

# The hero's learning journey

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## Abstract

**Purpose** – The purpose of this paper is to discuss how educators can harness the natural momentum of learning to create a dramatic and exciting hero's learning journey. Given the importance of motivation, educators can borrow ideas from game designers by using gamification – a process to re-frame a real life goal to be more appealing and achievable. A series of learning activities, developed to meet both cognitive and emotional needs, results in an engaging learning journey.

**Design/methodology/approach** – The concept presented, based on PSI Theory, OCEAN Big Five character traits and player/learner archetypes, is that learners are motivated by three basic needs: affiliation, competence or certainty (assuming other physiological needs are met).

**Findings** – Armed with insight into types of motivations at different phases, learner experience designers can create different learning journeys and user profiles. Learning activities can be planned for each need and phase based on changing motivations: collaborate and curate (affiliation), choice and ownership (certainty), challenge and accountability (competence).

**Research limitations/implications** – Further research is needed in the area of gamification in education. A qualitative study should be conducted on preferred learning and assessment activities for each player archetype and, importantly, this research should represent broad samples and not be restricted to the online gaming community.

**Originality/value** – Rather than focussing on an isolated unit of study, and asynchronous eLearning modules, learning designers can use modern technologies to seed and nurture learning communities where each person has an appealing pathway to enable them to move from novice to expert at their own pace in a spiral of satisfying learning.

**Keywords** Motivation, Education, Gamification, Instructional design, Learning design, Player types

**Paper type** Conceptual paper

## Introduction

This paper discusses how educators and learning designers (also known as instructional designers) can harness the natural momentum of learning to create a dramatic and exciting hero's learning journey (Kort, 2008). Learners differ in their motivation and what they experience as a fun and engaging activity. What they found fun yesterday may change today as motivations not only change in different contexts, but also change over time. Rather than self-motivation to learn resulting from having a "good" attitude, being part of a "good" family, or a "good" school, enjoyment in learning is based on individual-specific experiences and preferences (Kovas *et al.*, 2015). Game designers are funded to primarily focus on player engagement and emotions, so they use a range of game/play elements to ensure that players are challenged, entertained and satisfied. Game designers also focus on multi-player options, which are akin to creating learning communities, for players to find inspiration and challenges along the way. Given the importance of motivation, educators and learning designers can borrow these ideas from game designers by using a gamification – a process to reframe a real life goal to be more appealing and achievable.

Learning designers can benefit from understanding and applying theories of motivation from fields of psychology, organisational behaviour and dramaturgy to the classroom, such as the PSI theory by Dörner and Güss (2013) that, "not only models cognitive, but also motivational and emotional, processes and their interactions". The PSI Theory of emotions asserts that, assuming basic physiological needs are met, actions result from an individual meeting their needs for: affiliation, competence or certainty. Certainty is a, "need for knowledge which allows prediction and explanation of events". Competence is a, "need for behaviour patterns, which enable a person to cope with all kinds of problems". Affiliation is a, "need for binding (attachment) to a person or a group of persons,



it determines social cohesion". These three PSI needs are related to the Big Five personality traits of: openness, conscientiousness extroversion, agreeableness and neuroticism or "OCEAN" (Lim *et al.*, 2012). When there are no urgent needs in any of the three PSI areas, the learner is fully open to discover and absorb new ideas, which maps to the OCEAN trait of openness. Monica Mayer (2009) used Dörner's PSI theory of emotions to explain the motivations underlying Bartle's (1996) four player types which are used by game designers to address and balance a wide range of player motivations.

During the learning journey motivation and emotions will change, somewhat predictably, over time. There is a natural momentum of curiosity, hopefulness and frustration which leads to satisfaction (Kort, 2008). Using Joseph Campbell's hero journey, and Bartle player types, patterns in these motivations can be identified. Each phase is a precursor to the next and essential to complete the journey with new values and skills embedded as part of their life. When the learner returns to their "ordinary" lives they are now more powerful and versatile due to a process of authentic, and engaging, learning.

Based on these patterns of motivation, educators can build learning journey maps of successful learners' experiences. Learning journey maps are used by UX experience designers and learning experience designers as part of a human focussed design process (Seitzinger, 2015). Learning designers can then plan activities and assessment that are in synch with what motivates students at each phase of their journey. Conversely, they can identify the most likely reason for disengagement at each of the phases. They can also identify at which points in their journey the learner will benefit from the teacher directing, coaching, supporting or delegating, as explained by Hersey's (1985) situational leadership theory. The long-term goal is to embrace the natural momentum of learning, and learning communities (communities of practice), by creating an environment where anyone from a novice to a visionary feels welcomed and valued (Stuckey, 2007; Oliver and Carr, 2009). Along the way peers, mentors and gurus create challenges and offer support to ensure the hero keeps progressing at whatever pace they choose. The aim of this approach of the hero's learning journey, and insight into learner motivation, is to design educational activities to appeal to a wide range of constantly changing motivations.

