

# Designing leadership and soft skills in educational games: The e-leadership and soft skills educational games design model (ELESS)

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5 *Designing Leadership and Soft Skills in Educational Games: The e-Leadership and Soft Skills*  
6 *Educational Games Design Model (ELESS).*  
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38 Keywords: soft skills, leadership, game-based learning, leadership, e-leadership, education games,  
39 training games, technology enhanced learning, e-learning  
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42 **Abstract:**

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44 While the field of leadership studies includes a large corpus of literature and studies, the literature  
45 and scientific research in the field of e-leadership and soft skills used in learning game environments  
46 is at present small in scale. While some training environments such as *America's Army* have utilised  
47 leadership in a game environment, these environments are just now beginning to be exploited for  
48 supporting soft skills and leadership training and education. Towards contributing to this newly  
49 emerging field of literature and study, this paper presents a new model, the *e-Leadership and Soft*  
50 *Skills Educational Design Model (ELESS)* for assessing the use and constructing the effective design  
51 of soft skills and leadership skills in multiplayer learning game environments. The paper includes a  
52 review of the literature around distributed (shared) leadership models and presents some examples of  
53 studies assessing how leadership is being used currently in game environments. The paper also  
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3 includes a case study of the Leadership Game (LSG) in order to test the efficacy of the model with  
4 reference to a practice example.  
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7 Practitioner notes:

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9 What is already known about this topic

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11 • Studies have been undertaken which shown the potential for learning soft skills and leadership  
12 skills in game environments and serious games.  
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15 • Games are powerful training and educational tools for motivating and engaging learners, and  
16 reaching hard-to-reach learner groups  
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19 • Leadership and soft skills need to taught differently from hard skills  
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22 What this paper adds

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24 • A new model for designing and analysing serious games and game environments for  
25 leadership and soft skills (ELESS)  
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28 • A consideration of the literature around current leadership models in relation to their use in  
29 the few studies undertaken using game-based approaches.  
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32 • A case study of the Leadership Game, a game used to teach leadership skills, including  
33 decision making, team work and social interactive learning  
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35  
36 Implications for practice and/or policy

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38 • As previous studies have shown using games for education and training as part of a blended  
39 learning approach can be more effective than using just traditional approaches alone.  
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42 • The growing use of game-based approaches in the US is evidenced in representation at White  
43 House level of specialists in the field and growing funding into serious games initiatives in the US and  
44 EU. The impact upon policy therefore is to see more uptake of game-based approaches in primary,  
45 secondary, tertiary and training contexts, more representation of SG in policy and funding  
46 development levels and wider investment into research and development (e.g. EU FP7 funded GALA  
47 network of excellence in SGs).  
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50 • The implications upon educational infrastructure and practices will be considerable over the  
51 next five years, as systems evolve to respond to increasing online and technology enhanced learning  
52 approaches.  
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### 1.0: Background

Leadership studies include a large corpus of literature (e.g. Lowe et al., 1996; Judge et al., 2002; Avolio, Reichard et al., 2009; Avolio, Walumbwa et al., 2009), crossing different disciplinary areas and fields of practice. However, on the contrary, literature supporting our understanding of the role of leadership – or e-leadership – in terms of its application and teaching in technology enhanced learning game environments, is relatively sparse (e.g. Reeves & Malone, 2007; Lisk et al., 2011; Mysarlari, 2011). The reason for this dearth of literature is mainly because mature educational game environments that can model such advanced soft skills as leadership and decision-making are still in their infancy<sup>1</sup>. However this is changing as game development tools become cheaper and more pervasive, and as expectations of learners to be more engaged during learning increase over time. Another perhaps deeper reason for the lack of literature is because the focus of ‘pedagogic modelling’ in sophisticated learning environments, such as learning game environments, has taken traditional curriculum objectives, tasks and outcomes, and modelled them in the environment, rather than the other way round. As many soft skills are not embedded into the national curriculum, the full benefits of teaching and learning in technology enhanced environments is only beginning to be considered and the advantages more fully understood. Although it is fair to say that even the early training game environments, such as *America’s Army*, did utilise soft skills development such as leadership in their game designs (Zyda, 2005) and leadership remains a significant component of entertainment games such as *Call of Duty*.

