The impact of gamified education on learning motivation

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Abstract: *Due to tense business environment and technological developments, agile organizations are invoked to provide flexibility that is necessary to gain business advantages. Accordingly, employees and the education system also have to align to meet new challenges and to develop new skillsets. Technological progress and changes in society have also impacted the characteristics of how younger generations perceive and learn. Researchers of generation domain report high level of impatience and shorter attention span. One of the attempts to capture and maintain longer-term attention is gamification, a melting crucible of several theoretical domains (pedagogy, applied psychology) and behavioural design professionals use its applications in practise. In this paper I aim to relate motivation theory of learning to gamification in order to utilize its findings in business education. Learning motivation has extensive literature, as well as gamification, however the relation between them is not recognized deeply in empirical research. My work is based on literature review of respective theories and structured review of gamification frameworks, and is the first step in my series of research aiming to quantify this relation.*

Keywords: *learning motivation, goal orientation theory, education, gamification*

1 Introduction

Education today faces tough challenges. Main influencing factors are changes in global business and economy and transformed demand for labour market resulting in changing requirements for skillset of fresh graduates. From the perspective of the latter it is vital to understand that the skills and qualities of the incoming freshmen are also changing. Universities face the following dilemma: their mission is to prepare the subsequent graduates to solve problems that are more complex but at the same time it is more time and resource consuming to make proper knowledge transfer to generation Z freshmen.

This research paper first outlines the general challenges educators are facing in chapter 2. Chapter 3. outlines motivation theories respective to learning, including interventions that seem to be a very important link between learning theories and gamification. Chapter 4. discusses gamification concepts while chapter 5. connects gamification and learning motivation theory, followed by the conclusions in the final chapter. Finally, this exploration aims at business education due to the corresponding corporate and teaching experience of the author.

2 Education in whirlwind

2.1 Gradual changes in economic thinking and education

The prolonged global and system level subprime catastrophe of 2007-2009 has been the first major global crisis since the Great Depression of the 1930s. Mainstream economists have been caught off-guard, even worse, their proposed "therapies" to treat the contagion that has spread – from the relative small sized lending cluster in the US – to basically all economies, did not prove to be efficient. Global economy gradually recovered, but economic thinking seems largely unaffected (Bekaert et al. 2014, Lucas et al., 2017).

Science disciplines tend to get isolated due to specialization, however as scientific challenges become more and more complex, developed and tested procedures are borrowed from different fields and thus interdisciplinary approaches emerge: principles and methods become integrated, synthetized resulting in new knowledge (for example biochemistry or astrobiology).

Such assimilation exists between economics and behavioural science that can be utilized among economists to better understand and approximate reality in their models. The approximation of these fields enables us to study decisions, behaviour or even the impact of gamification on behaviour– as it will be later elaborated in this paper.

2.2 Influence of the digital age

Information is easy to access for anybody with internet connection. As available information has no almost limits, former dependencies between parties have also changed: the relation between retailer and consumer, or teacher and student. This also means that (a) there is too much information to handle and (b) some pieces of information get obsolete quickly, so real time access is of uppermost significance for members of the society. As the on demand access to information has spread, knowledge has become less of a differentiator. Researchers (Schwas and Samans, 2016, Kai-Holger, 2016, Smith, 2017) point out the importance of creative problem solving as well as the ability to connect through different domains to foster innovation. Participants must be able to navigate and locate information and also must be able to understand, interpret and criticise it. Finally, they need to be digitally fluent to communicate effectively through digital media. The question is how to prepare students for this challenge? It is evident, that the learners today are significantly different from the students of yesterday (Jones et al., 2007). The amount of information in the digital age is so overwhelming that students in the digital age are easily distracted and impatient. Digital material shall be specific and available anytime anywhere (Kai-Holger, 2016). For a successful knowledge transfer it seems vital to understand the digital age learners' characteristics better.