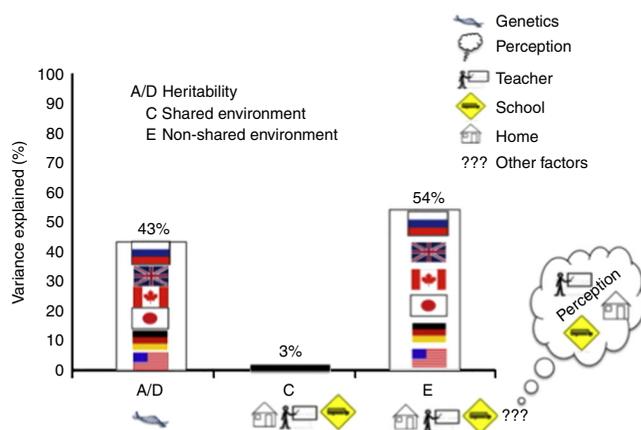
### **Why we differ in motivation to learn**

Lack of engagement and enjoyment when learning is puzzling and of serious concern (OECD, 2016). A common reaction, as summarised by motivational researcher Petrill, is to say, "someone is not properly motivating the student, or the child himself is responsible", (Kovas *et al.*, 2015). An extensive study of sets of twins disputes this opinion. The results of the study, "Why children differ in motivation to learn: insights from over 13,000 twins from 6 countries", found that:

Contrary to common belief, enjoyment of learning and children's perceptions of their competence were no less heritable than cognitive ability. Genetic factors explained approximately 40% of the variance and all of the observed twins' similarity in academic motivation. Shared environmental factors, such as home or classroom, did not contribute to the twin's similarity in academic motivation. Environmental influences stemmed entirely from individual specific experiences (Kovas *et al.*, 2015).

By comparing how close the answers were for fraternal twins with identical twins (who share all of their inherited genes), the researchers established a strong genetic effect. This was not surprising, but to have virtually no shared environment (3 per cent) component was unexpected (Figure 1):

Considering the striking consistency of these results across different aspects of academic motivation, different subjects, different ages, and different cultures, we believe that it is time to move away from solely environmental explanations, such as "good" or "bad" home, teacher, and school, for differences in enjoyment and self-perceived ability (Kovas *et al.*, 2015).



**Notes:** Average heritability, shared environment and non-shared environment for enjoyment and self-percieved ability from six large-twins samples. The sample in which anomalous result of non-significant heritability was found (enjoyment of German at age 9) was excluded from the figure. The schematic drawing of home, teacher and school are included in both shared and non-shared environment legend – to reflect that such factors can lead to similarities and differences in family members. Non-shared environments may also include perceptions of these factors

**Figure 1.** Genetics and non-shared environments affect an individual level of enjoyment in educational activities

Therefore, if enjoyment, and engagement, of learning experiences are equally based on our genetic inheritance (43 per cent) and our unique and personal preference (54 per cent), regardless of our home and school shared environments (3 per cent), then learning designers need to address both cognitive and emotional needs of leaners. The first step in this process is to explore how fun and play relate to learning.

### Play and learning theories

Play and learning are closely intertwined. Theorists and philosophers like Dewey, Steiner, Vygotsky, Piaget and Montessori speak of the importance of play in learning (Huang and Plass, 2009). Fun, curiosity and play are fundamental to progressive and constructivist learning theories and methodologies such as: project-based learning, inquiry-based learning, multi-disciplinary approaches, adaptive learning and personalised learning (Kapp, 2012). Humans have evolved because they play and it is through cognitive evolution that learning became “fun” due to substances like Dopamine being released as a reward (Brown, 2014). Raph Koster (2013) argues that we stop playing a game when we have figured out the challenge, so fun is just another word for learning, or to be more precise, the curiosity to learn is what is fun.

An alternate view of play and learning is to separate work, as “productivity”, from play as being “trivial”, which leaves little place for play in serious education. This ongoing debate about what education should be, goes back to Socrate and Aristotle’s opposing views on reality being subjective (traditional) or objective (progressive), these are, “opposing, irreconcilable, extremes underlying the tension in the centuries old Education debate” (Wheeler, 2015). Gamification, by definition, is directly linked to productivity, yet is still often perceived as a waste of time (McGonigal, 2011). Terms like fun, play and games are complex and implicit and should not be assumed to mean the same thing to all people.

Exploring their use in our everyday language and redefining these terms is the first step to fully embrace the power of play in learning and addressing boredom, lack of confidence and agency (McGonigal, 2011).

### Games, game-based learning and gamification

While education has always, naturally, involved a little bit of play, conversely, bards, storytellers and game designers make play and entertainment the highest priority while they squeeze in a little bit of surreptitious learning. There has been a recent increase in the term gamification to describe a merging of game elements into “non-game” contexts (Zichermann and Cunningham, 2011). There is ongoing debate over the use of the term gamification and what is a “non-game context”. “Gamification” is an umbrella term used to mean different things to different people; gamification could be a product, a way of thinking, a process, an experience, a designerly way, and a system, all at once (Raftopoulos, 2015). This is in line with the complex interpretations of the underlying terms of play and fun. This paper, which has an educational focus, proposes a definition of gamification as, “a process to reframe a real life goal to be more appealing and achievable”. Keven Werbach (2014) focusses on the difference between a game as a “product” and gamification as a “process”. Whether the output is a “game” or not can be hard to define, as gamification and games are fluid concepts drawing on play at their root as depicted in Figure 2. However, in contrast to the subtle differences at the output end, there is a clear difference between a game designer and a gamification designer as outlined in Table AI. Learning designers need to understand that they do not have to have a huge budget and make a highly interactive or structured “game”, for it to be called “gamification”. The game elements used to enhance motivation may be subtle and barely invisible to participants. Traditional schools and courses are, in fact, already “gamified” as they use points (grades), levels (years) and challenges (exams). The question is how to use these game elements in a way that is motivating, rather than de-motivating to a broad range of learners. Being bored or and feeling behind (incompetent and overwhelmed) at school are the two highest reasons for dropping out (Azzam, 2007). Unlike other socio-economic and personal factors that affect drop-out rates, these are two areas where educators do have an influence.

