Virtual worlds and the learner hero

How today's video games can inform tomorrow's digital learning environments

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A B S T R A C T

Participation in expansive video games called 'virtual worlds' has become a mainstream leisure activity for tens of millions of people around the world. The growth of this industry and the strong motivational appeal of these digital worlds invite a closer examination as to how educators can learn from today's virtual worlds in the development of next generation learning environments. Self-determination theory (SDT; Ryan and Deci, 2000) has shown value in explaining both the motivational dynamics of learning (Deci et al., 1994), as well as the strong motivational pull of video games and virtual worlds (Ryan et al., 2006). As such, SDT provides a framework that can bridge the gap between education and consumer virtual worlds and be applied to new research and development in how to best build virtual worlds for learning. The concept of the 'learner hero' is introduced as a potentially useful unifying concept in considering how to leverage the high motivational appeal of commercial virtual worlds in building digital learning environments.

K E Y W O R D S   *education, educational technology, motivation, video games*

THE MAJORITY OF AMERICANS NOW PLAY VIDEO GAMES, and high levels of participation occur in many other developed countries (Entertainment Software Association, 2008). Video game adoption is growing at a remarkable pace: the most popular online game at the time of this writing boasts over 10 million players worldwide, giving just one game a greater population

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than Sweden. By contrast, the most popular online game five years ago had 100,000 players, or roughly 1% of the current market leader.

The rapid growth of video games has outpaced a full understanding of their psychological impact. The literature to date often focuses on gaming's negatives, such as the ill-effects of violent content (Anderson et al., 2004) or video gaming as a pathologically addictive activity (Khan and Kantof, 2007). While several authors over the last decade have extolled the positive impact that consumer gaming can have on learning (Gee, 2003; Johnson, 2005; Prensky, 2006), the mainstream sentiment is that video games are an indulgence to be managed: a digital cookie jar whose contents are not seriously considered to be emotionally or educationally nutritious.

Despite this perception, the past decade has seen many games expand into increasingly rich and complex virtual worlds. Unlike the narrow experiences offered by early video games, today's games are filled with a wide array of narrative, challenge, choice, and interpersonal interaction. Johnson (2005) notes that one of the great misconceptions of today's video games is that they are simple-minded, when in reality they provide remarkable mental challenge. The question that he and others ask is: Why given their complexity and the hard work they often require do games continue to exert a powerful motivational pull?

We believe a well-validated framework such as self-determination theory (SDT; Ryan and Deci, 2000) can explain the qualities that lead to sustained engagement with games, and subsequently how those qualities can inform the development of new learning environments. Numerous studies of SDT and education over the last two decades have established that supporting intrinsic needs of autonomy, competence, and relatedness facilitates deeper and more internalized learning (Deci et al., 1994; Rigby et al., 1992). Recent research applying SDT to video gaming has shown that enjoyment of video game play was highest in gaming contexts that supported the same basic needs that educational research has shown facilitate learning (Ryan et al., 2006). Thus while many educators might view video games skeptically, SDT offers video games and education some common ground: from the self-determination perspective, the fundamental principles that support both enjoyable games and healthy education are, in fact, well synchronized. We believe that, by looking into commercial virtual worlds, we can discover many promising directions for the development of digital learning environments that maximize self-determination.

VIDEO GAMES AND MOTIVATION

Theorists have been interested in the strong motivational pull of games for more than 25 years. Malone (1981) was one of the earliest writers to try to

unpack what was 'intrinsically motivating' about games, that is, the factors that make games motivating in themselves. He hypothesized that the appeal of games was largely a function of their ability to evoke challenge, fantasy, and curiosity in players. Based on the work of Csikszentmihalyi (1975), Bowman (1982) saw potential to harness educational power from early video games (e.g. Pac Man), by studying the ways in which arcade games induced flow experiences for players. Within the framework of SDT, much of this work highlighted how well-tuned early video games were in providing competence satisfactions through a combination of (1) sustained optimal challenge and (2) a timely informational feedback loop between player and game. Although arcade games have receded as the dominant form of gaming, these same mechanisms of competence satisfaction continue to be carried forward and elaborated by the more sophisticated games of today.