2.3 Generations – think different, act different, learn different

The term generation refers to a group of people who live in the same time span (Jones et al., 2007). They are formed by the main influencing factors that shape society in their era. The late 20th and the 21st century has been mostly impacted by developments in technology. New platforms of communications have emerged, distances have shortened, new lifestyle, social connection and brand new consumer behaviour have evolved. For this paper generation Z (also referred to as Millennials) and generation Y (also known as the Silent generation) actors are the target group due to their age and potential university studies.

Tari (2015) describes Millennials as people with the demand for everything right now. They are online all day and experience a significant portion of their personal relations in the virtual world.). Online glimmering and offline anxiety is a part of their everyday life. Whereas you can be anything and everything, you also fell that you can never be good enough and lack of self-confidence. Immediate feedback (likes, reactions, answers) is essential for them. This is where their usual impatience and – compared to previous generations – weaker concentration abilities originate from. Digital addiction exists because social media usage increases dopamine level (Ritvo, 2012), the neurotransmitter that forms feeling of happiness and satisfaction. This works the same way as for example smoking, gambling or drug use. Any motivation system aiming to tie the attention of the impacted actors, must compete with this extremely strong influence (Zichermann and Linder, 2013). As both X and Y generations are impacted by technology and their attributes from this research paper's perspective are similar, I will borrow the denomination of Tari (2015) and use generation #yz for both.

Let's acknowledge that generation #yz actors are extremely efficient in navigating and finding information, professional in multitasking and information processing and have powerful visualisation skills. Building on their tech-savvy skills they are efficient self learners and have strong entrepreneurial approach. These are the attributes that educators have to build on.

2.4 Implications for educators

In order to effectively fulfil their teaching roles, universities are looking for answers to such questions, as how can universities create more value for students, employers and the world? How do fast pace technological advancements influence business education? Business schools cannot continue to teach standardized solutions to predictable problems (Kai-Holger, 2016). Learning experience must be engaging and relevant. In best case curriculum development shall be designed in a learner centered way and aligned with real "business-like" objectives.

Educational material and activity has be a mixture of formal, informal, collaborative (social) and experimental vehicles. "The right format for the right purpose, mixing formats makes learning more effective" (Chasse, 2017).Digital

age learners. need access to study resources, information, connect to peers as well as experts, or even the educators. Vice versa, feedback and support with regards to progress shall also available. Though learners of this era own their development and do it continuously, the quality of knowledge transfer is key, therefore the quality of attention and effort is vital. This is what learning motivation is about.

3 Motivation theory of learning

Publications relating to learning motivation usually do not offer quick wins and easy recepies to tackle student motivation. Reason being that learning motivation itself has quite complex mechanisms, mainly, being highly dependent on context. Therefore research suggests that motivating students shall be tailor made, on demand, on the spot, based on learning environment, student profiles. (Fejes, 2015)

Learning motivation research tries to find out why individuals invest time and energy to study and what factors influence their motivation. Zeynali et. al. (2019) approaches learning motivation from students perspective, and argues, this is a factor that makes the student feel the academic action meaningful. Deci and Ryan (1985) thought academic performance and underlying motivation is meant to engage the individual to invest effort into learning, in order to reach their academic goals.

Fejes (2015) argues that quick changes in technology and work processes bring about the constant evolution of relevant skills and the appearance of lifelong learning. it seems that competences required in the future can not be taught as such, because nobody is able to foretell what skills and pieces of knowledge will be required later. Therefore the most important task of educators is to support students in developing skills of acquiring new knowledge.

Pintrich (2000) summarizes learning motivation research under 3 directions. Task specific motivation research focuses on one specific task and the respective goal motivation and the individual's self assessment on actual performance. However, this domain does not investigate why the specific goals are chosen. Substance specific motivation research takes general approach on goals and the reasons as well, aiming to determine the reason behind the behavioural patterns to achieve the goals. Goal orientation motivational research is the middle ground between these, focusing on underlying reasons as well as perception on performance, thus creating the perfect toolset for education related motivation research. Therefore I focus on goal orientation theory.