Whatever labels we place on these products as being games, or not, what they have in common is justifiable focus on player/learner emotional engagement. If games, play and motivation are assumed to be an essential part of the learning process, the next question is to look for predictable patterns of motivation for design purposes. What will attract someone to cross the threshold and engage? What will keep them challenged enough to

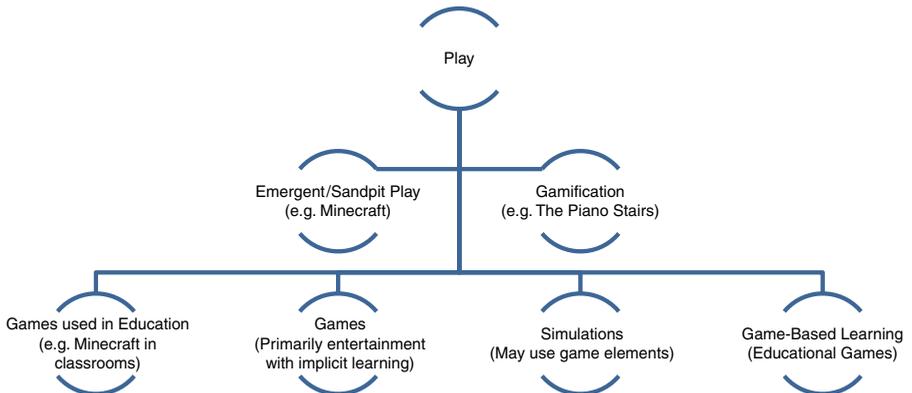


Figure 2.  
Play and game genres

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practice skills and look for knowledge to solve problems? What will build their confidence and resilience to face failures and mistakes? What will motivate them to embed new skills and values and build up to being an expert or visionary in this field?

### **Bartle player archetypes and learning journeys**

Creating player/learner archetypes can assist in the learning design process. We all develop familiar behaviour patterns; however, we are not one “type” or style of learner or player (Pashler *et al.*, 2008). When you join a new learning community, you are trying to figure out the new environment and people, and the skills you will require to move on from being a novice. As you mature your motivations change as you settle in to the new culture and acquire new skills. Although player/learner motivations are constantly changing through this process, Richard Bartle (2005) observed that the changes in player motivations over time were somewhat predictable. His observations of behaviour were in multi-user dungeon virtual worlds, yet they have often been applied in other contexts. Bartle (1996, 2005) described four player types which he later extended into eight player types. The person moves between these player types as they become more confident and capable. For example, learners, who start off being domineering, as “Griefers” or controlling Mother Hen types, have the potential to become “politicians” and later “friends”. Two main player tracks were identified, with opportunities to cross-over at various points. The four basic player types of socialiser, explorer, killer and achiever and tracks are described fully in Table AII.

Bartle (2005) compared the virtual world to the hero's journey where people master new skills and then they move on to the next phase. A well-designed game matches the challenges to the progression in the journey from self-ignorance to self-mastery as a hero as shown in Figure 3:

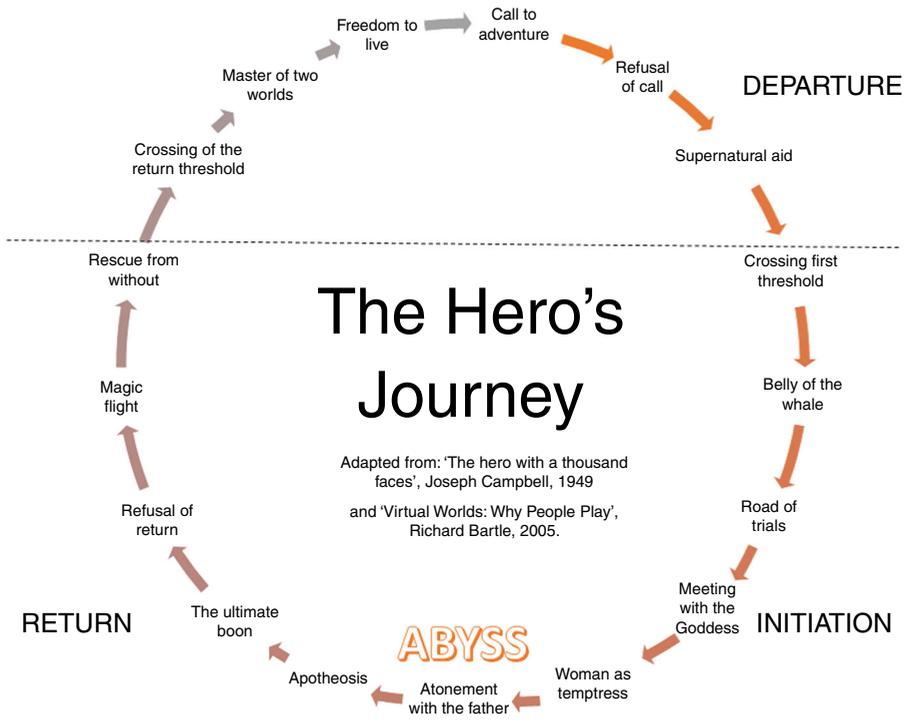
The individual travels from the mundane world to be reborn into an “other world” of danger and the unknown, where normal rules do not apply and in which the bulk of their adventure takes place; having succeeded there, they then return to the mundane world armed with new knowledge and experience (a renewed sense of self), to address whatever issue drove them to the world of myth in the first place (Campbell, 1949).

