

Gamification of Research Methods: An Exploratory Case

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Abstract

This work investigates the benefits of gamification in the taught research methods unit within the Business Management course. It utilises an exploratory design where the team attempted to use a gamified approach to teaching research methods. Two consecutive cohorts were chosen; both cohorts were studying research methods and had the same assessment, in the same format, and were taught and marked by the same teaching team. The first cohort studied the subject without any attempts in gamifying delivery, the second cohort engaged with a gamified curriculum. The latter cohort exhibited stronger final results and a higher level of engagement thus suggesting that a gamified approach to curriculum delivery enhanced the grade results. This first pilot then led to the development of a bespoke software that is imbued with the philosophical streaks from educational pedagogy and the learning literature to support a gamified approach to education.

Key words: Higher Education, Gamification, Student Engagement, Business Education

1. Introduction: The UK Academic Context

The British Higher Education context is rapidly morphing. The rise of fees in the UK Higher Education (hereinafter HE), the removal of student caps and the liberalisation of the sector (allowing new entrants such as BPP and Regent's University, both for-profit institutions) are all factors that have increased the competition among HE institutions for students (Anonymous, 2014). Research on student experience indicates some apathy and disengagement among the student population as students seem to adopt a stance of entitlement for their education (Soilemetzidis, Bennett, Buckley, Hillman, & Stoakes, 2014). However, the rapidly changing socio-economic context affecting the British HE institutions is one side of the dilemma; the other side is the pedagogical approach of HE institutions to education. The three-year long degree with its emphasis on textual information and its over-reliance on lectures and seminars may appear outdated to a younger generation that is able to acquire information at a much faster pace and in a diversity of formats beyond text via social media and the Internet (Culkin & Mallick, 2011; Kubler & Sayer, 2010). HE institutions find their own existence challenged with questions about their impact (AACSB, 2008) and their approach to education, feedback, and learning (Nicol & Macfarlane-Dick, 2006).

HE institutions have reacted to this challenge with a plethora of teaching approaches to rejuvenate the student learning experience. Blended learning, work-based learning, flipping the classroom, the MOOCs are just some of the fragmented facets of the HE response (Gibbs, Knapper, & Piccinin, 2009; Kubler & Sayer, 2010). However, a promising pedagogical approach to this brave new world of HE is the game-based approach to teaching and learning; also known as gamification (often technology-enabled) of academic activities. The next section will provide a review of gamification in the academic context.

2. Gamification in Higher Education

Games have moved into the mainstream (Alpert, 2007; Deterding, Dixon, Khaled, & Nacke, 2011) and their ability to engage and engross players poses an interesting paradox from the perspective of an educator. People are willing to commit enormous amounts of time and effort to playing games, and yet if they are students they may be disengaged from their studies. A review of the literature reveals that the main components that make a game engaging or even addictive could probably be distilled into four broad aspects of gaming (Dickey, 2007; Landers & Callan, 2011; McClarty *et al.*, 2012; Mead, 2010):

1. Rankings and Progression pathways that allow for continuous comparisons among players.
2. Narratives and socialisation/collaboration that allow for immersion in the game environment.
3. Scaffolded Learning with increasing Challenges (mastery) that allow for slow and yet gripping immersion to the game (the 'just one more turn' symptom).
4. Immediate (Multi-Layered) Feedback which allows for continuous feedback on progress.

A cursory examination of current higher education practice highlights that all four themes suggested above are inadequately developed in academic offerings and gamification has the potential to deliver great benefits (McClarty *et al.*, 2012). The rankings and progression pathways can be likened to grading and formative and summative assessments, however grading opportunities and assessments are typically delivered only twice or three times per semester; thus comparisons are not easily achieved as information is not publicly available. When it comes to narratives, educational narratives are weak; assessments are not linked to a meta-narrative; they tend to be stand-alone items. The scaffolded learning with increasing challenges that tends to get the gamer addicted to gaming is not well developed in educational contexts, especially with the focus on HE as fostering independent study; a perspective that often seems to excuse poorly designed material and poorly developed educational content (Nicol & Macfarlane-Dick, 2006). Finally, with regards to immediate feedback, the feedback is not immediate, with the average HE institution providing detailed feedback three weeks after submission of any summative assessment.