3.1 Goal orientation theory

Goal orientation related literature divides the motives into goal mastery and performance related goals. Mastery related motivation relates to acquiring new pieces of knowledge and improvement of competences, while performance motivation is about the pursuit of presentation of personal capabilities. Literature

seems equivocal (Fejes , 2015) about the priority of mastery goals over performance goals due to the clear difference of aiming at learning itself or rather at comparison between classmates that could result in negative feeling of failure. Those individuals who follow mastery goals compare their achievement to themselves ("did I learn it?", "did I develop?") while students with stronger performance goal relate themselves to "competition". Below I refer to Maehr and Meyer (1997) to summarize the concept as a whole. As literature emphasizes interventions mainly relating to mastery goals I will use only the mastery ide of the goal orientation theory to map with applied gamification logic.:

	Mastery goals	Performance goals
Success	Self-improvement, innovation, creativity	Better grades/performance than peers
Value	Effort, try to solve complex challenges	Avoid failure
Satisfaction	Improved competences, knowledge	Be the best in the team; success vs. effort
Work/performance	Learning, exploit individual learning capabilities	Be the best in the team; success vs. effort
Source of effort	Internal; individual "doing" is important	Demonstrate own values and achievements
Evaluation criteria	Absolute, focus on improvement	Social norms, comparison
Mistakes	Part of development, provides information	Failure, shows lack of capabilities
Competence	Improved by effort	Inherited, constant

Figure 1 - Comparison of mastery and performance goals
Source: Maehr and Meyer (1997, p. 388.)

The above-mentioned driving factors have their counterparts in the gamification framework shown later on in this paper.

3.2 Interventions

Based on Epstein L. Joyce's 1989 work on Family structures and student motivation Kaplan and Maehr (2007) highlight the importance of interventions with regards to student motivation. Interventions are classroom level programs, or even types of behaviour of the educator to strengthen learning motivation. The authors cite a representation of interventions with regards to domains of Task, Authority, Recognition, Grouping, Evaluation, Time (TARGET dimensions). Relating to mastery goals, and the corresponding link between mastery goal interventions and gamification, I used Kaplan and Maehr (2007) table to summarize this model.

Domain	Dimension description	Support in mastery goal
Task	Types of learning activities and tasks	Diversified, challenging tasks
Acknowledgement /Authority	Formal and informal positive feedback, encouragement	Focus on the individual improvement
Responsibility	Offer independent work and feeling of control	Encouragement of active participation, personalized tasks
Group work	Seating, group tasks allocation	Individual and team assignments
Evaluation	Evaluation and feedback of work	Offer opportunity for growth relating to tasks, diverse methods for demonstration of results
Time	Quantity of work, speed of work	Involve students into schedule preparation

Figure 2 – TARGET dimensions
Source: Kaplan and Maehr (2007, p. 159)

It has to be highlighted that learning motivation is highly context dependant. The essential task of educators is to support students in developing their capabilities to acquire new knowledge. Pedagogical practise and theory emphasizes potential interventions among TARGET dimensions in order to motivate learners, increase their attention and willingness to do their work.

A possible set of methods to anchor attention and increase engagement is within the field of gamification. In the last part of this paper the overall scheme of gamification will be explained among a practical toolset of gamified approaches, followed by the explanation of relation between gamification elements and learning motivation.

4 Gamification

Gamification is the use of game design elements in non-game context as defined by Zichermann and Linder (2013). Practically, these are a set of methods, mechanics that are used to draw and maintain attention. The flow of a seminar session, testing, homework preparation, the whole course or even entrance tests can be gamified by mechanics, such as narrative, feedback, point or badges, or missions (Rigóczki, 2016).

