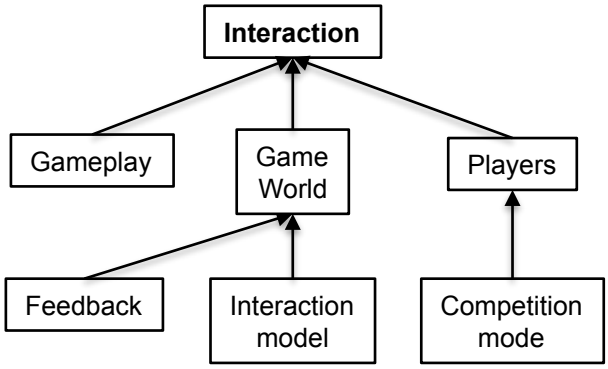

Figure 22

52 Involvement

Involvement refers to engagement or participation. Involvement is the act of participating in something. It is usually related with the concerns and curiosity about something and sharing activities of a group. Three stages of involvement exist: **engagement**, **engrossment** and total **immersion** (flow) (Brown & Cairns, 2004; IJsselsteijn et al., 2007). In engagement **users' preferences** are met and they are willing to spend time with the activity. In engrossment involvement is achieved through **emotional** engagement and total immersion is generated with the help of **empathy** and **atmosphere** (Brown & Cairns, 2004). Those levels are based on the attention and focus (concentration) that is required from users – higher amount of attention generates deeper involvement. For some researchers the immersion and the involvement seem to be synonyms (Sweetser & Wyeth, 2005).

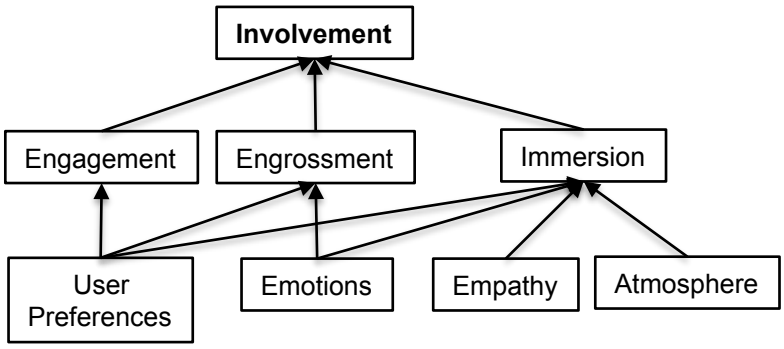

Figure 23

53 Intrinsic motivation

Intrinsic motivation happens when people engage with the activity just for the activity itself and not for some external reward (Farzan & Brusilovsky, 2011). For some reason the task is meaningful for the participants. They are interested in overcoming the **challenge** or just to have **fun**. Activity provides **feedback**, not points although points can provide also feedback when they are well structured (Kapp, 2012). Well-defined smaller **goals** are the best motivators (Farzan & Brusilovsky, 2011). One method how to provide intrinsic motivation is to build tasks that support participant's personal **needs**. Those needs are for example (Zhang, 2008):

1. Autonomy or control (of personal activities) – psychological need.
2. Self-identification or self-expression – psychological need.
3. Feeling competent or skilful (trough optimal challenge and positive feedback)- cognitive need.
4. Achieving achievements (optimal challenges and positive feedback) – cognitive need.
5. Need to belong somewhere - relatedness – social need.
6. Need to lead others or feeling power and control (leadership) – social need.
7. Desire to follow and to be guided (followership) – social need.
8. Show mood, emotions and feelings (affects) via intensive interaction – emotional need.

54 Knowledge

Knowledge is part of user competences.

55 Levels

Levels can have different meaning in games (Adams, 2009). Levels can be different parts of the game **challenges** or game **story**. In this case levels in the educational context can be study units (e.g., lessons). Levels can also refer to the rating of the player based on her **score**. In this case levels can be seen as a final grade of the course. Level can be related also with the **difficulty** of the game. In this case levels can describe different versions of the same learning assignment.

