

# **Managerial Games in Education**

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# **HOW TO INCREASE INVOLVEMENT IN THE LEARNING PROCESS? USE OF GAMES AND GAMIFICATION IN TEACHING AND BUSINESS ACTIVITIES**

Magdalena Cyrklaff

The fast pace of life and even faster speed at which information and its meaning becomes outdated makes the contemporary market of goods and services evolve all the time. A big challenge for marketing experts is to react to changes immediately and adjust product presentation forms and methods to the needs and skills of consumers. These days an efficient marketing strategy is one of the key tasks both of commercial institutions and of non-profit organisations. Creating a group of loyal and active consumers requires familiarity with modern marketing solutions, which are very often connected with new media and technologies. At present gamification is one of the most attractive methods of customer relationship management, combining elements of a game, education, competition and engagement. This paper discusses the problems connected with the use of games and gamification in education and marketing activities, which can be applied both in business and in non-profit organisations such as schools, libraries, cultural centres, or museums.

## Why do people play games?

According to a Dutch cultural historian and linguist Johan Huizinga, play is the motor of civilizational development<sup>1</sup>. His work *Homo Ludens, a study of the play element in culture* includes a definition that already became a classic, which is quoted in almost every work concerning games and fun activities, saying that a "game" is: *a free activity that proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner. It is a goal in itself, and it is accompanied by the feeling of tension and joy and it stands quite consciously outside "ordinary" life*<sup>2</sup>.

The book "Man, play, and games"<sup>3</sup> of the French sociologist and philosopher Roger Caillois is a real polemic and supplement to the theses made by Huizinga in *Homo Ludens*.... This researcher distinguished four game categories:

1. Agon (in Latin – fight, wrestling) – games based primarily on competition, where there is a winner-loser situation. Every player has equal chances of winning and only their skills can guarantee their victory. This game category includes chess and sports competitions.
2. Alea (in Latin – dice) – games of chance; play in which the player competes with themselves or with chance. Such games include roulette or one-armed bandit. Financial reward is a motivating incentive in these games.
3. Mimesis (pretending, role playing) – these games consist in role playing in order to be appreciated by the audience and succeed. Such games involve the spectators, who experience *catharsis*, i.e. cleansing, releasing negative emotions. This game category includes role playing games, which eliminate the boundary between participants and observers.
4. Ilinx (vertigo) – the play that is the source of strong sensory experiences and changes reality. In these games, we often play against our own weaknesses, and experience catharsis if we win. This

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<sup>1</sup> P. Tkaczyk, *Grywalizacja. Jak zastosować mechanizmy gier w działaniach marketingowych*, Gliwice 2012, p. 13.

<sup>2</sup> J. Huizinga, *Homo ludens. Zabawa jako źródło kultury*, trans. M. Kurecka, W. Wirpsza, Warszawa 1985, p. 48–49.

<sup>3</sup> R. Caillois, *Gry i ludzie*, trans. A. Tatarkiewicz, M. Żurowska, Warszawa cop. 1997.

game category includes games that give a reward of defeating ourselves, e.g. riding roller coasters, parachute jumping, etc.<sup>4</sup>.

People play games as they want to obtain good results, discover and learn the gaming world, enter into contact with other players, or to influence others<sup>5</sup>. These four main types of player's behaviour were the basis on which Richard Bartle, a retired Essex University professor, distinguished four basic player categories, namely:

1. *Achievers* – players focusing on achieving maximum results and being better than others. Interactions with other players help them acquire information or relax. They are symbolised by card diamonds, the desire to gain pints, treasures.
2. *Explorers* – players who want to discover the gaming world first of all, its mechanics and secrets, or even errors. They are not interested in collecting points. Spades are their symbol, as they “dig through” the world in the search for wisdom.
3. *Socialisers* – players for whom relations with other players, interesting conversations and new acquaintances count the most. If they resort to violence, they do it only to defend other game characters. They are symbolised by hearts, empathy is the source of pleasure derived from the game for them.
4. *Killers* – players who must feel power over other players. The greater the chaos their move introduces into the game, the more satisfaction and joy they derive from it. Their messages often include exclamations and vulgar language (e.g. “Die, spawn!”). Clubs are their symbol, as weapons are their basic tool that helps them derive pleasure from the game<sup>6</sup>.

As it can be seen, every player can be assigned to specific group, which is certainly connected with the fulfilment of their needs and personality traits.

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<sup>4</sup> P. Tkaczyk, op. cit., p. 28-29.

<sup>5</sup> Ibid, p. 76-78.

<sup>6</sup> Ibid, p. 78-81.