4.1 Gamification frameworks

Mora et al. (2015) in their literature review of gamification frameworks enlist 22 structures of gamification. They categorize them by being complete framework (or not), being generic (or specific) and academia or business relations. Within the enlisted frameworks Yu Kai Chou's Octalysis (Chou, 2017) is acknowledged to be generic and complete. Its building blocks are motivational drivers and as such, in my opinion, are comparable to learning motivation theories. Finally, though having scientific base, Octalysis has been developed in practise, through examination of computer games, resulting in practical and applicable toolset for designing, or analysing processes. After careful consideration of the models and

deeper understanding of Octalysis I propose to compare practise and theory through Octalysis and goal setting theory.

4.2 Octalysis

Octalysis is a framework for process analysis and design. The idea behind is that individuals making decisions about taking part in an activity, and to what extent, can be driven by 8 basic psychological drives.

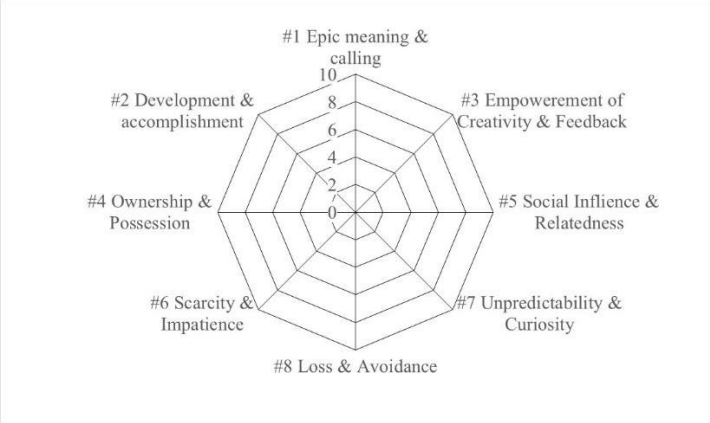

Figure 3 - Octalysis Framework
Source: You-Kai, 2017

These drives described by the author as follows. ***#1 Epic meaning and calling*** is a drive experienced by those who feel that they are a part of something bigger/more important and strive to contribute to this greater good. Such behaviour is the voluntary contribution to free Wikipedia article related work, or other contribution to a forum or other community***. #2 Development and accomplishment*** is an intrinsic motivational force about progress, personal development and defeating challenges. It is important to note that gamified gifts (badges, points, etc.). do not reflect the same meaning without challenges. ***#3 Empowerment of creativity and feedback*** relates to piloting and repetitions of activities to find out the best solution. It is essential to live out the creativity from within and also to be able to see its result, hence feedback***. #4 Ownership and possession*** drives people by endowing them with the feeling of actually possessing, or owning something, or feeling in control. Most of the points, badges and virtual remunerations belong here. ***#5 Social influence and relatedness*** accumulates social factors that motivate people, such as mentorship, social acceptance, companions and social reactions. Individuals driven by #5 feel being drawn to other people (or places, events) they can relate to. ***#6 Scarcity and impatience*** drives people who want something just because they do not have that. Typical example would be appointment dynamics on a web page (visit again at a later point to gather badge, etc.). ***#7 Unpredictability and curiosity*** steers individuals' attention to what will happen next. Very frequently used concerning TV series, books or any other material with

narratives. Finally, ***#8 Loss and avoidance*** drive makes us try to avoid a negative event. Fading opportunities, potential loss of work done are such examples.

4.3 Relation between Octalysis and the goal orientation theory

As discussed earlier learning motivation in practical terms can be applied through interventions, changes in pedagogical methods. In this chapter I aim to connect TARGET related activities with Octalysis, therefore forming a relation between theory and practice. Though these relations are based on the author's grammatical understanding of the phrases of Octalysis as well as learning motivation, the terms are quite abstract and the author judges that such level of abstraction leaves space for comparison of seemingly separate ideas.