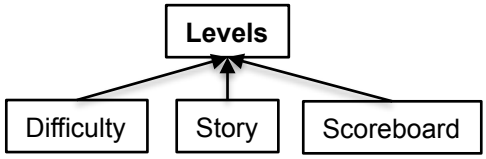

Figure 24

56 Loosing Self

Losing self-consciousness - When user is totally engaged with the activity they stop worrying about self evaluation and others opinions (Csikszentmihalyi, 1990). It does not mean that participant is not paying attention on what happens in mind and body but stop focussing on presenting himself (Jackson & Marsh, 1996). The "self" refers to the self-esteem. Losing the self-consciousness does not mean stopping the reflective thinking (Kiili et al., 2014). After the flow experience the sense of self emerges stronger (Csikszentmihalyi, 1990; Salen & Zimmerman, 2004). According to some researchers losing self-consciousness or reduced awareness of self or sense of serenity (Jennett et al., 2008) is a part of immersion (Sweetser & Wyeth, 2005) or absorption (Beume et al., 2008). Losing self-consciousness happens when users awareness is merged with the challenge (or merging happens because user stop worrying about self).

57 Loyalty

Loyalty is one of the social aspects of gameplay (Yee, 2005).

58 Luck

Luck is chance or randomness (Adams, 2009).

59 Meaningfulness

Meaningfullness is one of the game balancing aspects (e.g. meaningful challenges, reasonable options) (Adams, 2009).

60 Merging action-awareness

Action-awareness merging means deep and effortless involvement that feels like the activity is completed automatically - participant feel oneness with the activity (Brühlmann, 2013). During this experience participants are losing self (Jackson & Marsh, 1996). Tasks are designed so that they are fulfilled spontaneously and effortlessly (automatically). This may sound contradiction to one of the previous dimensions – task must be challenging but this is what the participants experience during the flow – activity is challenging but it also seems automatic (Jackson & Marsh, 1996). This kind of merging can be achieved if the tasks are well balanced, have clear

goals and generate clear feedback. When participants concentrate on task in hand and feel the sense of control over it.

61 Messages

Messages are examples feedback and socialization.

62 Motivation

All previously mentioned aspects are more or less related with motivation. In general student motivation is related with following questions and answers (Pintrich, 2003):

1. What do students want? Students need to feel success (achievements), power or control and relatedness and self-worth (Pintrich, 2003).
2. What motivates students? Motivation is higher when students believe that they are competent and efficient, when they believe to have control over their activities, when they feel personal or institutional interest, intrinsic motivation, importance and relatedness with personal goals (Pintrich, 2003).
3. How to get what students want? Students who are self regulating (who set goals, plan and monitor their cognition, motivations and actions) are most likely to perform well at school (Zimmerman, 1995).
4. Do students know what they want or what motivates them? Because in many cases the motivation is related with subconscious factors, students don't know what motivates them. Motivation is influenced by implicit attitudes, stereotypes and identity (e.g., belonging to certain group) (Schultheiss, 2001).
5. How does motivation lead to cognition and cognition to motivation? It is sure that emotions have impact on motivation but it is not sure how emotions can support acquisition of knowledge. Study of flow is one example of positive emotions related with classroom activities. Another factor that can regulate the cognition and motivation is affect (Pintrich, 2003).
6. How does motivation change (age related and micro level) over time? When in general the understanding about motivation is getting more developed during the growth of individual, it is well known that students in teens ages are less motivated or it becomes less adaptive (Pintrich, 2003).
7. How do context and culture affect the motivation? Context is affecting students' inner motivation and there may be ethic and cultural differences in motivation (Pintrich, 2003).