Pioneering academics within HE have been experimenting with the gamification of the curriculum for many years. Examples abound from the incorporation of MMORPG mechanics in role-playing in the classroom (Susaeta *et al.*, 2010) to simulations that use game mechanics (Dubbels, 2013). However, gamification attempts in HE have proven to be challenging: often the educators adopt gamification principles rather mechanistically and in a piecemeal fashion (McClarty *et al.*, 2012). In other cases, the process is managed by technologists and there is too much focus on the mechanics of the gamified process that often ignores the underlying philosophy and pedagogy that should guide the gamified activity (Dickey, 2007; Wu, Chiou, Kao, Hu, & Huang, 2012). Not all games are appropriate for all academic activities and they have to be fit for purpose, which requires imagination, continuous feedback from the users, and a continuous trial and error process that would help refine these activities (Hamari, Koivisto, & Sarsa, 2014; Landers & Callan, 2011).

This article presents a novel attempt to gamify the curriculum of a module in business research skills that focuses on the importance of narrative (aspect number 2 from the mechanics presented above) and hopefully provides some insights into how narratives can facilitate a gamification attempt.

3. Research Design

This exploratory research emerged as the course team faced a problem with the delivery of Business Research Skills (hereinafter BRS), a Level 5 HE module. Traditionally, students on this particular module performed very poorly, with low attendance (especially for the seminars) ranging from 20%-40% attendance. The October cohort 2013-14 was no exception and the poor results prompted action from the course team. The course team conducted a quasi-experiment (De Vaus, 2001) with the subsequent cohort, the February cohort of 2014, by holding all aspects of the module the same but added a gamification element during the seminars. The following table compares the characteristics of each cohort and highlights further the fact that the main difference between the cohorts is the addition of the gamification element:

Dimension	October Cohort 2013-14	February Cohort 2014
Period of Delivery	15 Weeks	15 Weeks
Number of students:	77 students	50 Students
Contact hours per student	36 hours	36 hours
Team Delivering the module	2 tutors	2 tutors plus an additional tutor delivering the gamification element
Team Marking the module	2 tutors	Same team
Gamification Delivery per student	0 Hours	10 hours of gamified content

Table 1: Comparison of the dimensions between the two cohorts

The two cohorts had a similar profile before they were taught the module. The main outcome used to measure the effectiveness of the gamification component was the grade distribution. The assumption is that the gamified component would be the main reason for any substantial differences noted between the two cohorts. The experimental research design is shown in Figure 1 below:

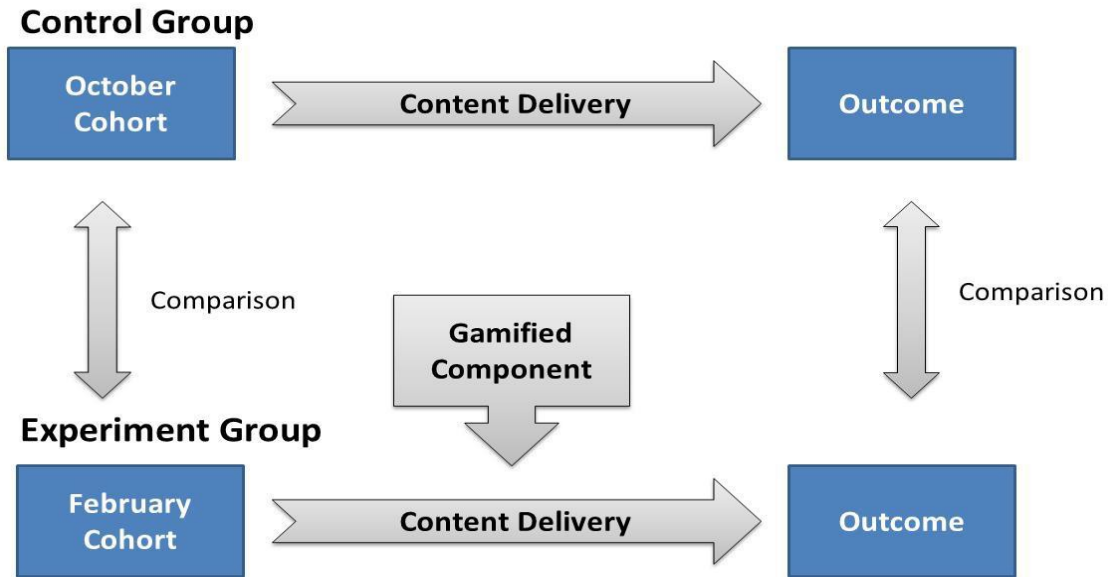


Figure 1: Experimental Research Design

The gamification component for the February cohort covered five seminar sessions; which were converted into a series of activities that together formed five rounds of a competitive league engaging eight teams of students. Parallel to the group rankings there were individual scores.