In the same way that a well-designed game matches the challenges to the progression in the journey from self-ignorance to self-mastery as a hero, it is the challenge for the learning designer to plan that most learners “become their characters” at roughly the same time that their characters' skills become internalized”. With this authentic and deep learning process, the next spiral of learning can commence and build on the natural momentum of playful, dramatic and curious learning. Amy Jo Kim (2014) explains the player journey in similar terms:

Character transformation is the backbone of great drama – and personal transformation is the backbone of great gameplay. At their core, games deliver a learn→ practice→ mastery arc that's deeply, intrinsically motivating. In games, WE are the protagonist – the person with agency, facing a series of choices and challenges along a meaningful journey. Games are pleasurable learning engines. It feels good to engage our brains and get better at something.

To further explain each main phase of the hero's journey, Bartle (2005) uses the analogy of a baby learning to walk, at first they thrash about trying to figure out what these arms and legs can do eventually they walk without explicit thought. As we get to know a new environment our motives are to build our competence, reduce uncertainty and meet our needs for affiliation. This results in “social dominance” or “opportunist” explicit behaviour during the first phase of learning.

The next phase as we “start to walk” we take on a few small problems. Now we are primarily motivated by the need to build our competence. There is less aggression and attempts to prove our self-worth, our belonging, or prove ourselves capable. We may take a trial and error approach like a “scientist”, or ask other people as a “networker”.



**Figure 3.**  
Adapted from Joseph Campbell's (1949) hero with a thousand faces

Sources: Adapted from Campbell (1949), Bartle (2005)

Once we have mastered the basics we are ready for a real challenge. We look for opportunities and worthy components. Some people play as “politicians” with their new found social power and others become “planners” focussed on noting up as many achievements as they can.

In the final stage, you feel like you belong and are capable. Challenges do not interest you anymore because you believe in your own competence. You are now interested in “hacking” the system you now thoroughly understand, and transforming it. Or perhaps you just hang around as a “friend” because you like it here as the local Guru. Your actions are now implicit. Bartle (2005) describes this process as, “locate to discover to apply to internalise” which is how learning works in general.

Game designers and gamification designers have used and adjusted these observations of player types; however, they are not based on research or a formal theory. Bartle (2005) encourages more work in this area to further understand player motivation, and in which contexts this framework should rightfully be applied. There are relevant fields of study, and established theories, that offer a strong research base to create learning journeys. Two of these are discussed in this paper: PSI theory and OCEAN Big Five personality traits, with a discussion on how they relate to the hero's learning journey and Bartle player types.

### PSI theory

Reasons for changes in motivation throughout a learning journey can be explained using the PSI theory of emotions. Unlike other theories that separate emotions and cognitive processes, PSI theory: “not only models cognitive, but also motivational and emotional, processes and their interactions” (Dörner and Güss, 2013). The theory is that,

assuming basic physiological needs such as food, water and maintenance of physical integrity are met, actions result from an individual meeting a one of three needs: certainty is a, “need for knowledge which allows prediction and explanation of events”; competence is a, “need for behaviour patterns, which enable a person to cope with all kinds of problems”; affiliation is a, “need for binding (attachment) to a person or a group of persons, it determines social cohesion” (Dörner and Güss, 2013). See Appendix 3 for further descriptions of each need.

These needs, also referred to as “drives”, are conceptualised as fuel tanks with an alarm level to indicate urgency of need to refill, along with inlet and outlet valves which vary in size (see Figure 4). Changing any of these parameters will affect motivation and hence behaviour, as has been successfully modelled with robotics and computerised agents in MicroPsi and OpenPsi (Bach, 2003).

The state of these three fuel tanks create various combinations, as described by Mayer (2009), are depicted in Figure 5 (available at: [www.moojoo.com.au/the-heros-learning-journey/](http://www.moojoo.com.au/the-heros-learning-journey/)).

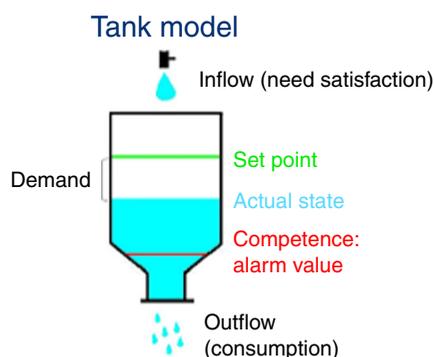
### PSI theory and OCEAN Big Five

The basic PSI needs are related to the OCEAN Big Five personality traits neuroticism, extraversion, agreeableness, conscientiousness and openness. Fleeson (2004) suggests that the traits should not be conceived of as dichotomies (such as extraversion vs introversion) but as continua. The person has the capacity to slide up and down each dimension as (social or temporal) circumstances require. More than one dimension can affect a particular PSI need. For example, the extraversion dimension is derived by high importance in affiliation needs, while the conscientiousness dimension involves two needs: competence and certainty (Nazir *et al.*, 2009). Each OCEAN trait is assigned a value ranging from 1 to 5 to create a character type. These measurements were then used in computerised agents to test the PSI theory against the OCEAN personality dimensions:

The need for affiliation is affected by both the extraversion (high importance) and agreeableness (low importance) dimensions) and the final weight for each drive is calculated by averaging the mapped values for the relevant BIG Five dimensions. Thus, the weight for need of affiliation for character A would be  $(0.8 + 0.6)/2 = 0.7$  (Lim *et al.*, 2012).

When virtual mice were programmed with these values they became introverted in their behaviour and other mice were programmed to be more extroverted. Although the introverted mice learned about their environment faster, overall their numbers did not reproduce to ensure the survival of their whole community:

The extroverted mice were more able to make their way, were more cordial (more help missions, less aggressions), although they run more often into dangerous situations, more explorative,



**Figure 4.**  
PSI Theory of  
emotions analogy  
of fuel tanks to  
explain motivation

displayed less affirmative perception than the introverted mice. Especially the fact, that the extraverteds were better able to adapt to their environment, shows that success is not only dependent on cognitive functions. Emotional regulations play a decisive role for the adaptiveness of an agent (Dörner and Gerdes, 2012).

As educators, the lessons in this is to balance individual advancement, based solely on cognitive needs, with affiliation (a non-cognitive need) to ensure that whatever cognitive skills are possessed are shared for the benefit and longevity of the whole community.

### **PSI theory, OCEAN and player types**

A German Psychologist, Monica Mayer (2009), interviewed people about their gaming habits and preferences in order to understand and map their motivations using Bartle player types. Dörner's PSI theory was used to further explain player motivations and especially how and why people moved between the player types. The tables, in Figure 6 (available at: [www.moojoo.com.au/the-heros-learning-journey/](http://www.moojoo.com.au/the-heros-learning-journey/)), show how an urgent need for all three fuel tanks to be refilled results in "killer" behaviour. While a comfortable level in all tanks allow for explorer behaviour, which will constantly refill the competency tank. When the learner is fully open to discover and absorb new ideas, this maps to Bartle's "explorer" type and, by extension, the OCEAN trait of openness to experience.

A Game Designer from Ubisoft, Jason Van denBerghe (2013), wondered if the Big Five traits reflected gamer preference. His qualitative studies into player types found correlation between the games people purchased and their Big Five personality types, excluding one type – neuroticism. Jason identified four different areas where people sat on the OCEAN spectrums of: seeking challenge, novelty, stimulation or harmony/disharmony (see Figure 7, available at: [www.moojoo.com.au/the-heros-learning-journey/](http://www.moojoo.com.au/the-heros-learning-journey/))

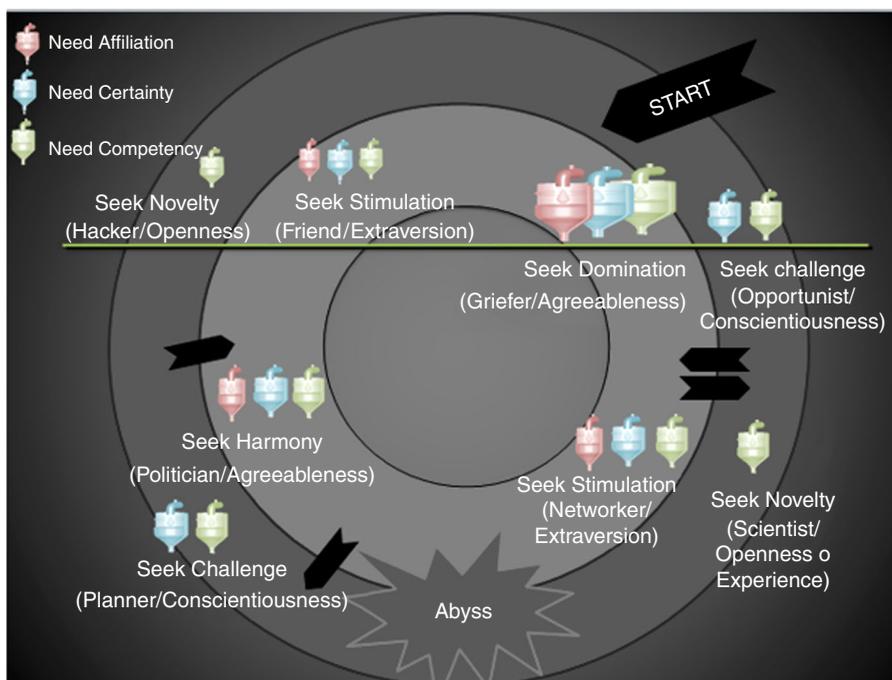
Another extensive study by Yee (2016) used multi-dimensional scaling factor analysis on motivations of gamers. He concluded that there were clusters of motivation (action – social, mastery-achievement, immersion – creativity). However, the concepts of power and discovery (exploring) sat alone as bridges between the main clusters (see Figure 8, available at: [www.moojoo.com.au/the-heros-learning-journey/](http://www.moojoo.com.au/the-heros-learning-journey/))

### **Recommendations for learning designers**

Armed with a deep insight into types of motivations, learner designers can anticipate the phases a learner must go through to unlearn and be reborn with new skills and values. We can imagine a few different learning journeys and user profiles, as shown in Figure 9. Players may switch between tracks as indicated by the black arrows. Bartle did notice that in later stages only one-way cross-overs seemed to happen.