In the last decade video games have become vastly more complex 'virtual worlds', and have outgrown most of the early explanations of their motivational appeal; explanations based primarily upon the concepts of optimal challenge and flow have simply become inadequate to capture the full range of what modern games offer. For this discussion, we define *virtual worlds* as having two core elements: (1) a digital environment that is a representation of either a real or imaginary geographic 'place', and (2) the requirement that a user adopt a character, avatar, or personality that resides within that world and is the means by which the user interacts. By this definition, all video games are not virtual worlds, but almost all of today's virtual worlds are games.[1]

Unlike past generations of video games, today's virtual worlds are not characterized by challenge alone. In fact, many virtual worlds allow players to avoid challenge altogether if they would rather pursue social or purely exploratory activity. As such, the evolution of games into virtual worlds brings with it the need for more comprehensive motivational models that can fully explain their appeal and that can keep our psychological understanding of games apace with their rapid evolution. Furthermore, such models will be critical to discovering when, where, and how the strong motivational qualities of games might be harnessed to enhance learning and other meaningful experiences outside the domain of entertainment.

Self-determination theory shows promise as a more comprehensive model of game motivation, and the authors have been applying SDT to virtual worlds and gaming to validate its value as an explanatory framework. As mentioned above, initial research by Ryan et al. (2006) validated the idea that having 'fun' during video game play was attributable to the satisfaction of needs for competence, autonomy, and relatedness, not just for certain kinds of games, but across a wide range of games ranging from simple arcade to highly

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complex virtual worlds. By assessing the 'player experience of need satisfaction' (PENS), four studies confirmed that experiences of competence, autonomy, and relatedness were major contributors to game enjoyment, regardless of the specific content, complexity, or genre of games. This early evidence provides promising support for SDT as a motivational model that can keep pace with the ongoing evolution of video games and virtual worlds.
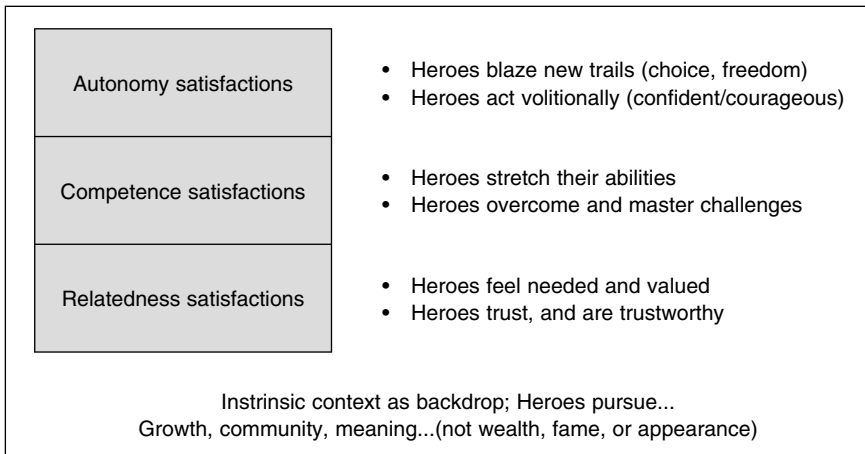
THE IDEA OF THE 'LEARNER HERO': FACILITATING SELF-DETERMINATION IN LEARNING AND VIRTUAL WORLDS

We have noted an interesting synergy: the game industry has been implicitly encouraged to build virtual worlds for entertainment that support the very needs SDT prescribes for optimal learning. But what specific form does this support and synergy take? Here we focus on one such unifying construct that we call the *learner hero*. We believe that entertainment virtual worlds have elegantly integrated both the need facilitation and goal framing recommended by SDT by casting each player in the role of a *hero*. The hero thus becomes a conceptual framework for self-determined activity that can inform ongoing research and development of learning technology.

Looking at the structure of video games illustrates this point. Before a potential player steps into an entertainment virtual world, he or she is provided with a clear context that invites courageous and heroic action. This context encourages players by stating they have the 'right stuff' to succeed in the larger challenges and goals that the world and its inhabitants need. Put differently, the game 'believes in' the player and communicates that the player's participation matters (i.e. the context is immediately autonomy supportive). Even during the earliest experiences in a virtual world, when the activities available are limited to learning the basic parameters of the game and how to function in it, there is the suggestion that much bigger and greater opportunities are available if the player chooses to pursue them. In other words, by building a context of the player as a heroic actor, virtual worlds establish a highly facilitative environment for intrinsic need satisfaction. After all, heroes blaze new trails (autonomy), heroes master the challenges before them (competence), and heroes act in relationship with and for the betterment of the community (relatedness). In this way, it might be said more generally that the hero epitomizes self-determined functioning (see Figure 1).

