

# GUEST EDITORIAL Gamification, serious games, simulations, and immersive learning environments in knowledge management initiatives

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## Abstract

**Purpose** – The purpose of this paper is to provide an in-depth and critical review of the literature and theories on knowledge, knowledge management (KM) as well as the concepts and approaches relating to organizational learning and the knowledge-based economy. The paper also provides more details and definitions of various issues around gamification.

**Design/methodology/approach** – Several sources have been reviewed and consulted including various mainstream referred journals focusing on KM and gamification as well as books, online databases, governmental reports, and statistics, etc.

**Findings** – Game-based learning (GBL) in business must align with the learning goals and outcomes of training and development, and clearly demonstrate that learning can be evaluated and achieved. Serious game experiences drive personal change and transformation by generating an attitude of acceptance of the challenge, motivation to achieve, and constant innovation through participant commitments. Simulations push the participant into experiencing an immersive environment. Finally, gamification, as a collection of techniques, may be applied to the educational and workplace activities, or used as a wrapper for GBL, serious games, and simulations.

**Research limitations/implications** – We are on a unique and unusual path to revitalizing and reinvigorating the educational experience. This new path is not about throwing a LMS at faculty and hoping it sticks. This new path is about creating faculty who are mentors, coaches, and life-long learners who understand the research implications of applying game-based learning in the classroom, as well as the workforce.

**Practical implications** – Higher educational teaching as well as corporate LTD (Learning, Training, and Development) are being significantly disrupted. The innovation taking place in teaching requires more experiential learning, the kind of learning stimulated with serious games, simulations, immersive learning environments, and gamification. This issue will help to outline disruptive approaches that work.

**Originality/value** – This paper provides a review of the emerging trends and cases where gamification, simulations, serious games, immersive learning environments, virtual reality, and augmented reality are applied to the deployment of knowledge-based initiatives.

**Keywords** KM, Serious games, Virtual reality, Gamification, Environments, Augmented reality, Simulations, Immersive learning

**Paper type** General review

## Introduction

We are pleased to present this double special issue of the *World Journal of Science, Technology and Sustainable Development (WJSTSD)* entitled, “Gamification, serious games, simulations, and immersive learning environments in knowledge management initiatives”.

This double special issue of *WJSTSD* covers a wide range of dimensions and perspectives. The objectives are to review the emerging trends and cases where Game-based Learning (GBL) can be demonstrated by gamification (GAMING), simulations (SIMs), serious games (SGs), immersive learning environments (ILE), virtual reality (VR) and augmented reality (AR) are applied to the deployment of knowledge-based initiatives. The impact within knowledge



management (KM) initiatives will be described in terms of knowledge acquisition, capture and creation, knowledge organization, knowledge stewardship, knowledge storage, knowledge sharing, knowledge mobilization, knowledge diffusion, and knowledge preservation/archiving.

GAMING, SIMS, SGs, ILEs, VR, and AR have all converged to align with highly relevant KM initiatives. Professionals, managers, leaders, supervisors, and knowledge workers are learning to acquire, capture, and steward knowledge and intellectual capital through GAMING, SIMs, SGs, ILEs, VR, and AR knowledge mobilization tools, techniques, and applications.

Within the corporate sector, K-20 education sector, and public sector, initiatives associated with micro-learning, e-Learning, personal KM, organizational learning, and knowledge mobilization exhibit a significant business value proposition for increased performance, engagement, and retention. Large and growing populations of Gen X, Gen Y, Gen Z, and millennials are more familiar with the pragmatics of playing games than grappling with the theoretical concepts explicit and tacit knowledge. Many of the positive characteristics of the millennials can be harnessed through GBL within knowledge-based environments.

### What is knowledge and KM?

There is a large amount of literature about knowledge with different views and opinions (Alavi and Leidner, 1999, 2001; Holsapple and Joshi, 2002; Joshi *et al.*, 2007; Kettinger and Li, 2010; McQueen, 1998; Nonaka, 1994; Zack, 1999a, b, etc.); however the nature of knowledge and defining knowledge is not a simple undertaking (Purvis *et al.*, 2001).