#### **Track 1 – solo-player (outer circle)**

This learner will start as a highly conscientious opportunist seeking a challenge. They are not looking for their affiliation tank to be refilled in this context so they prefer to be a solo learner. They have high levels of uncertainty in this new environment. Once their tank levels are raised they can move into the next phase of seeking novelty. They will then act as a scientist and will learn through trial and error. This will challenge some of their assumptions and beliefs so they must let go of some ideas and be reborn into a new understanding. Still feeling wobbly (lacking certainty again) but determined they test out this new set of ideas they move into the next phase. They need to reduce that uncertainty through practice and repetition to build their competence. They seek challenges to do this and become "planners". Eventually, they will end up being innovative visionaries "hacking" the system they now thoroughly understand. Once the spiral is complete they are enthused to pick up a new challenge and start the learning cycle again.



**Figure 9.**  
Combining Bartle,  
Mayer (Dörner) and  
the OCEAN Big Five

### Track 2 – multi-player (inner circle)

This learner is more interested in other community members than the system itself because they have a high need in their affiliation tank. Initially, they will seek interaction with other learners and may veer towards competitive, socially dominant, proud and possible disruptive behaviour as they clumsily try to meet their needs. They need activities to reduce uncertainty, build competence and that provide opportunities for interaction. As they begin to carve out and find a place in this new community, and scope out what needs to be learned, they will fill up some of their tanks and move into the next phase of seeking stimulation (in a less clumsy and dominant manner). They still need to build competence and reduce uncertainty as they will face new challenges. Eventually they face the abyss and have to find the resilience to get through this unlearning. Their previous habits and beliefs felt comfortable and now they feel unsafe. Some will balk at the abyss and revert back to being resistant “griefers”. They may be present in the class but they have disengaged from learning. Those who can find the courage to let go and move into the next phase will be seeking social harmony. They will use their new powers in a more diplomatic way as a politician. When they have established themselves as a highly experienced person in this skill they will hang around as the local “friend” and mentor to support novices and become the most highly valued community members.

A different way of presenting this learning journey is in a spreadsheet where learning activities can be planned for each need and phase based on changing motivations (see Figures 10 and 11):

- collaborate and curate (affiliation);
- choice and ownership (certainty); and
- challenge and accountability (competence).

For the novice these activities would be low stakes practice activities with options to fast-track through to harder levels. The challenge and accountability activities are less necessary at the higher levels. As an example, the learning designer uses this tool to check if they have any activities that would make a “master level” person improve their competence. Note that although separated into three columns for planning, an activity may meet multiple needs, i.e. both affiliation and certainty. The columns to the right in Figure 10 are reminders about the changing motivations during each phase.

An example of a completed hero’s learning journey planner is provided in Figure 11. Tasks have been allocated to match changing motivations through the five phases in the journey and points are attributed to the importance of the task.

### Conclusion

The aim of this paper was to think of learning design in terms of a hero’s learning journey with a natural momentum. As designers, we naturally understand people with similar emotions and motivations; however, our challenge is to find ways to extend our empathy and be able to design a pathway(s) that appeals to multiple types (Van denBerghe, 2013). UX design and LX design aim to do just that (Seitzinger, 2015; Edsurge, 2016).

The observations, theory and research reviewed in this paper first of all established that motivation is worth exploring and understanding: to effectively design a learning experience, we need to understand what is considered “fun” to another person. The next step is for concepts of fun, games, gamification and play in relation to learning to be contemplated and understood in a deeper way. We can borrow ideas and observations from game designers and psychologists to find patterns in motivation. Campbell’s hero’s journey shows us how each phase is a pre-cursor to the next in authentic learning. The PSI theory of emotions leaves us with the mental image of three fuel tanks which constantly need refilling. From these we have the basic four player types, (and eight by extension of subtypes). If we know what is needed to let go of a phase and move into the next one, we can design learning activities accordingly. As teachers, or facilitators, in these learning communities (aka communities of practice), we can adjust our role to be a director, a leader, a delegator or a coach in response to the level of commitment and competence in the learner.

Kort (2008) describes the learning journey as a roller coaster ride that travels through any number of emotional states along the way – curiosity, fascination, surprise, anxiety, confusion, bewilderment, frustration, anguish, chagrin, hope, perplexity, elation, satisfaction and confidence:

When you complete a full circle it brings you back home to Quadrant I – the Joy of Discovery Learning. Round and round we cycle, time and again, climbing the arduous learning curve [...] the roller-coaster of life’s learning journey [...]. Onward and upward! What a wild ride, eh (Kort, 2008).

The qualitative studies of Yee and Van denBerghe into motivation mentioned focus heavily on gamers and their motivation. It is recommended that this research be expanded to a broader range of participants than just the gaming community. As the Big Five traits seem fairly stable across age, it raises the question of how learner journey s differ, or not, in primary, secondary and tertiary education. The Big Five are fairly consistent across cultures too, but cultural adjustments to the learning journeys can be made particularly around the need for affiliation in collaborative vs individualistic cultures (Nazir *et al.*, 2009).