The sources of motivation can be divided in two groups - **internal** and **external** (Zhang, 2008). Internal sources are related with personal **needs**, **cognition** and **emotions**. External motivation is related with **environmental** aspects (Zhang, 2008). Personal needs can be **physiological** (biological), **psychological** (self wellbeing and growth) and **social** (socialization). Cognitions are mental events (**beliefs** and **expectations**). Emotional sources are related with showing **mood** and feeling **affects**. In contemporary psychology this twofold division has been expanded to more refined classification: 1) external motivation (external values), 2) introjection (internalisation of external values), 3) identification (internal control and self endorsement), and 4) integration (higher level of internal control) (Pintrich, 2003). In current document for simplicity reasons the traditional approach is used.

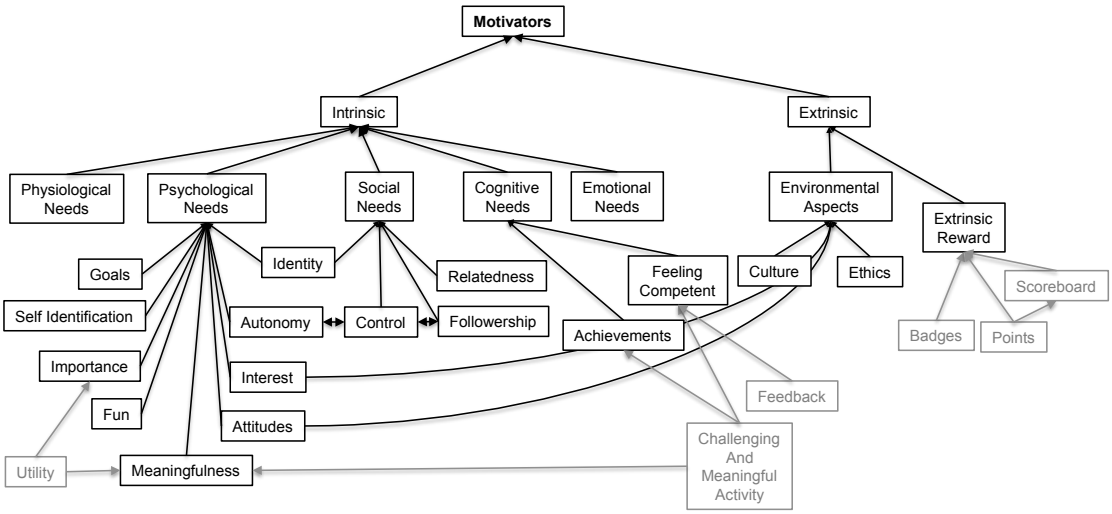

Figure 25

63 Narrative

Part of the story that is narrated by the game, not interactive (Adams, 2009).

64 Not Essential

No essentiality refers to the fact that games are usually seen something that are not **indispensible** (Adams, 2009). In most of the cases playing games is **not profitable** (Huizinga, 2014) and **inefficient** (Suits, 2014), something that are played for **recreational** purposes (Adams, 2009). It does not have to be so in serious games or in game based learning although in well-designed educational games serious purpose is so well hidden behind the recreational activity that users don't feel they are learning while playing. After finishing the game they discover that they have learned something.

65 NPC

Non player characters.

66 Opponent

oOher players or NPC's.

67 Performance

Performance is activity of doing something, usually related with the feedback and progress.

68 Player

Main actor in the game.

69 Points

Points are provided for solving challenges and achieving objectives in most of the games. Points can be added or counted down. They can be represented with the help of numeric or symbolic values (badges) (Antin & Churchill, 2011). Game points are like grades in educational system. Based on the collected points players can be listed in the **scoreboard**. Points can be divided into **levels** and levels can be presented with **badges**. This is easiest method how to implement competition in games. Scoring system in the educational condition is similar to game mechanics. This is the reason why points, badges and scoreboards are most frequently used game elements in gamification (Kapp, 2012) (Hamari et al., 2014).