Large numbers of children and adults are playing entertainment games in their spare time, a recent survey by the International Software Federation of Europe (ISFE, 2010) revealed that 74% of those aged 16-19 considered themselves gamers (n=3000). Notably, according to one survey undertaken (n=1,108 children) by one of the authors of this paper, *Call of Duty* was the most popular game for children in the 9-15 year age range and was named by 53% of boys and 12% of girls (Dunwell et al., 2011). This same study revealed that children play a diverse selection of games, while the largest proportion played action and adventure games which include leadership skills (73% and 75% of male and female children played these respectively), puzzle games (66%), simulations (56%) and role-playing games (56%) were also popular (Dunwell et al., 2011: 53). Multiplayer online games in general have been found to be very engaging and absorbing leading to long play times (e.g. Yee, 2006).

While these predominantly entertainment genres are engaging the attention of many children and adults, recent research work in educational games or “serious games” as it is sometimes termed, is changing our understanding of the capabilities of learning with games. While early studies focused

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<sup>1</sup> One notable exception is *America’s Army*, a game developed by the Moves Institute in the US, the game was designed to attract new military recruits, and was developed by Mike Zyda.

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3 upon proofs of concept, comparative studies with traditional learning approaches and short game  
4 experiences, today there has been a shift of emphasis of these environments away from early pilots,  
5 isolated research projects and silos in different disciplinary fields into a more cohesive field of Serious  
6 Games (SG) with research perspectives from cognitive psychology, pedagogy, computer science,  
7 artificial intelligence, business studies, health and human-computer interaction and latterly as a subset  
8 of technology enhanced learning. According to at least one study, games are regarded as a perfect  
9 environment for teaching soft skills including intrapersonal skills that support self-efficacy, self-  
10 directed learning and reflection upon performance, in addition to interpersonal skills that allow  
11 players to collaborate, communicate, cooperate and negotiate, important skills for problem-solving  
12 and leadership (Dondlinger, 2007).  
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19 At the same time more mature game environments are evolving and becoming more widely used  
20 by learning communities, e.g. *River City* (e.g. Ketelhut et al., 2010) and *Roma Nova* (e.g. de Freitas &  
21 Liarokapis, 2011; Panzoli et al., 2010). In parallel, there is a shift in how pedagogy is being  
22 considered in educational games generally, away from a modelling of traditional learning, assessment  
23 and content delivery towards a more game-based approach, whereby the strengths of game-based  
24 learning design to form new pedagogic outcomes, objectives and approaches is emerging. That shift  
25 though subtle has major implications for how soft skills are taught in practice. At least one study has  
26 found that developing soft skills, such as critical skills, online requires a different approach from  
27 technical hard skills (Morgan & Adams, 2009).  
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34 By opening up game environments to teaching and rehearsing soft skills; leadership,  
35 communication and decision-making skills will be able to be taught as part of wider curriculum  
36 objectives and content delivery, and as part of a more effective and engaging blended learning  
37 experience. Opportunities for cross-curricula teaching and learning and the use of new pedagogic  
38 approaches may result from these changes, and new models such as exploratory learning, inquiry  
39 learning and problem-based learning will become more mainstream in educational practices.  
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44 Along with this more robust approach to using game mechanics to guide increased engagement in  
45 learning and other areas of human activity, the term, 'gamification' has emerged. The term implies  
46 being able to extract game mechanics, such as narrative, rewards, competition elements, role-play,  
47 missions and quests, to enrich human practices and altruism, as well as increasing happiness in life  
48 experiences and supporting attitudinal and behavioural change (McGonigal, 2011; de Freitas, 2011;  
49 Knight et al., 2010; Rebolledo-Mendez et al., 2009). With these strengths of game play for supporting  
50 learning in different contexts, there has been an early interest in the research around particular soft  
51 skills, and how they might be taught in educational – or serious as they are sometime termed (Michael  
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3 and Chen, 2006) – game environments. As part of this, one European Union funded MODES project<sup>2</sup>  
4 has focused upon how game-based approaches can support soft skills, as well as developing a new  
5 curriculum for teaching them, and there is a real interest in finding new approaches for testing these  
6 kinds of skills and for finding sustainable and replicable ways of teaching them amongst publishers  
7 and educational content developers.  
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11 In the United States, research work around multiplayer online game environments, such as *World*  
12 *of Warcraft* (MacStewart, 2010) and *Call of Duty* have not only revealed learning transfer but real  
13 strengths with developing soft and social skills, such as leadership and team building skills. Although,  
14 while the strand of research in the psychology area around violence in games (e.g. Brock et al., 2012)  
15 has been a barrier to uptake of entertainment games in most educational settings, the serious games  
16 movement and its emphasis upon purpose developed educational and training games avoids these  
17 problems and negative associations. However, while soft skills which are valued highly in industry  
18 have often not been assessed explicitly in pre-16 education, and are hard to assess with any accuracy  
19 in post-16 education and training contexts, the possibility of doing so in game environments is  
20 appealing to educational publishers and users alike. This particular strength of games, and recent  
21 positive reporting of employment recruitment and guild leading experience in the media (e.g. Seeley-  
22 Brown & Thomas, 2006), has led to renewed interest in games as a learning tool – but essentially as a  
23 tool of assessment, monitoring of performance and for testing for career progression. Individuals, for  
24 example who have led large guilds display leadership skills and guild leaders display a range of  
25 different skills such as mediating conflict and planning (Goh & Wasko, 2009) and evidence of  
26 transferral of these skills into offline leadership has been indicated in the literature (Jang & Ryu,  
27 2011).  
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38 This paper then comes out of this different conceptualisation towards game-based learning, as part  
39 of a blended learning experience, which rather considers how games and their game mechanics can be  
40 used for supporting more effective and engaging education and training, rather than the usual  
41 approach which seeks to apply traditional learning models and practices in game environments. This  
42 is not to say that traditional learning approaches should not be used in game design, where traditional  
43 approaches are more engaging and inclusive of learners these should be part of the learning blend – or  
44 ‘immersive learning experience’ (de Freitas & Neumann, 2009). In the rather more complex  
45 environment and system of the educational game environment then, an optimum potential  
46 environment for teaching and learning a diverse range of leadership and soft skills is provided. To  
47 turn potential to actual we first need to consider this opportunity in the light of game design,  
48 pedagogic modelling and soft skill development to allow effective learning game environments to be  
49 designed, developed, implemented, evaluated, validated and assessed consistently.  
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58 <sup>2</sup> For information on the EU-funded MODES project see: <http://www.modesproject.eu/>.  
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3 For this reason, this paper explores how a model can be developed and applied to a leadership  
4 game which consideration of serious game design, cognition and soft skill development and the  
5 implementation of the environment in practice. This paper however is rather more concerned with  
6 educational games rather than entertainment games, and while there is a blurring in some of the  
7 functionalities and shared technologies, at this time lower budgets and attempts to balance pedagogic  
8 and entertainment elements mean the two are still relatively different genres of games. Our focus has  
9 been to develop scientific approaches and techniques for modelling learning within game  
10 environments and developing the best methods for scaffolding learning within them, thereby  
11 supporting the learners and learner groups. This paper brings together some of this knowledge  
12 provides a review of the field of e-leadership, and against this suggests a model for developing  
13 educational games within the context of soft skills in general and leadership skills in particular tested  
14 against a fully developed and in use game: the *Leadership Game* developed by PIXELearning to test,  
15 assess and teach leadership in small groups.  
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## 24 **2.0: Method**

