

Students Engagement through Gamification in Education

Gamifying Formative Assessment

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Introduction

World is changing and how?

The web 2.0 has created a singularity effect in the life we lead. The communication and its dissemination; information gathering and its transference; knowledge acquisition and its application (Mishra and Kotecha) have all been changed in front of us, with us and by us.

The education sector is one the most susceptible sector as it caters to the society, economy and nation's growth. Since it has myriad stakeholders, it becomes extremely important to be updated and exhibit dynamism in its approach and processes. This is the time when the seamless world is offering myriad teaching-learning processes to the teachers across the globe; on the other hand, the students sitting in our classrooms are changing. The students, across the world in K-12 and higher education are now spurring debates, demanding reforms and making educationist policy makers to ponder upon the efficacy of the education system (Mishra and Kotecha 2016). Emergence of web 2.0 as a learning-teaching tool for millennials (Report 2010) was hailed fervently. It is believed and proven also that the technology-driven learning has actually changed the dynamics of learning acquisition.

Year 2013 was the year of MOOC (New York Times 2013) as substitute of traditional classroom teacher. It was thought that courses from Ivy League colleges with their apt content and best practices in teaching-learning will be able to emerge as the next-gen university (Mishra and Kotecha 2014), but later research suggested that completion rate of these courses are merely 13 % (Onah 2014). Thus, proving that content, in-your-own-pace/place and time can also not titillate the curiosity of the students.

In one of the survey which author conducted in an Engineering college of Western Region of India, teachers were asked to describe Successful Class. The teachers define it as – when the students are engaged through out. Most of the definition indicated one way or other a class as

successful- when students are active, participative and have shown curiously to learn.

Thus, methods to motivate student to learn has taken a back seat, but the method to create the conditions which facilitates the environ where students get motivated themselves becomes a challenging and have-to-do issue. question (Wendy Hsin - Yuan Huang and Dilip Soman 2013)

Teachers around the world are trying to see the philosophy and science of learning and try to adopt and adept that methods that can create these conditions. From 'Sage on the stage' to 'Guide by the Side', teachers are transforming and evolving themselves. It has shifted the paradigm of Teaching as a reverent act to learning as a fun thing (Mishra and Kotecha 2016)

Back Ground

Games especially online games are a 99.6 Bn industry. It has 58 percent of users from Asia-Pacific region (source: <https://newzoo.com/resources/>) The average age of the gamer is 32 years, and 25 percent of the users are below 18 years and 49 percent of them are from the age group 18-49 years.

The popularity and addiction of online gaming has surprised people, market and game developers. The insatiable appetite for the games and quantum of playtime by avid gamers indicates the hold and strong engagement with the gamers. In one of the research study, gamers were asked why they play game. The top answers were that it provides them challenge, creativity and winning. Other outcomes were social environment, friends, Problem-solving, random surprises, exploration, imagination, sharing, teamwork, role playing, recognition, and last but not the least triumphing (Ryan, R.B et al 2006).

Though there are many theories which have proven that playing the computer games give rise to number of adverse effects, which includes augmented desire towards violence,

inferior emotional and physical well-being, poorer achievement and efficiency, and badly managed personal and familial relationships (Anderson & Bushman, 2001; Healy, 1990; Gentile & Anderson, 2003; Setzer & Duckett, 2000). Some studies have shown that there are actually augmented psychological benefits from the game experiences, which includes a sense of efficacy and self-control over one's environment (e.g., Jones, 2002), enhancements in learning (Gee, 2003; Johnson, 2005), increase in the life span, as players vicariously live the life which brings them more happiness (Jane McGonigal 2012)

It is evident that games have the potential to yield both psychological harms and benefits to the players.

What is Gamification in Education?