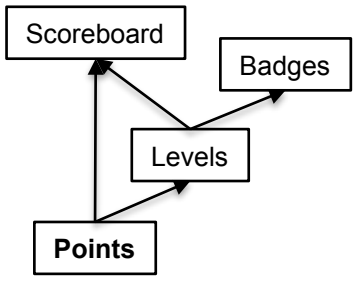

Figure 26

70 Progress

Progress in one hand is the sequence of activities that make up the game (Adams, 2009). In this sense it is a synonym for the **gameplay**. On the other hand, progress describes what goals the user has to meet and what objectives are achieved (Farzan & Brusilovsky, 2011). In this case it is similar to the **badges** and **achievements**. It can also be related with resource acquisition challenges. In the educational conditions the teacher can set study goals or it can be the planning task for the student in the beginning of the learning event in order to track the students progress.

71 Recruiting

Recruiting is engaging new members(Nonaka, Umemoto, & Sasaki, 1998), part of socialization and community activities.

72 Relatedness

Relatedness is need to belong somewhere (Zhang, 2008), one of the social motivational aspects (Pintrich, 2003).

73 Relationship

Creating and maintaining relations between players (Nonaka et al., 1998).

74 Reputation

Reputation is social status, kind of reward (Admiraal, Huizenga, Akkerman, & Dam, 2011) or motivational factor.

75 Resource acquisition

Accumulating resources: finding, unlocking, collecting and managing limited resources are the core elements of game economical challenges. Examples of economical challenges vary from accumulating resources (also points) to achieving balance in ecosystem or taking care of living things (Adams, 2009). Teachers can provide in-game "currency" for students for certain achievements. Later they can change his currency with items that are useful for solving further challenges (like drawing sets or software licenses) (Sheldon, 2011).

76 Reward

Reward is game element that satisfies the user and motivates them to achieve more (Hsu et al., 2013). Games can provide **extrinsic** reward like **points** and **badges** and **intrinsic** reward where tasks are rewarding by their nature (Adams, 2009). Intrinsic reward can be some item (resource) or skill (power) that can be used for solving the future assignments, or revealing next episode of the game story. For example, the reward can be set of new tools or renewed graphical representation of the avatar with new equipment (Guin et al., 2012). It is recommended to provide extrinsic reward for boring and routine exercises and not for challenges that are engaging for their nature (Kapp, 2012). It is also discovered that the size of the reward is not in correlation with the level of satisfaction - smaller reward can be as same pleasurable as bigger prices (Kapp, 2012). Some rewarding mechanics are difficult to classify are they intrinsic or extrinsic motivators. One of them is social status or **reputation**. For example, one can participate in activities just for gaining the respect of fellow players (Admiraal et al., 2011). From one hand, reputation is something that is related with external factors (how others see me) (Deterding, 2012). On the other hand, it is related with internal needs and emotions (Montola et al., 2009). In games play (as engaging activity) is the intrinsic reward itself (IJsselsteijn, Kort, Poels, Jurgelionis, & Bellotti, 2007). Unfortunately the rewarding system used in schools is mostly based on extrinsic motivators. Students learn for getting better grades and not because the content is appealing or the challenge is engaging. Most likely learning is not motivating activity because in the design of learning activities the focus is not in involvement but in correctness of the study content end learning goals.