Organizational learning is the process by which the organization's knowledge and value base changes, leading to improved problem-solving ability and capacity for action (Probst and Buchel, 1997, p. 15). Organizational learning occurs through shared insight, knowledge, and mental models and builds on past knowledge and experience, that is, on memory (Stata, 1989, p. 64). For Drucker (1998), knowledge is simply information that changes something or somebody – either by becoming grounds for actions or by making an individual (or an institution) capable of different or more effective action. This definition addresses both the individual and corporate aspects of knowledge.

From a management perspective, Nonaka and Takeuchi (1995) argue that the key difference between information and knowledge is that information is much more easily identified, organized, and distributed. Knowledge, on the other hand, cannot really be managed because it resides in one's mind. And whilst there are various typologies, in its simplest form there are two main types of knowledge – tacit and explicit. Explicit knowledge may be expressed and communicated relatively easily; tacit knowledge tends to be personal, subjective, and difficult to transmit (or sometimes even to recognize). Thus, while some explicit knowledge may lend itself to codification and commodification in knowledge management systems (KMS), tacit knowledge is very strongly embedded in the mind of the individual and highly context-sensitive (Barnes, 2002). Alavi and Leidner (2001) define KMS as a class of information system applied to managing organizational knowledge. A key challenge of KMS therefore, has been to make appropriate tacit knowledge explicit and portable (Swan, 2001).

Various definitions of KM show that KM includes many dimensions. Alavi and Leidner (1999) refers to KM as a systemic and organisationally specified process for acquiring, organising and communicating both tacit and explicit knowledge of employees so that other employees may make use of it to be more effective and productive in their work.

For the IBM Institute for Knowledge-Based Organizations, the term KM conjures up a number of images: a customer service representative accessing a database of frequently asked questions; a team of consultants collaborating on a new salary study; or a facilitator capturing the lessons learned from a major marketing initiative (Fontaine and Lesser, 2002). Meanwhile the UK Improvement and Development Agency for local government, considers the concept of KM about building organizational intelligence by enabling people to improve the way they work in capturing, sharing, and using knowledge. It involves using the ideas

and experience of employees, customers, and suppliers to improve the organization's performance. Building on what works well lead to better practice, strategy and policy.

The concept of a knowledge-based economy is used to describe an economy that creates, disseminates, and uses knowledge to enhance its growth and development. According to various report by the World Bank (2008), a successful KE is characterized by close links between academic science and industrial technology, which is empowered by increased education and life-long learning and greater investment in intangibles such as research and development and software.

**Game-based learning**

Games provide immediate feedback, which appear to be more effective and efficient than traditional learning strategies, while exhibiting many complementary values to coaching and mentoring – critical knowledge sharing and exchange (KTE) activities. Table I provides more details and definitions of various issues around GBL.

Game-based learning	Game-based Learning (GBL) emerged on the academic and enterprise scene in the late 1990s. GBL encompasses fun, play, engagement, serious learning, and interactive entertainment. GBL is a pedagogical (K-12) or andragogical (adult) approach to learning that may be defined as: “a type of gameplay that has defined learning outcomes. Generally, GBL is designed to balance subject matter with gameplay and the ability of the player to retain and apply said subject matter to the real world. GBL describes an approach to teaching, where students explore relevant aspects of games in a learning context designed by teachers. Teachers and students collaborate in order to add depth and perspective to the experience of playing the game”
Serious games	Serious games may be defined as: ... a game in which education (in its various forms) is the primary goal, rather than entertainment (Michael and Chen, 2006, p. 17) ... more than just story, art, and software, however. [...] They involve pedagogy: activities that educate or instruct, thereby imparting knowledge or skill. This addition makes games serious (Zyda, 2005, p. 26) ... [being played] seriously or casually. We are concerned with serious games in the sense that these games have an explicit and carefully thought-out educational purpose and are not intended to be played primarily for amusement. This does not mean that serious games are not, or should not be, entertaining (Abt, 1971, p. 9)
Simulations	Simulations narrow the focus of serious gaming. Simulation is the imitation of reality, recreating an alternative reality within a controlled environment. Simulations have been used for millennia for training, entertainment, and explanation. The games of go, chess, or risk are representative, well-known simulations, while less visible GBL SIMs would include SimCity; Harvard's case study: Columbia's Final Mission; or Planet Jockey Leadership Development. Simulations combine and encompass a range of multi-sensory experiences: video, audio, motion, haptic, and olfactory. Simulations are often categorized into three genres: live, virtual, and constructive. Of course, any simulation could combine two or even three of the categories. For much of the learning within GBL, the SIM involves human interactions, as opposed to science-based SIMs that require the individual to observe or measure something (i.e. a physics, chemistry, or math SIM)
Gamification	Gamification may be defined as the process of integrating game theory and design, game elements, games esthetics, and game mechanics into a learning experience. Gamification of processes, products, and services increases engagement in employees, managers, and customers. The results can be demonstrated in terms of: creative thinking effective and efficient workplace and customer service activities improved participation and loyalty increased knowledge acquisition and application within educational and learning activities increased performance management innovative business practices organizational and cultural transformation