It should also be noted that this approach of a hero’s learning journey requires long-term design where each hero can progress at their own pace, supported by peers, mentors and gurus. Rather than designing a unit of learning in isolation, as in typical asynchronous solo eLearning, the focus shifts to the learner and their experience over time to become experts and visionaries in a field and stay on long enough to nurture novices. Fundamental changes to short blocks of learning and cross-disciplinary projects are required for this type of

Immersion level	FUEL TANKS		MOTIVATIONS		MAIN RISK OF QUITTING			
	AFFILIATION Collaborate & Curate	CERTAINTY/CONTROL/ RISK/POWER Choice & Ownership	COMPETENCE Challenge & Accountability	Multi-player	Sole-player	Affiliation	Certainty	Competence
<i>Novice</i>				SEEK DOMINATION <i>Greifer &gt; 1 KILLER</i>	SEEK CHALLENGE/ ACHIEVEMENT <i>Opportunist &gt; ACHIEVER</i>	Feel is closed	Feel out of control	Feel incompetent
<i>Problem Solver</i>				SEEK STIMULATION <i>Networker &gt; /SOCIALISER</i>	SEEK NOVELTY <i>Scientist &gt; EXPLORER</i>	Not enough connection with others	Not enough risk	Feel bored
<i>Master</i>				SEEK HARMONY <i>Politician/KILLER</i>	SEEK CHALLENGE <i>Planner &gt; 1 ACHIEVER</i>	Not enough interaction as a leader	Not enough freedom to innovate	Not competitive enough
<i>Expert</i>				SEEK STIMULATION <i>Friend /SOCIALISER</i>	SEEK NOVELTY <i>Hacker/EXPLORER</i>	Not enough connection with others to mentor	Too predictable	Not enough freedom to experiment
<i>Visionary</i>				SEEK STIMULATION	SEEK NOVELTY	Not enough connection with others to be known as a Guru	Too predictable	Not enough freedom to experiment

**Figure 10.**  
A blank hero's learning journey planner for learning designers

**Figure 11.**  
Example of a  
competed hero's  
learning journey  
planner-with points  
and levels

	Collaborate & Curate	Choice & Ownership	Challenge & Accountability
<b>Novice</b> 0-10 pts	View portfolios of Experts/Visionaries (1 pt each) Read and like Forum posts from peers (1 point each)	Make a choice (true/false) - see answers from others (1 pt) Choose avatar/online profile (2 pts) Read resources (1 pt each)	Self assessment quiz (private results) (10 pts if pass over 85%) Match concepts to definitions (10 pts if pass over 85%)
<b>Problem Solver</b> 11-100 pts	Add new concepts to a shared glossary (10 pts) Add new quiz questions to a shared pool (10 pts)	Choose types of practice tasks and fast-track options	Practice answering questions (open book) (100 points if over 85%) Add practice tasks to a Portfolio (10 pts per blog post)
<b>Master</b> 101-400 pts	Post in forum (50 pts) Find new relevant resources to share (20 pts per item)	Create own project based task	Assessable Quiz (Time restraint) (400 pts if over 85%) Self assess project (400 pts) Portfolio of work progress (400 points)
<b>Expert</b> 401-800 pts	Moderate posts (10 pts each week) Post and reply (10 pts each week - max 100)	Choose peers to support	Peer project assessment (400 points) Rate student generated quiz questions and resources (100 pts per item) Peer Portfolio feedback (100 pts per feedback)
<b>Visionary</b>	Inspire others to continue learning Publish top student generated content	Define and review curriculum and standards	Redefine excellence by example through a shared online portfolio

deeper learning to occur (Bull, 2016). Embracing the true power of a learning community means mixed levels interacting in possibly larger classes of different ages/stages. The internet is so readily a part of the work and home life that communities of practice have organically erupted. We are now ready, as learning designers, to use the World Wide Web to connect highly distributed groups of people and thoughtfully seed and nurture learning communities (Stuckey, 2007).

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**Appendix 1**

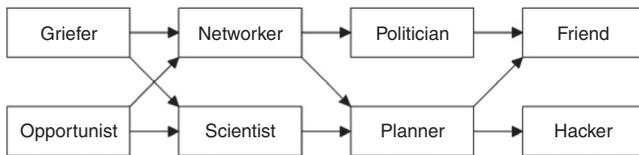
The comments are based on a review of flagship products presented at annual conventions of both game designers (Game Design Conference Vault, 2015) and Gamification designers in 2015 (Gamification World Congress, Barcelona 2015).