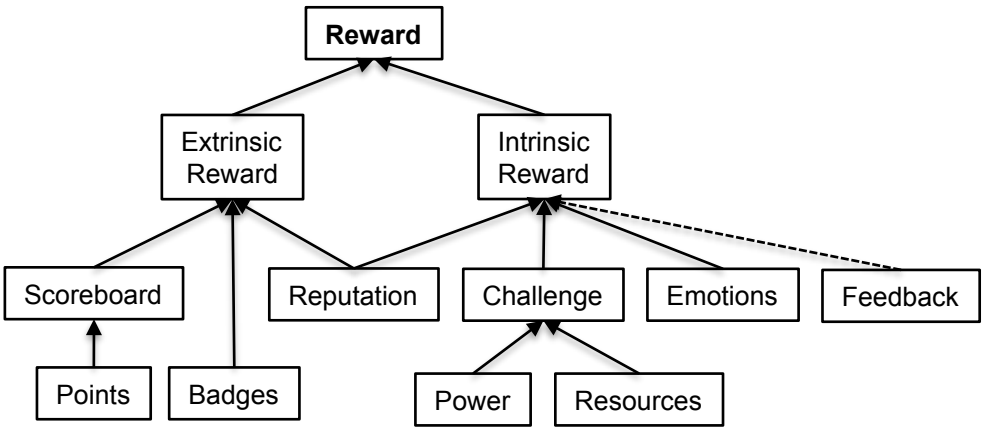

Figure 27

77 Risk

Risk is a game element that is most difficult to integrate with the course design. Risk can be created with the help of **uncertainty**. Uncertainty can be achieved with the help of **luck** (or chance or randomness). But it can be generated also with the help of **hidden information** that will be revealed when player takes risk or generated by the action of the **opposite player** (Adams, 2009). At the same time using the luck in educational conditions can teach the chance seeking (Bardone, 2012). In the educational conditions risk can be implemented for example in the format of quiz between two students. Risk requires reward. Some games are heavily based on randomness (e.g., gambling) but players prefer to believe that their achievements are based on skills (Adams, 2009) and not on luck. Therefore randomness should be used rarely and with caution. In the educational conditions randomness can be used by rolling the dice for selecting the student who has to make a presentation (Sheldon, 2011).

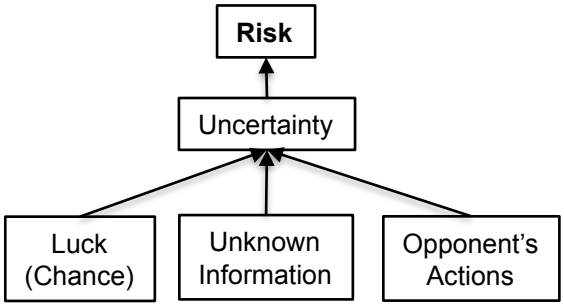

Figure 28

78 Roles

Roles are a character abilities and responsibilities in the game.

79 Rules

Game rules are complex set of game resources or objects and relationships between them (Adams, 2009). Rules declare how users interact with the game environment. One part of the rules is the conditions how the players can earn **rewards**, how the game is divided into **levels** and what are the pass and fail **conditions**. This can be easily implemented in educational conditions. For example, grades are points, points form the score and players are listed on the scoreboard (Sheldon, 2011). It is more difficult to describe **resources** or **objects** that should be provided to the learner in order to solve challenges. And how those objects are related to each other (in what **conditions** object can be used and how using one object is changing other objects) and what **events** they cause?

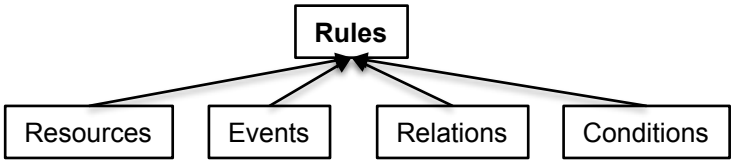

Figure 29

80 Scoreboard

Scoreboard is format of extrinsic reward, progress and feedback (Sheldon, 2011).

81 Self Expressions

Self-expression is related with the users desire to **autonomy** or **originality** (Hsu, Chang, & Lee, 2013). It can be related with building the players self-identity for example through designing personal avatar for virtual environment or customizing vehicles in racing games. In the educational conditions this kind of self-expression can lead to the higher involvement among students (Gee, 2014). Students can express themselves by designing personal avatar for the course.

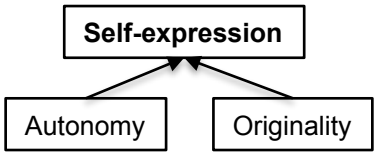

Figure 30

82 Skills

Skills are part of competences (Adams, 2009) and example of achievements (Montola et al., 2009).