The comparison is made by assigning Octalysis core drives to TARGET dimensions. **T**asks relate to #2 Development and accomplishment. **A**cknowledgement can be connected to #3 Empowerment of creativity and feedback as well as #5Social influence and relatedness. **R**esponsibility is linked to #4 Ownership. **G**roup work can be attributed to #1 Epic meaning and #5 Social influence and relatedness. **E**valuation has much in common with 2 Development and accomplishment and #3 Empowerment of creativity and feedback. Finally, **T**ime is accounted for in #6 Scarcity and #8 Loss avoidance.

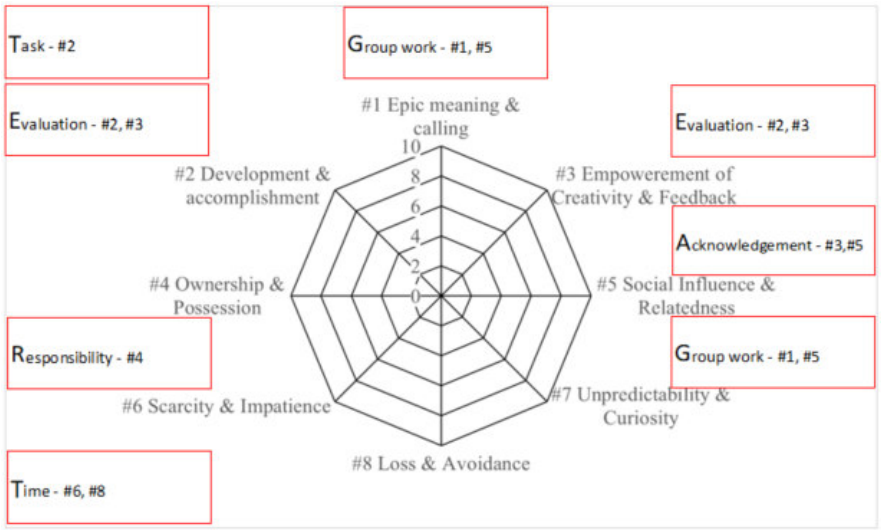

Figure 4 - Octalysis and learnin motivation building blocks together (edited by the author)

The importance of learning motivation connected to practical (actionable) gamification concept is that academic literature as well as business practice is rich

in examples of game elements[4] that are connected to core motivational drives. Though learning motivation is strongly determined by context, having a wide plate of possible tricks and hints up the sleeve of the educator gives opportunity for a new educational experience.

Conclusions

Education is in facing serious challenges, driven by digital age relating to changing habits, information technology and social media. Within the set of education, business and economics educators meet their own challenges originating from the even more complex markets, organizations and systems.

The impact of the most conspicuous generation #yz attributes has been discussed. Generations evolve over each other and differ from the previous generations, determined by changes of their era. The education system must adapt at least due to two reasons. On one hand, primary and secondary schools have already started alternative approaches to effective teach students who develop new learning behaviour and tactics. Students, who enter universities tomorrow, will learn in a different way. On the other hand, future jobs will require skills, such as creativity, initiative, critical thinking, resilience, attention to detail and complex problem solving (Schwas and Samans, 2016) which gives new direction for the education system. From pedagogy perspective the core challenge is to receive and anchor the attention of students and for this reason gamification seems a viable solution. There is wide literature with empirical research about the beneficial impact of gamified teaching, but the link between benefits and learning motivation research has not been fully explored. As learning motivation research has well known methodology it seems useful to connect the two motivational approaches, and if there is correlation, the impact of gamification could be approximated based on a well documented and widely used survey of learning motivation.

The core challenge in the next steps of this research is the mapping of survey questions to their closest gamification / Octalysis pairs potentially by slight changes in wording. Gamification literature offers a rich treasure chest of applied tool for pedagogy, so the outcome of this research can be a validated inventory of gamification tools and their (content dependent) impact on learning motivation.

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