Popular virtual worlds excel at inviting players to assume the role of hero. For the most part, they present challenges that are available to engage as the player wishes, and the consequences for failure are minimal. In most cases, players can simply re-attempt the challenge with no lasting ill-effects or

FIGURE I   *The learner hero integration of self-determined action*

Autonomy satisfactions	• Heroes blaze new trails (choice, freedom) • Heroes act volitionally (confident/courageous)
Competence satisfactions	• Heroes stretch their abilities • Heroes overcome and master challenges
Relatedness satisfactions	• Heroes feel needed and valued • Heroes trust, and are trustworthy

Instrinsic context as backdrop; Heroes pursue...
Growth, community, meaning...(not wealth, fame, or appearance)

negative consequences, or can opt to disengage from challenges and activities freely. This is but one example of how virtual worlds promote greater facilitation of self-determined functioning, and thus can serve as a model for educational technology.
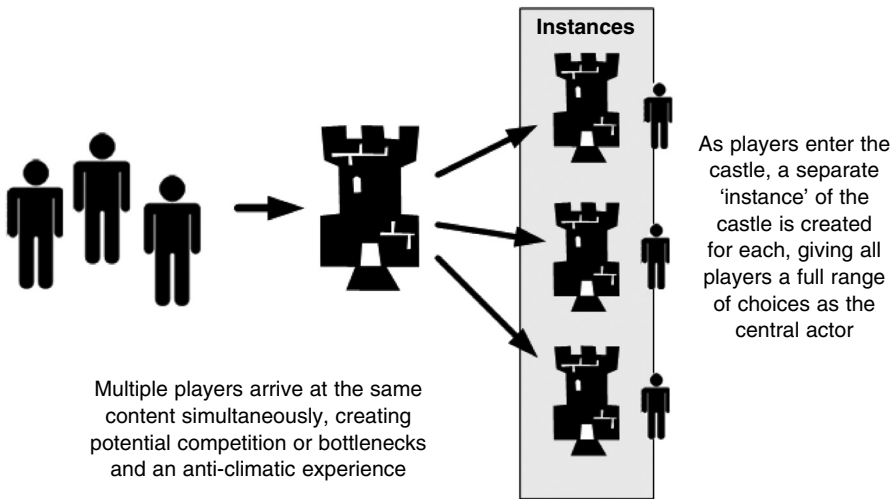
IMPLICATIONS OF THE LEARNER HERO

The concept of the learner hero suggests that, in developing educational virtual worlds, the value of today's games lies in their narrative structure as much as their underlying technology. The heroic context is a strong facilitator and can inform the development of educational technology and content in much the same way it has for commercial video games where technology and design have developed specifically to support the player's ability to act with the self-determined volition and mastery of a hero.

One example of this evolution comes from the complex genre of virtual worlds called *massively multiplayer online games* (hereafter MMOs). These games are characterized by a large and varied environment that is continuously available for many thousands of players to inhabit simultaneously. MMOs have evolved an interesting technical structure that lends itself well to building a heroic narrative by weaving together individual challenges and interpersonal interaction. To do this, MMOs combine interpersonal spaces – a large city for example that all players co-inhabit for the purposes of socializing, trade, and planning collaborative action – along with 'instancing' of specific content that is designed to put each player center stage, allowing them to engage content individually or in small groups. 'Instances' might be a quest that players need

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to undertake within a distant castle involving complex puzzles or other challenges as they move through a story. In early MMOs this created a problem in that players were competing with each other to experience such content – they would be forced to stand around in a crowd of other players waiting for their turn to pick up the blue key or kill the black dragon. In a sense, this parallels one of the dynamics that can often be found in traditional learning environments, where students are constrained by the limited resources of the classroom and attention of the educator. In any setting, being asked to wait in line is not very interesting, and hardly heroic. Virtual world developers solved this problem by offering each player their own copy ('instance') of specific quests, tasks, and content. As illustrated in Figure 2, a door to the distant castle can exist in a public space available to all players, and thus five people may all independently reach the castle at roughly the same time; but upon entering each individual player would have their own personal castle to explore and master.

This structure of creating virtual world learning environments that combine multiuser spaces with more individualized instances offers learners the opportunity to shine individually, while also acting in collaboration with other students. In fact, one of the most remarkable elements of today's MMO games is that, in addition to myriad opportunities for individual heroism, they often require large groups of players to come together for collaborative problem solving, fostering trust and reliance on others while giving everyone a meaningful role to play. Many tasks, for example, are oriented to the attainment of an individual goal, but require a team of companions who assist

FIGURE 2   *An example of how 'instancing' functions*

Instances

As players enter the castle, a separate 'instance' of the castle is created for each, giving all players a full range of choices as the central actor

Multiple players arrive at the same content simultaneously, creating potential competition or bottlenecks and an anti-climatic experience

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you in achieving it. Players therefore have the opportunity to be supported by others in their personal growth, as well as repeated opportunities to help others grow in similar ways. Thus the heroic satisfactions of autonomy and competence are interwoven with those of relatedness, as players meaningfully support and are supported by other players.