83 Socialization

For playing the game player is the most important element of the game. Different players enjoy different activities. Bartley has divided players of multiplayer games in four categories (Bartle, n.d.): achievers, explorers, socializers and killers. Achievers focus on collecting points, explorers on discovering the game world, socializers in creating contacts and communication and killers on causing troubles. Similar types can be recognised also in the classroom conditions. Some is interested in new knowledge, some focus only on grades, some visit the school only for social reasons, and some are interested in puling. Different player or student types experience the gamification differently (Hamari et al., 2014).

Playing a game is an social activity (Adams, 2009). In the era of digital technology first games were meant for single player but most of the modern digital games are supporting cooperation and socialization in different formats. In multiplayer games players are allowed to **communicate** with each other through short text messages or online oral communication. Those functionalities are good for creating **emotions** among players. For some players socialization is the most important motivator for playing games. Several authors have listed different game elements that support socialization. Simoes (Simões, Redondo, & Vilas, 2013) mentions: user **loyalty**, **achievements** (number of likes, comments, …) and **recruitment** of new members. Yee (Yee, 2005) adds: socializing (getting to know others, helping and chatting), **relationships** (finding friends) and **teamwork** (collaboration). Socialization is also very important part of knowledge creation process (Nonaka, Umemoto, & Sasaki, 1998).

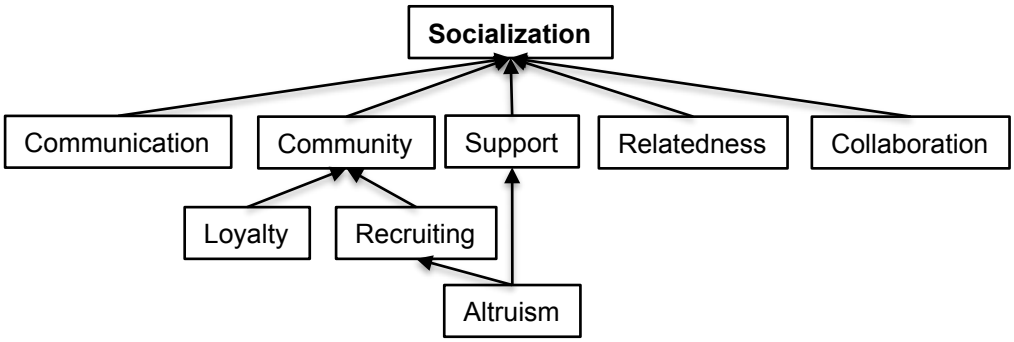

Figure 31

84 Sound

Sounds are part of game aesthetics and art.

85 Space

Space is the aspect of the game world (Adams, 2009)

86 Stile

Stile is part of the art (Adams, 2009).

87 Story

Not all games are story based (e.g., puzzles) (Adams, 2009) but one possible method how to bind learning with the game is to use educational story as a backbone for the game. One possible method how to use story element in the gamification is to design the course as a hero's journey (Campbell, 1990). It can involve avatar design, character growth and self-assessment stages. Simply telling a story in the classroom is narrative and not a game. For example story and character growth are used in gamified online surveys (Guin, Baker, Mechling, & Ruylea, 2012).

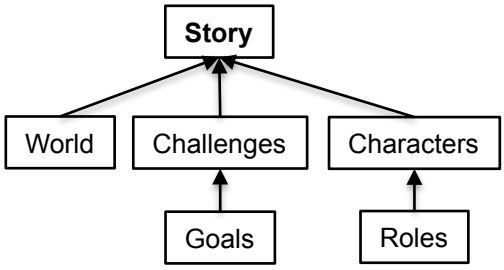

Figure 32

88 Support

Support in format of socialization and collaboration.

89 Surprise

Surprise is example of game emotions.

90 Teams

Format of interaction and collaboration (Adams, 2009).

91 Teamwork

Format of interaction and collaboration.

92 Time

Time is important element of game world but also strongly related with game rules. Time can be integrated with game design through **time pressure**. The progress of the game can be based on **turns** or on **real time**. In some games time flows differently in different challenges and actions. Time is like variable that can be adjusted by the designer or by the player. In most games time is not specified at all. In some genres it is not recommended to use time limitations because it can cause solving challenges with the brutal force (Adams, 2009). In educational conditions the time limitation is frequently used. Time pressure can be implemented through count down clocks, time bars or checkpoints.