The activities undertaken by the students of the experiment group as part of the gamification were varied in order to test a variety of skills and abilities as well as to ensure that different teams would win each round so that no team would dominate this competitive process. Quizzes were designed to test retention of knowledge, debates were used to test understanding of high-level concepts in research methodology and to practise rhetoric, while mini-presentations/vivas were utilised in order to test students’ main ideas for research and their abilities to articulate these ideas. All these skills were relevant to the BRS module and were designed to prepare students to deliver the summative assessment successfully.

4. Data Analysis

Below [Figure 2] an outline of four of the activities undertaken and team performance for each of the first four rounds:

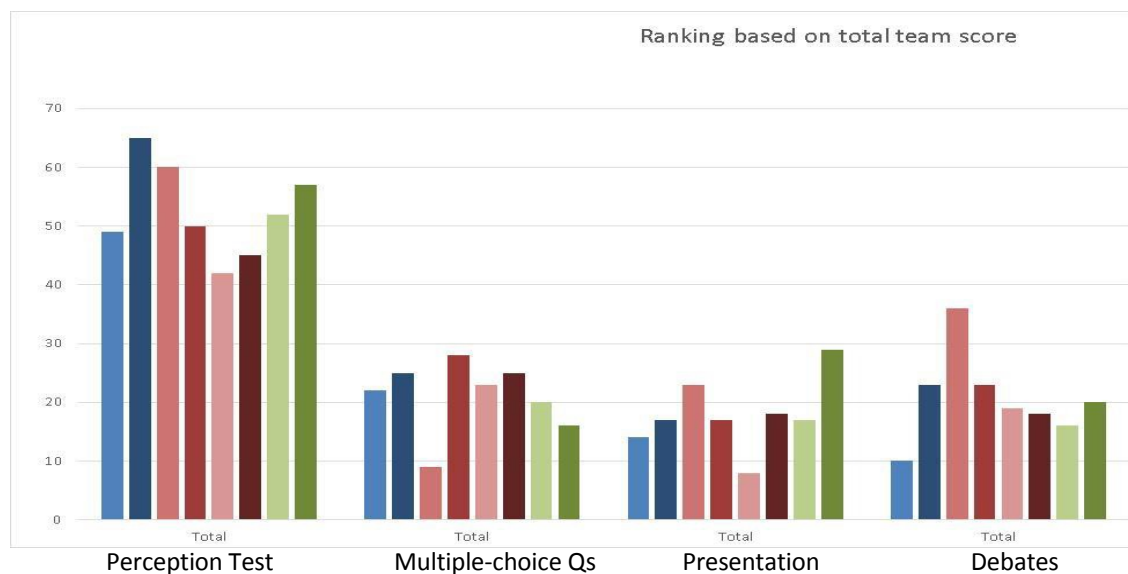


Figure 2: Score for each Team Activity

Each colour represents a different team and their results according to a point system. As we can see, there is a fluctuation with regards to the identity of the winning team, as different teams do better with different activities.

The relative grade distribution indicates a higher involvement from the February cohort and overall better results with a much higher proportion of 2:1/1st class module results in relation to the October cohort and far fewer failures proportionately [see Table 2 below].

February Cohort			October Cohort 2013-2014		
Classification	No. of Students	% of students	Classification	No. of Students	% of Students
1st Class	2	4.00%	1st Class	3	3.90%
2:1 Class	11	22.00%	2:1 Class	7	9.09%
2:2 Class	10	20.00%	2:2 Class	30	38.96%
3rd Class	24	48.00%	3rd Class	26	33.77%
FAIL	3	6.00%	FAIL	11	14.29%
Grand Total	50	100.00%	Grand Total	77	100.00%

Table 2: Comparing grade distribution of the two cohorts

The average grade in the February cohort was 54% while in the October cohort the average grade was 47%; a substantial difference in assessment performance. With demographics being effectively the same, academic abilities assumed similar, the marking team identical and the size of cohorts comparable, the experimental intervention (the introduction of a gamification component) is most likely the reason for the substantial difference in performance.

4. Discussion

The comparison of the grade distribution between the two cohorts strongly indicates that gamification has had a positive effect on student engagement. This outcome supports the literature on game-based learning which overall indicates that gamification does improve the engagement and performance of students (de Sousa Borges, Durelli, Reis, & Isotani, 2014; Hamari *et al.*, 2014; Wu *et al.*, 2012).