**Table I.**  
Definitions of  
gamification

Virtual reality environments and simulations have been found to be very effective for each step in the KM life-cycle, because of their immersive experiences that make for sticky knowledge and lessons learned. At the same time, card games, board games and three-dimensional games can present employees and learners with compelling challenges set in realistic environments, where failure is an option for learning. GBL may be defined as the process of integrating game theory, game elements, and game mechanics in order to engage employees and learners, enhancing their participation, commitment, and performance.

GBL in business and education is an experience that helps individuals and teams:

- improve performance;
- commit and take responsibility for learning, knowledge acquisition, and knowledge acquisitions;
- achieve and sustain engagement;
- promote transformational mind-sets; and
- open the mind to creative thinking and innovation.

GBL within training and education builds passion, rigor, organization, discipline, resiliency, and grit. Simulations, 2-D, and 3-D worlds can construct immersive environments for experiential learning. GBL in the enterprise and higher education are not just the inception of the “funification” of work. GBL creates a foundation for building the learning organization by:

- cultivating leadership, teamship, followship, collaboration, and communityship traits;
- improving soft skills, hard skills, competencies, and individual performance;
- focusing attention upon innovative knowledge work through personal and team reflection that can be described in terms of affect, behavior, and cognition; and
- supporting the achievement of the mission, goals, strategies, and objectives.

Just like KM, GBL in the enterprise must be aligned with the strategic goals and result in clear benefits for the enterprise and its stakeholders. GBL in higher education must align with the learning goals and outcomes of a course; and clearly demonstrate that learning can be evaluated and achieved through experiential, project-based, competency-based learning strategies. SGs and playful experiences drive organizational change and transformation by generating an attitude of acceptance of the challenge of continuous improvement and innovation from direct participation.

### Double special issue

The call for papers attracted more than 30 abstracts and papers from all over the world representing all continents of the world with tremendous scope in both focus and source; providing great encouragement for the future of this unique area of research. Authors include professionals, consultants, managers, and executives who proposed various articles about the interact with Gen X, Gen Y, Gen Z, and millennials when deploying KM/knowledge mobilization initiatives. We also received large number of papers from higher education instructors, professionals, academics, and practitioners who have built online, e-Learning and blended learning environments where KTE have been facilitated by GAMING, SIMS, SIMs, SGs, ILEs, VR, and AR.

We hope that the outcome of this special issue will help to outline the major issues that frame the current state of research, practice and emerging trends on GAMING and KM initiatives and contribute to better understanding of such an important topic where cases of GAMING, SIMS, SIMs, SGs, ILEs, VR, and AR are applied to the deployment of knowledge-based initiatives.

The application of GAMING, SIMS, SIMs, SGs, ILEs, VR, and AR to KM initiatives has the potential of re-invigorate the foundational work performed by the KM thought leaders of the last four decades.

Finally, we would like to congratulate the authors for their valuable contribution and it is hoped that the ensemble of papers presented in this double special issue will help to stimulate debate amongst scholars, researchers, professionals, consultants, managers, executives, and practitioners that will ultimately lead to a more integrated and multidisciplinary approach to GBL and KM initiatives. We are also grateful to all reviewers for graciously offering their invaluable comments, which have enriched the quality of the papers in this double special issue, and also for making available to us their valuable time and efforts. The suggestions and criticisms of these leading world experts greatly enhanced the quality of this double special issue, and much credit goes to them for the quality of this double issue.

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