## Psycho-neurobiological aspects of gaming

Games are a controversial issue. Very often opinions concerning them are shaped on the basis of highly publicised cases verging on addiction. The story of Anthony Rosner may serve as an example here, who got so much involved in building the imaginary world of the game "World of Warcraft" that his gaming binges lasted for 18 hours a day. He thus neglected all relationships, school, and personal hygiene<sup>7</sup>. Despite cognitive, behavioural, and neurochemical aspects of Internet or computer abuse, the latest classification of "Diagnostic and Statistical Manual of Mental Disorders" informs that more research is needed in order to conclusively and officially classify excessive Internet or Internet game abuse as addiction<sup>8</sup>.

We cannot yet give a full answer to the question what makes a man get addicted for example to playing games, yet we know it is connected with dopaminergic synapses<sup>9</sup>. It was proved by accident around the year 1954 by two young researchers, James Olds and Peter Milner, who investigated rats. Their aim was to examine whether stimulation of a certain brain area of rats has influence on their choice of turning direction – to the right or left. An electrode aiming to check it was placed too deep, however, and when electrical stimulation was turned on, the rat sat down and sniffed as if it was receiving a pleasant stimulus. Then the rats were placed in Skinner box, in which they could trigger self-stimulation of the brain by pressing a lever. Some rats did it even 2,000 times per hour until they collapsed out of exhaustion<sup>10</sup>. Results of successive experiments showed that stimulation of the basal ganglia brain area is the source of strengthening only when it covers dopamine-secreting axons. Other types of behaviour have the same impact on dopaminergic neurons – starting from sex and finishing on playing computer games<sup>11</sup>.

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<sup>7</sup> See A. Paturel, *Game theory: how do video games affect the developing brains of children and teens?*, *Neurology Now* 2014, vol. 10(3), p. 32-36.

<sup>8</sup> Ibid.

<sup>9</sup> J. W. Kalat, *Biologiczne podstawy psychologii*, scientific ed. J. Kaiser, trans. M. Binder, A. Jarmocik, M. Kuniecki, Warszawa 2006, p. 452.

<sup>10</sup> Ibid.

<sup>11</sup> Ibid, p. 452-453.

It may seem that a hundred per cent satisfaction causes secretion of the highest level of dopamine, yet research suggests that it is not so in some cases (see Figure 1). If the probability ( $P$ ) of reward is 100%, a sudden increase of dopamine level occurs during its visual stimulus. And when the probability equals 0, i.e. the participant of the experiment does not know why a given object is shown to them and what they can expect later, the same dopamine increase occurs, but at a different moment – after receiving the reward. The situation is completely different for  $P$  equalling 50%. It turns out that in this case dopamine level increases both during the presentation of the visual stimulus and during getting at and receiving the final result. It can be concluded on the basis of this study that in some cases uncertainty about getting the reward was increasing and maintaining the reaction of the dopaminergic system. In this process, a player was thus motivated to participate in the game as long as they were playing, until the very moment of receiving the reward<sup>12</sup>.

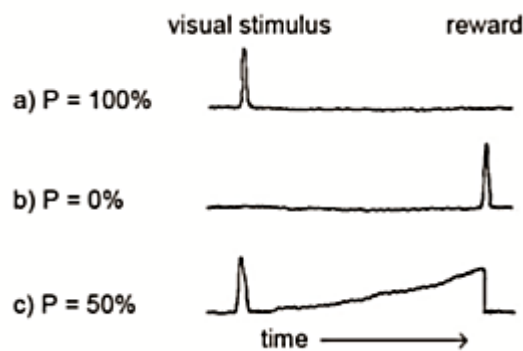


Figure 1. Dopamine uptake in response to likelihood of getting a reward.  
Source: W. Holmes et al., op. cit., p. 236.

The abovementioned results suggest thus that the biggest pleasure is derived from the process of participating in the game and uncertainty about the results that will be ultimately obtained in it. The sole fact/process of acquiring new skills and shaping the desired behaviour will be a benefit from

<sup>12</sup> See W. Holmes et al., *Neuroeducational research in the design and use of games based teaching*, [in:] *The proceedings of the 7th European conference on games based learning hosted by Instituto Superior de Engenharia do Porto, 3-4 October 2013*, ed. P. Escudeiro, C. Vaz de Carvalho, vol. 1, Portugal 2013, p. 236.