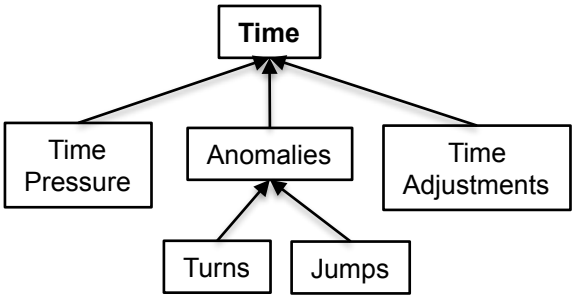

Figure 33

93 Time Transformation

During the deep involvement participant lose the sense of time. This happens because user is fully absorbed with the activity (action-awareness merging) (Ermi & Mäyrä, 2005). Usually time is passing faster then expected but sometimes participants have feeling that they have done a lot but time is standing (Jackson & Marsh, 1996). This dimension of flow may not be as universal as rest of them because in some activities the time is important factor for higher performance (Csikszentmihalyi, 1990) (e.g., solving the test during the limited time). It is easy to lose the track of time while playing videogames although after the playing experience the guilt can emerge because of wasting the time (IJsselsteijn et al., 2007).

94 Turns

Turns are example of game rules and game world time related aspects (Adams, 2009).

95 Utility

Utility is example of example of motivational factors.

96 Variety

Variety is one of the entertaining elements of the game. It does not mean that the game must be new or its content has to be unprecedented (although this is good too). It means that the content of the game should provide different challenges and different strategies to achieve them (Adams, 2009). The same is true in educational conditions. Course or class is more interesting if it contains different learning activities and lesson phases.

97 Voluntariness

Voluntary means that players are free to enter and leave from the game (Caillois, 1961). But when players are entered to the game and agreed about the rules their freedom is limited. By some researchers freedom is very important aspect of the game while others say it is more like illusion (Salen & Zimmerman, 2004). Based on the theory of planned behaviour (Ajzen, 1991) voluntariness in solving the task is the most important factor in shaping the users attitude and behaviour (Hamari et al., 2014). In the educational conditions the voluntariness depends on the school level. In the university and vocational training it is common that students can plan their studies by selecting between elective courses, choosing the semester when to start with the course or even between different lecturers. In the primary education level students don't have this kind of freedom. Sometimes they even can't decide what school to choose. Game based learning is free if the student has freedom to choose between gamified courses and the traditional one. Most of the cases it is difficult to achieve because schools are lacking resources to provide parallel courses. It is possible in higher and vocational education level.

98 World

Game world is an imaginary place (magic circle) where players go during playing the game (Adams, 2009). It can be created with the help of the game **story** and **graphical** elements that represent the game environment but other aspects like **time**; game **cultural**, **emotional** and **ethical** dimensions are also used for creating the sense of being surrounded with something that is credible but also magical at the same time. Sometimes game world is only a virtual space in players' head. In the educational conditions this kind of imaginary place can be created with the design of VLE. For example interface for the online course can be designed as a map of the game land (Hammais, Ketamo, & Koivisto, 2014).

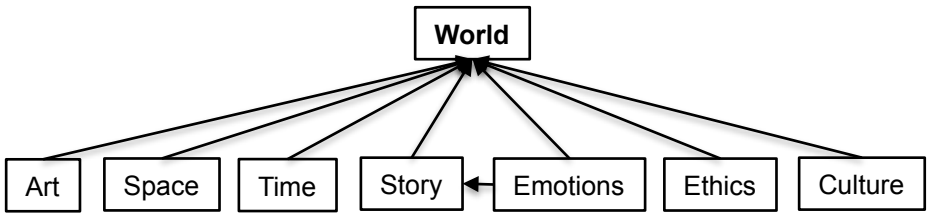

Figure 34

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