The design of diverse gamified activities bore fruit. Different individuals and different teams won each round thus indicating that the challenges were diverse. Attendance improved, engagement increased and the actual performance was substantially higher in the experiment group (Feb cohort) than in the control group (Oct cohort) in what was deemed to be one of the most problematic modules of the curriculum.

The positive results of this pilot have led to the creation of an internal project funded by the University of Bedfordshire Student Experience grant that aims to gamify aspects of the curriculum with a focus on developing study and employability skills. The project aimed to develop a focused gamified pedagogical approach that would be supported by a web-based platform and would emulate the successful elements distilled from our pilot studies, and the extant literature on gamification.

5. Web-Enabled Gamification: Current and Future Developments

The pilot outlined above clearly demonstrated that the software needs to support a range of different activities and should facilitate their delivery in a flexible, user-friendly manner. However, the bespoke software has the added advantage that it would allow real-time access and continuous engagement inside and outside the classroom utilising a number of devices including tablets and mobile phones. The designed web-based platform would work on similar principles to popular persistent browser-based, massively multiplayer online real-time strategy games (MMORTS) and would assume that social interactions are vital for student engagement and are mostly happening off the game alongside the platform (though the platform allows for internal communications). MMORTS also maintain an environment of competition among players by providing a variety of matrices and statistics for players to peruse and thus benchmark their progress against other players.

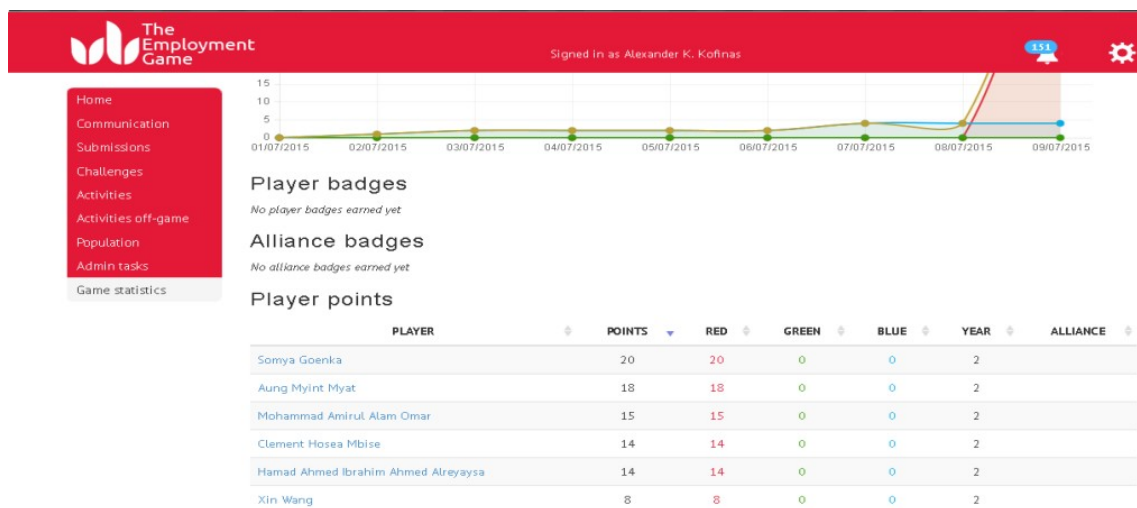


Figure 3: Rankings of Players

Another important aspect highlighted by the pilot was the importance of rankings, an aspect that is seamlessly incorporated in the software as students can see their progress as they complete each activity, on a group level and an individual level as demonstrated in figure 3:

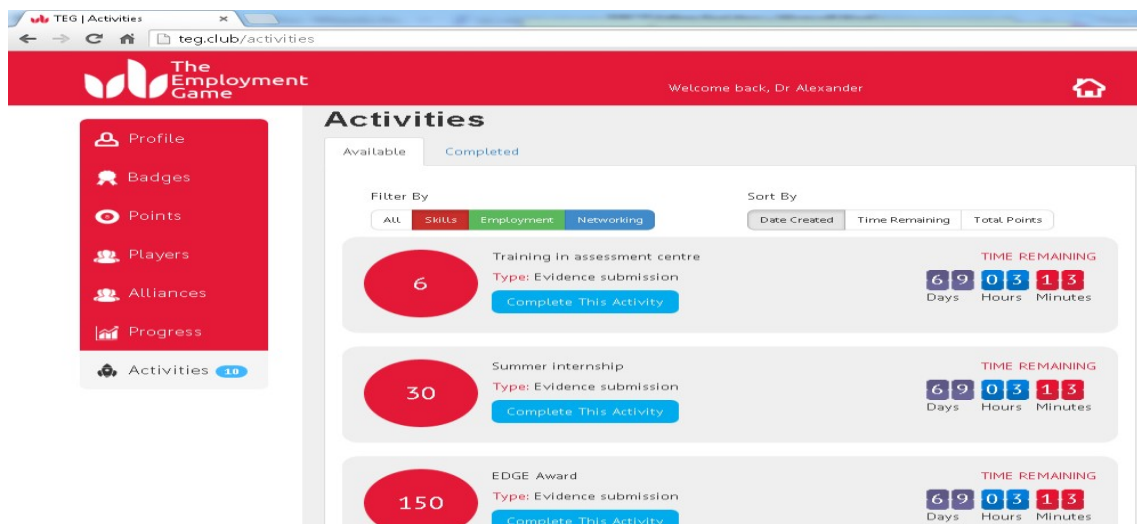


Figure 4: Range of activities a student can undertake

At the same time MMORTS allow cooperation by providing mechanisms for forming guilds and alliances where players come together to interact and socialise while they compete against each other. Any player could form a guild, as demonstrated in Figure 5:

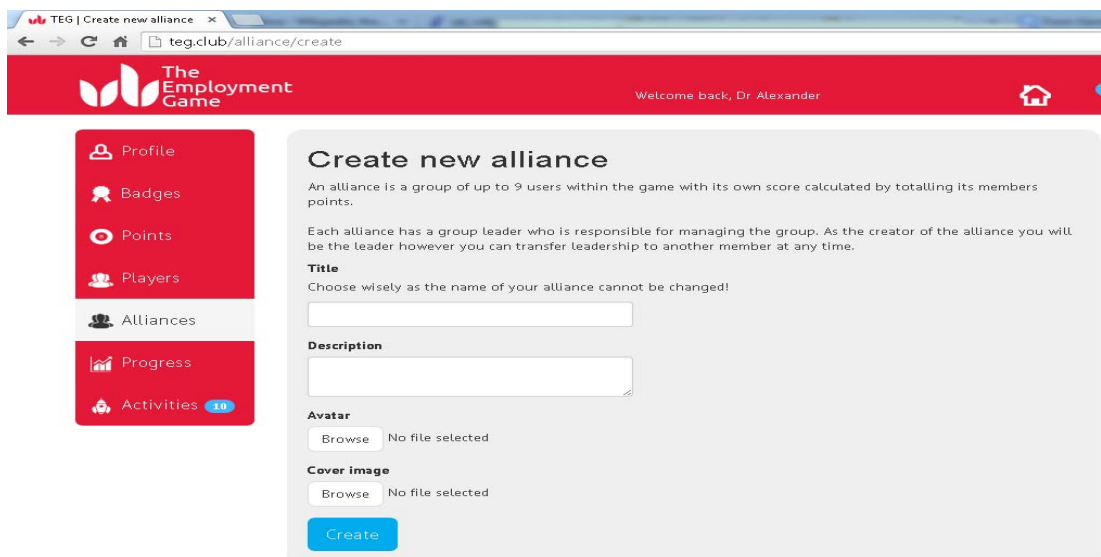


Figure 5: Web-Page for Creating new Alliances

This desire to cooperate and compete is a characteristic of the millennial generation (Popescu, Romero, & Usart, 2013) where often they will cooperate/compete around a focal activity and thus propel the whole community forward (Dery, Tansley, & Hafermalz, 2014; Massanari, 2013). This is a dynamic that if harvested can be very productive and is implicitly one of the aims of the web platform. The narrative typical of MMORTS has to be adjusted to the context of Higher Education; the first pilot lacked in narrative and it was short (five activities over five weeks). There is a need for a longer narrative, maybe a year-long competition that will resemble the quest narrative and will be individual and team-based.