Basically gamification is the use of game elements and game design techniques in non-game contexts. It is putting commonplace activities in game context. It also means integrating game dynamics into teaching content, pedagogy, and assessment in order to spur participation. A Game-designer defines gamification as the sequence of design principles, procedures and systems which motivate, engage and inspire individuals, groups and communities, and alter their actions and result desired results (Ray wang)

Why Gamification:

A recent study has shown that person gets motivated to perform their task in two ways – intrinsically and extrinsically (Pink 2011). Where Intrinsic motivation involves engaging in behaviour which is personally satisfying meaning performing a task for their own sake rather than by the desire for some external reward, and Extrinsic Motivation refers to the behaviour that is driven by external rewards like money, fame, grades, and praise. Pink has asserted that only intrinsic motivation makes person more engaged in the task. Rewards like good marks, placements and other achievements works but not to that extent.

One of the thing which makes intrinsic motivation so strong is because it offers autonomy (control of conditions by self), mastery (proficiency of the tasks) and purpose (clear understanding of the Why) (Pink 2011).

One of the very popular theories of gamification in real life is Octalysis (You-OI Chou 2003) which details the game elements in various tasks. This theory is used widely by game designers and games developer to make more engaging games. The core elements which are known as Core drives (You-OI Chou 2003) are:

1. Epic Meaning and Calling: This element is about giving person a role bigger than life. It makes them feel important and in control. The element can be incorporated in the classrooms with the projects which can save lives or improve the lives of the people.

2. Development & Accomplishment: It is inner purpose for self-development, honing skills, and overcoming challenges. The outcome is rewarded. This core drive stresses upon the challenges and encourages reward only after overcoming it. The rewards are points, badges, leader boards (also known as PBLs)

3. Empowerment of Creativity & Feedback: Enabling through Creativity & Feedback means users engaging in a creative process where they synthesise and build things. Examples are Lego, block building and painting as a highly fun yet fulfilling activity which does not need any other dynamic to make it more engaging.

4. Ownership & Possession: One of the most strong drive, it addresses the basic need of human being and that is owning something. This owner feeling drives them to do activities in better ways. This gets exhibited in making and updating profiles of themselves or making resumes too.

5. Social Influence & Relatedness: This drive calls upon the basic human nature which is to generate good will. This is the drive that propels people to experience mentorship, approval, social responses, camaraderie, along with healthy competition and desire to outdo others. It works on the premise that a better skilled/ owner person drives you to reach the same level.

6. Scarcity & Impatience: This principle is based on wanting or having something person can't have. It is Appointment Dynamics where person need to return back in fixed and scheduled time to get their rewards. This makes them think about the task entire day.

7. Unpredictability & Curiosity: This works on the simple principle of curiosity – what will happen next and anticipation. This randomness attracts the person to keep on checking it back.

8. Loss & Avoidance: This works on the principle of avoiding bad things to happen to us.

Most of the games (there are various categories of the games ranging from strategizing to exploration) work on reward system. The system is popularly known as the PBL system. It is: Point, Badges, Leadership board.

The Badges are used to encourage participation and reward for reaching specific goals. For example, awarding a welcome badge for joining the tutorial class or Platinum badge for the fastest Calculus learner of the week.

Points: Use to inspire engagement, teamwork and active participation in classrooms.

Leaderboards: Points are for leaderboards that boasts the standing of the person, there can be micro-leaderboard (inside a small group), macro-leaderboard (in the

classroom) or sectional-leaderboard (in entire batch). It boosts the standing and is used as a currency or barter system to barter other benefit.

Thus, the games are intricate and complex system surprisingly following the rules and principles. It propels gamers to think like a problem-solver, innovator and critical thinker so that to use the rules and form hypotheses so as to achieve the different levels.

One of the biological reasons for constant engagement of the gamers with games is weak but qualified. The challenges provide constant stress to the players, this cause rise of the hormone Cortisol in individual's system. The moment the player overcome the challenge, a surge of dopamine- pleasure inducing hormone is released (David J Linden 2011). This also makes the person powerful and superior to others. The player later become addicted to the rush of dopamine and thus want to clear hard and harder challenges.

Design:

Gamification in our classroom Project Reverse Grading:

The author after understanding the dynamics decided to inculcate them in one of the assessment module.

The project was Reverse Grading and was based on the principle of 'Loss & Avoidance' and 'Ownership & Possession'. Authors have not found any literature related with reverse grading in higher education institutes.