	Game designers Produce an activity that has: a goal, rules, a feedback system, voluntary participation – and the potential to lose (McGonigal/Bartle)	Gamification designers Produce an activity that has: a goal, rules, and a feedback system that reframes a real life goal to be more appealing and achievable (the ability for the player to win or lose are optional)
Real life activity connection	No direct connection, although a game will indirectly affect a players interaction with real-life, often in unpredictable (emergent) ways	Direct connection – without this it is not gamification, although the player does not have to aware of the connection
Budget (based on an average hourly development rate of \$100)	\$10,000 up to \$100,000 for an hour of interactivity 100:1 (low end development) 1000:1 (high end development) (Objective is to make a financial profit – requires scale and high quality)	From \$100 to \$1000 for an hour of interactivity 1:1 (low end development) 10:1 (high end development) (Objective is to impact a person's behaviour and make a financial profit)
Educational value	Usually learning is abstract, metaphorical and private. There is no assessment of integration with real life High autonomy on what the player learns. Often the teamwork involved is an opportunity to learn, rather than the game itself which acts as a catalyst	Imposed, specific and measured on what is integrated with real life activities Abstract learning may also take place
Entertainment	The player satisfaction and emotions are paramount and take precedent over any skills development (educational value)	The player satisfaction and emotions are very important and balanced against educational value
Objectives	The game objectives are often very explicit	The objectives can be subtle and often implicit in processes, although they can be made explicit
Time span	Playing games (board games/sports) usually have a short time span of an hour or two. Video games have shorter levels that operate as mini-games	Gamification designs often have a time span of days, weeks or months
Voluntary participation	Requires that everyone who is playing the game knowingly and willingly accepts the goal, the rules, and the feedback. Knowingness establishes common ground for multiple people to play together. And the freedom to enter or leave a game at will ensures that intentionally stressful and challenging work is experienced as safe and pleasurable activity (McGonigal, 2011)	Most projects are highly structure and imposed by an organisation Some choice may be offered but participation is generally enforced
Obstacles	A wide range of obstacles – time, other players, puzzles, challenges, quests, AI enemies	A narrower range of obstacles Strong dialogue of competition (obstacles) as being negative and collaboration preferred
Feedback on progress	Often use points, badges, leader boards, and many other feedback mechanisms Emphasis on extrinsic motivation, which may be effective in the short term but will fade in power unless new levels and challenges are unlocked	Might use points, badges and leader boards, and other feedback mechanisms Extrinsic motivation is the first step towards building intrinsic motivation for the targeted real life activity

**Table A1.**  
Game design vs  
gamification design

**Table AII.**  
Bartle player types

(Bartle, 2005)	Description (Mayer, 2009)	Comments (Mayer, 2009)
Explorer Sub types: scientist/hacker	Feeling of superiority through dominating the system of the game. Thoroughly understanding the underlying patterns and finding the best strategy The game/activity must have complexity and alternative paths strategies to explore and assess	Explorers do not need anyone, but exchange is often like with other explorers in order to learn new facts. Because they will not defend, they deny the killers the joy their power
Socialiser Subtypes: networker/friend	Feeling of acceptance and through lots of friends and strong relationships Socializer's prefer simple games – the game serves as a platform for communication between players, or as a topic of conversation	Tactical cooperation between the players is a necessity, situations where players blindly trust and can rely on each other Role play is typical
Achiever Subtypes: opportunist/ planner	Feeling of superiority through following instructions and getting finished fast They have low precision and low competence Achievers want to get things done, like collect treasures and compete in battles	Achiever's need to constantly prove that they are able to cope with situations successfully, because their levels of competence are not high. They prefer games with clear guidelines for action and an achievable goal
Killer/competitive (socially dominant) Subtypes: griefier/ politician	Feeling of superiority through dominating other players in the game Killers predominantly prefer simple games For them, the game is not as important as the competition with other players	Killers have a high need for connection with other's but since they have few strategies to meet this need, this leads to further frustration and a vicious circle of interaction between the players



Source: Bartle (2005)

**Figure A1.**  
Bartle player tracks

**Appendix 3. PSI theory of emotions**

**Competence**

Competence consists of task-specific competence (and can be acquired through exploration of a task domain) and general competence (which measures the ability to fulfil the demands in general). The competence drive is frustrated by actual and anticipated failures to reach a goal. A low competence level indicates that the agent should avoid taking risks and choose options that have



**Figure A2.**  
Need for competence

worked well in the past (and thus have high probability) as shown in the figure below. A high competence means that the agent can actively seek difficulties by experimenting with new courses of action that are less likely to succeed. Together, competence and certainty direct the agent towards explorative behaviour; depending on its abilities and the difficulty of mastering the environment, it will actively seek novelty or avoid complexity (Bartl and Dörner, 1998).

### **Certainty**

Uncertainty reduction is maintained through exploration and frustrated by mismatches with expectations and/or failures to create anticipations. We need certainty in our lives. When we are certain about how things work and how others behave we can predict what will happen in the future and so feel safe. When we are certain about others, we can trust them. When we feel safe, we can relax and reduce our constant scanning for threats. Uncertainty is related to the CIA need for a sense of arousal. Certainty is related to the CIA need for control, Maslow's needs for health and safety, and McClelland's need for Power. While certainty is important, too much is boring. We also want stimulation and novelty to add interest and fun to our lives. This is why people try new things, take risks and gamble, even when they do not need to do so (Bartl and Dörner, 1998).

### **Affiliation**

The demand for affiliation is an individual variable and adjusted through early experiences. It needs to be satisfied in regular intervals by external legitimacy signals (provided by other agents as a signal of acceptance and/or gratification) or internal legitimacy signals (created by the fulfilment of social norms). It is increased by social frustration (anti-legitimacy signals) or supplicative signals (demands of other agents for help, which create both a suffering by frustration of the affiliation urge, and a promise of gratification) (Bartl and Dörner, 1998).

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