As the pilot showed, even the BRS module which is considered a very academic module can be gamified. As this is the module that leads to an academic dissertation, the team is considering converting the dissertation into the backbone of the competition, with the process emulating the structure of a quest and the ultimate goal being the creation of the dissertation report:

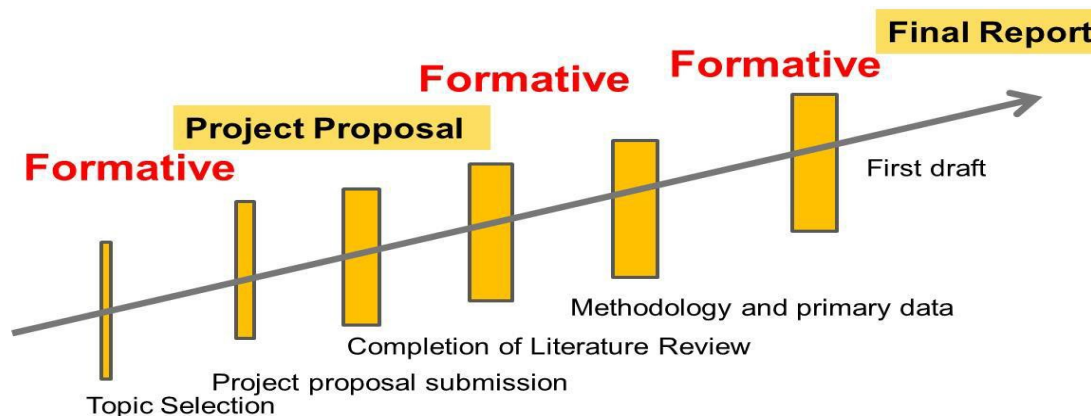


Figure 6: The final year dissertation as a Quest Game

Most of the obstacles that would be gamified are formative assessments instead of summative. The aim is for the student within the context of her personal quest to engage with activities that enable and enhance learning; thus the game should be designed so that students may fail when practising with formative assessments so that they can succeed when submitting a summative assessment. The pedagogy behind this new (for our university) approach to learning is based on the idea that students learn experientially by trying new things in a competitive/cooperative context and that the double-loop learning process of failure is as important as the single-loop learning process of success.

If we were to plot the whole module along time it could be seen as a continuous process of gamified activities that enable the student to undergo a series of single and double loops of learning experience (Argyres, 2004), as demonstrated in figure 7:

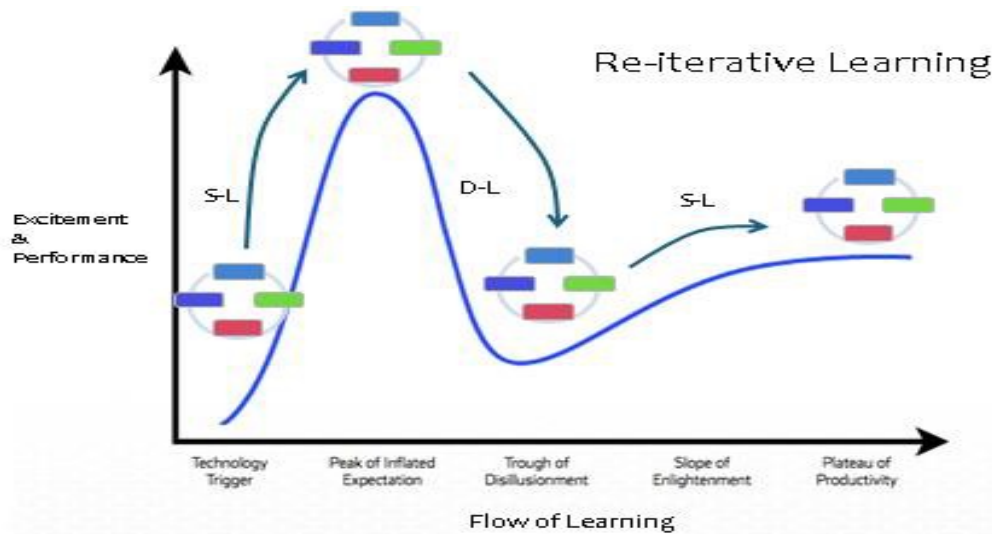


Figure 7: The continuous and re-iterative nature of Learning (author work adapted from the hype cycle popularised by Gartner Research (for example: Redman, Dulaney, King, & Pittet, 2004))

This year, 2015-16, the first version of this web-enabled 'gamified approach' to teaching was rolled out. The course team is aiming to address some of the weaknesses of the earlier design. Data will be collected at a more detailed level with regards to attendance and student performance in real time rather than at aggregate level. Feedback will be sought via interviews and surveys rather than relying on results alone as the current exploratory experiment scores low in validity.

6. Conclusion

The first gamification pilot (and others not described in this paper) alerted the course team to the benefits of gamification. The learning achieved by the team in these pilots has led to the creation of a bespoke software that combined the team's experiences with gamification, knowledge gained from extant literature and basic principles from MMORTS games to develop a novel approach to educational content delivery as a gamified system of progression that is not shackled by the formal summative elements of educational activity.

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