The learner hero, therefore, is a construct drawn from commercial virtual worlds that we believe can guide the research and development of digital environments focused on learning. We contend that the hero embodies both the quality of motivation recommended by SDT, and the intrinsic goal content (i.e. personal growth, community contribution) that has been shown to deepen the engagement of learners. Study and research into educational technology that supports this experience in learners – via such mechanisms as a meaningful context for action, communication that the learner matters to the virtual world, and a balance of communal and instanced content that allows for both individual and interpersonal growth – will help quantify the value of the learner hero construct as a touchstone to optimizing self-determination in virtual learning environments.

EXAMPLES OF THE LEARNER HERO

Several examples illustrate how the concept of the learner hero, combined with technical structures such as instancing, can be used to create vivid self-determined learning environments that we believe will encourage deeper and more internalized learning. History is just one example of a dynamic subject area – one that by its nature tells a story rooted in the interaction between events, human choices, and consequences. Yet educational technology is challenged to capture this dynamism: the passive (i.e. non-interactive) nature of traditional educational media amplified by the distance of historical events in place and time do not optimally convey to learners a sense of agency or relevance.

Immersing learners in a dynamic virtual world where the choices and consequences of history *become one's own* provides for agency and challenge that can facilitate deeper learning. Recreating a time and place such as 19th-century America would provide opportunities for learners not only to step into the shoes of leaders such as Lincoln or Lee during conflict (e.g. the American Civil War), but also to face the challenging political, economic, and social choices of Reconstruction and the Industrial Revolution. Instancing could provide each individual learner with the opportunity to act as the learner hero, experiencing personal agency in overcoming challenges and managing consequences that fosters deeper engagement with the material. At the same time, communal spaces allow multiple learners to interact and collaborate,

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each trying on different roles and learning as they navigate game challenges and interpersonal interactions.

Much like the molecular world, our digital 19th-century America can also integrate subject areas and bring them to life. A learner from a science classroom might take on the role of Elisha Otis, and be tasked with applying rules of physics and engineering in the creation of brakes for modern elevators. Once the challenge has been met, the task has immediate meaningful context and can support relatedness by assisting other learners who put that elevator to use as industrialists in a history or economics classroom down the hall (or across the country). While others have certainly been general advocates for the educational potential of such interactive worlds, self-determination theory provides a model for more precisely explaining both their educational value and motivational appeal: the facilitation of intrinsic need satisfaction and the affordance of meaningful goals deepen learning, enjoyment, and sustained engagement.

SUMMARY

Virtual worlds have become, in a remarkably short period of time, a place where millions of people spend time on a daily basis. These digital environments have an increasing verisimilitude that can address many meaningful learning scenarios as well as facilitating the migration of learning from the digital to the molecular world. In addition, the fact that an increasing amount of activity and interpersonal communication in the 'real' world takes place in a digital medium only strengthens the value of virtual worlds in teaching valuable and meaningful skills.

Beyond the general promise of virtual worlds, we have here reviewed several ways in which today's video game industry has greatly accelerated the development of structures that are highly supportive of self-determined functioning and that complement research done on SDT in more traditional educational settings. Because the same intrinsic need satisfactions that have been found to facilitate and deepen learning are also those that deepen fun and sustained engagement with games, SDT provides a promising bridge between these two domains, suggesting many possibilities for cross-pollination.

Specifically, we have suggested that virtual worlds support deeper exploration of the idea of the 'learner hero' as a promising framework in the research and development of educational technology. By creating learning environments where learners pursue individual and communal goals within the self-determined context of heroic action, both internalization of learning and intrinsic framing of activity would be facilitated. Furthermore, because virtual worlds allow the learning environment to combine shared spaces

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with instanced content in which every learner can take center stage without competing for limited resources, both personal autonomy and collaborative objectives can be achieved. In turn, this ensures that our learner hero always feels valued and relevant in the pursuit of meaningful goals. In short, from a self-determination perspective the primary contributions of today's virtual worlds to tomorrow's learning may not be technological, but conceptual.

NOTE

1. A notable exception would be the virtual world *Second Life*, which has no implicit game structure.

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