participating in a gamified subject/course, and not only its result in the form of a mark or a certain number of points possessed at the end. Uncertainty as the factor strengthening engagement in game-based learning was investigated by Paul A. Howard-Jones and Skevi Demetriou. They conducted three quasi-experiments, two on schoolchildren and one on adults, and the first of them is worth discussing. It covered a group of 50 primary school pupils from Cyprus: 27 boys and 23 girls of average age: approx. 11 years, 3 months and 24 days. The participants were asked to play a mathematical quiz, in which their task was to indicate whether particular mathematical calculations had a correct result or not (an example of calculation with incorrect result:  $13 \times 42 = 564$ ) and collect as many points as possible for correct answers. Before the problem was shown to them, the pupils had to decide if they wanted to receive it from Mr. Certain, or maybe Mr. Uncertain. If the pupil chose Mr. Certain and gave a correct answer, they obtained 1 point, and if they chose Mr. Uncertain, they received either zero or two points, depending on the result of tossing an animated coin. Despite the possibility of a loss and failure to obtain one point for the correct answer, pupils chose Mr. Uncertain more often. Moreover, the frequency of such choices increased proportionally to the duration of the game<sup>13</sup>. 10 randomly selected participants of the quasi-experiment were interviewed on their emotions experienced during the game. Only 2 persons from this group of respondents chose Mr. Certain, and gave a rational, unemotional justification of their choice ("If I was lucky, I would choose Mr. Uncertain, but if I did not win for a long time, I would choose Mr. Certain to get more points"). The statements of other persons were found to carry greater emotional load, which was connected with the frustration that appeared when the pupil's answer was correct and Mr. Uncertain assigned no points for it to them. Nevertheless, the pupils declared that they did not want to quit the game because of this frustration as it rather motivated them to further efforts and attempts than made them want to give up<sup>14</sup>. One can expect then that implementation of random elements into the game-based learning process will support increased attractiveness of the learning process, and thus strengthen the pupils' motivation and engagement in educational activities. The failure process in well-designed games should be

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<sup>13</sup> See P. A. Howard-Jones, S. Demetriou, *Uncertainty and engagement with learning games*, *Instructional Science* 2009, no. 37(6), p. 521.

<sup>14</sup> *Ibid.*, p. 521-522.



based on elements not connected with the pupil personally, and success on the contrary – it should be attributed to their skills and features<sup>15</sup>.

## Gamification and its three basic pillars

Gamification is a transfer of mechanisms known from games (for example computer games, but not only) into the real world aimed at changing human behaviour<sup>16</sup>. Thanks to the application of elements of game mechanics and dynamics it helps involve people in the activities that they previously found boring, repetitive, or not dynamic enough. Thanks to it, participants should derive pleasure from facing successive attainable challenges, cooperation, competition, entering successive levels of expertise or functioning in the role of an expert<sup>17</sup>.

The three basic pillars of gamification include:

- › fun, which increases satisfaction and the feeling of time well spent;
- › friends understood as a group engaged in common entertainment, cooperation; persons engaged and familiar with the rules of the programme, who discuss it, create a forum or a community around it;
- › feedback, i.e. immediate response, which is one of the key elements of games as it satisfies the need of process participants to get information on their actions fast<sup>18</sup>.

Drawing satisfaction from participating in games, performing certain repetitive tasks is conducive to entering the flow state. According to American psychologist Mihaly Csikshentmihaly, it is a state of so-called focused motivation, which can be achieved thanks to complete absorption with the activity<sup>19</sup>. Our body and mind may enter the flow state when we can see a clear set of

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<sup>15</sup> Z. Bieńkowska, *Gra, której trudno się oprzeć – czy nauka może uzależnić?* [on-line]. [Access: 18.04.2016]. www: <http://doji.com.pl/graktorejtrudnosieoprzec/>.

<sup>16</sup> P. Tkaczyk, op. cit., p. 10.

<sup>17</sup> Cf. S. Starzyński, *Gryfikacja* [on-line]. [Access: 18.04.2016]. www: <http://www.gryfikacja.pl/index.php/gryfikacja/>.

<sup>18</sup> S. Starzyński, *3 „F” Gryfikacji* [on-line]. [Access: 18.04.2016]. www: <http://www.gryfikacja.pl/index.php/2012/01/3-f-gryfikacji/>.

<sup>19</sup> P. Tkaczyk, op. cit., p. 52.

goals and instructions, when we know that the task is possible to be performed and when it gives us immediate feedback<sup>20</sup>. Application of these elements in the real world is difficult. For example, in an educational process immediate feedback often cannot be guaranteed to the pupil or student after a written exam, as time is needed to evaluate student works.

Gamification is used to programme curiosity, which is known to appear due to the so-called information gap, i.e. the knowledge that we don't know something. Curiosity is a state close to play, so we should begin designing a well gamified programme from planning its play and pleasure elements. It is crucial that such a programme should be well-designed. Tim Jones, account planner in the London branch of BBH, suggests that a good game (not really a computer, but marketing one) should include: the win condition, a clear goal of the game, action (expected from the player), obstacles on the road to accomplishment of the goal, and the rules<sup>21</sup>.