The pilot project was done for 22 students of IInd semester students of B. tech programme. The group meant to attend the lab sessions of the Communication Skills course. The lab session consist of presentation where the grading was done with the help of the rubrics. The rubrics have well defined criterion and descriptors. The lab session has a round of presentations of substantial weightage.

Before the commencement of the project, the students were made aware of the concept of reverse grading and after agreement from them it was administered. It was worked upon:

1. All the students were allotted full marks from the day one.
2. This includes slow and fast learners.
3. They now need to retain the marks.
4. They need to participate in classroom discussion after presentations, exhibit listening skill and other components of the rubrics.

After the round of Reverse Grading presentation round, students were also made to undergo another round of presentation and were evaluated through normal grading system. And the results were compared.

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Presentation Sheet						
No.	Roll No.	Non Verbal 5	Verbal 5	Content 5	Logical 5	Total 25
1						
2						
3						
4						
5						

Fig: 1. Sample of grading sheet.

Rubric for Evaluating Presentation skills Innovative Assignment

Sr No.	Criteria	Excellent (4)	V.Good (3)	Good (2)	Elementary (1)
1	Content Organization & Audience oriented approach	Logical Coherent Cohesive Use of Graphics/audio- visual aids Audience oriented	Logical Coherent Use of Graphics/audio- visual aids Audience oriented	Incoherent Ineffective use of Graphics/ audio-visual aids Less audience centric	Incomprehensive Disorganized At a beginner's level.
2	Subject Relevance & Knowledge	Original & well researched. Highly relevant.	Well researched but less original Relevant	Partially researched and not original. Less relevant.	Plagiarized content. Irrelevant. Lack of knowledge.
3	Grammar & Diction	Advanced proficiency.	Proficient	Less Proficient	Incoherent.
4	Non-Verbal	Excellent Body Language. Highly confident. Proper eye contact.	Good Body Language. Confident. Infrequent eye contact	Ambivalent Body Language Less Confident Less Eye Contact	Poor Body Language Nervous No Eye Contact
5	Oratory & Paralinguistic skills (Pronunciation, Pace, pitch, tone etc.)	Excellent Voice Modulation & Articulation Well audible	Good Voice Modulation & Articulation Quite Audible	Unclear Articulation Less Audible Monotonous	Poor articulation Inaudible Monotonous

Presentation score – (Based on Criteria 1-5) + Bonus (if any) = Final Score

Fig: 2. Rubric of the grading sheet

Results:

The comparisons between the grade cards are surprisingly reassuring. The reverse grading made students work hard to retain the grades. When the grades were compared, they fared better in the rounds which used reverse grading.

As the focus of this paper is to have gamification of teaching-learning process, we do not referred to the theories

related with assessments; instead we elaborated on how reverse grading is used as part of the learning activity.

When asked students what motivated them, one of the students who were from vernacular medium and a slow learner said, 'I never imagined that in a class like this I can have full marks. Now that I have these marks which made me equal to other students, I felt sanguine and internally motivated. It became easy to retain the marks'.

Another student said, "It is easy not to lose marks than to earn it, the thing which we already have is easy to protect and the thing which we don't have is tough to get, and this demotivates sometimes".

One of the students who was a fast learner said, "This concept which is so new actually made me enjoy the whole process and I was curious to see the result"

Concluding Remarks:

The potential of gamification is yet to be realized, as indicated in the study where it was evident that exploration of the efficacy of gamification for learning is needed along with our understanding of the nature of engagement in games (Connolly et al., 2012). The capricious students feel much more related with these tools which engage them in different manner using different behavioural theories. A prominent number of researchers now talk about the usefulness of the serious games and gamification for educational purposes, but still there is a lack of good and qualified empirical evidences that they improve learning outcomes (De Freitas & Jarvis, 2007). The authors have also used few tactics in their teaching –learning processes, insights of which are yet to be consolidated. The gamification i.e. use of game element and understanding of psych of Generation Z is becoming important every passing day, this thought is in sync with the study which found the gamified environment useful to improve students' learning outcomes in terms of pass rates (Cheong et al 2013))

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