The element that will motivate the player to face successive challenges in the programme is the dynamics of the game (associated with the reward), which makes it possible for the player to derive high satisfaction when properly designed. Game dynamics is built with game mechanisms – points or feedback, which are a certain kind of visualisation of the game dynamics<sup>22</sup>. Other elements of mechanics applied in designing games or gamified programmes include for example:

- › levels, which indicate the game's status and may be the source of pride for example from reaching expert level, which is a confirmation of the player's experience and makes other players look up to a particular participant;
- › achievements – challenges, i.e. ventures spread in time, for the accomplishment of which additional rewards, bonuses, or badges are obtained;
- › score charts, which distinguish the best players, customers, etc.;
- › virtual goods and places, which give satisfaction mostly to the players with social motives;

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<sup>20</sup> Ibid., p. 52-53,

<sup>21</sup> Ibid., p. 71-74.

<sup>22</sup> Ibid., p. 81.

- › gifts and charity, to which players with social motives allocate considerable sums as building relationships is their priority in all their actions<sup>23</sup>.

All these elements should be interwoven into a well thought-out plot, which will encourage participants to delve into the process of being part of the game or a gamified programme<sup>24</sup>.

## Engaging customers through gamification-based programmes – best practice

Already for several years now, gamification has been an attractive element of the consumer market, engaging customers in interactions verging on play and competition with their own or other people's weaknesses. Gamification is applied successfully by such companies as Microsoft, Starbucks or Honda, and Harvard Business Review wrote about it as one of the leading marketing trends in the second decade of the 21<sup>st</sup> century<sup>25</sup>.

Consumer platform designed by Gamfi for the Bonduelle brand in 2014 under the name "Vegetable inspirations" may serve as an example of best practice in the context of designing a gamified programme. The application is available at Bonduelle's Facebook fan page. The key goals of Gamfi when designing this programme included engaging the present fans of Bonduelle, acquiring new ones, increasing the number of visits on the brand's website, dietary education and acquiring user-generated content. Gamfi also managed Bonduelle's fan page communication and implemented a campaign increasing traffic on the gamified platform<sup>26</sup>.

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<sup>23</sup> Ibid., p. 81-93. Cf. G. Zichermann, Ch. Cunningham, *Grywalizacja. Mechanika gry na stronach WWW i w aplikacjach mobilnych*, trans. R. Jońca, Gliwice 2012, p. 43-92.

<sup>24</sup> P. Tkaczyk, op. cit., p. 93-94.

<sup>25</sup> Ibid., p. 10.

<sup>26</sup> „Warzywne inspiracje” – platforma grywalizacyjna Bonduelle po roku aktywności [on-line]. [Access 12.04.2016]. www: <http://www.marketingnews.pl/message.php?art=46126>.



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Photo 1. "Vegetable inspirations" platform.

Source: "Vegetable inspirations" platform [on-line]. [Access 12.04.2016] www: <https://apps.facebook.com/warzywne-inspiracje/>.

The community of the platform "Vegetable inspirations" has 27,000 members at present, who generated over 6,000 activity-related works within the application over a year. These included for example recipe exchange, sharing information on favourite products and childhood flavours. The platform contains also educational content in the form of quizzes, puzzles, and charades concerning Bonduelle products and healthy diet guidelines. Participants may collect points for even the smallest platform activity, for which they obtain also in-kind prizes. Numerous auctions are very popular here as winning them helps build a strong ranking position and opens up the possibility of further bidding and collecting points<sup>27</sup>.

<sup>27</sup> Ibid.

After a year of the platform's functioning Gamfi prepared a report on it, in which it can be read that users collected the total number of 19 million points for the fulfilment of 600,000 tasks. Average time spent on the platform by one user exceeded 21 hours. Thanks to advertisement of the brand by the platform's users Bonduelle saved over PLN 3 million, as such would be the cost of online promotion of the brand<sup>28</sup>.

## Summary and recommendations for education

Gamification is a powerful tool useful also in education, since the contemporary linear system of education cannot meet the expectations of the pupils and students born in the virtualised world with instant access to information. It also helps companies reduce promotion costs and generate demand for their products. The mechanisms of engaging people in brand related activities may serve as an example for creating educational platforms or inspire schools and colleges to design gamified competitions. It is important, however, that the business goals should not be copied uncritically onto the participants of the educational process, but they should be adjusted to their needs and skills. Moreover, potential damage of such activities should be prevented, e.g. health damage. It is also important that online gamification should be combined with real world activities, which will allow pupils and students to develop their social relations and minimise the time spent online. It should be kept in mind all the time that excessive use of the computer and uncritical surfing the Internet may lead to dangerous behaviour (e.g. cyberviolence), addiction, or alienation<sup>29</sup>.

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<sup>28</sup> Ibid.

<sup>29</sup> To read more about excessive use of the Internet cf. M. Cyrklaff, *Jak mucha w sieci pająka... Zespół uzależnienia od internetu oraz jego wpływ na psychofizyczne i społeczne funkcjonowanie człowieka*, [in:] *Ekologia informacji środowisku regionalnym*, ed. B. Taraszkiewicz, Słupsk 2012, p. 93-106.

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