25 The paper includes three aspects to the study: a literature review of key e-leadership models under  
26 consideration and identification of any game-based studies using leadership models and soft skills  
27 using keyword searches on web-based databases and search engines. The review allowed us to  
28 analyse and synthesise best practices and models in use for comparison with the ELESS model we  
29 evolved. The second aspect of the study involved iterating the model between the researcher and  
30 instructional designer, building upon previous game-based learning studies undertaken at the Serious  
31 Games Institute including *Code of Everand*, *Roma Nova*, *Alice* and *MODES*. The third aspect of the  
32 study involved developing the case study based upon user studies of the *Leadership Game*, this  
33 included evaluating the data sets from the user studies and analyzing the key findings from models,  
34 according to the game model and literature, previous studies and evaluation metrics from the 'four  
35 dimensional framework' (de Freitas & Oliver, 2007). Based upon these three aspects of the study, the  
36 model has been developed and tested. Further studies and evaluations will be undertaken to validate  
37 the model fully and in different learning contexts. This work has focused upon a user group in a  
38 professional company, where the game was trialled as part of blended programme. Qualitative  
39 feedback was gathered to gauge participant's reactions and impressions of the game for use in training  
40 programmes. All the data is anonymised and was collected with respect to the ethics process of  
41 PIXELearning research and development team, and stored and used under the Data Protection  
42 legislation.  
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## 53 **3.0: Literature review of e-leadership models and leadership in educational games**

54 The literature around leadership in organizations has historically been focused around traditional  
55 leadership models, such as transformational and transactional leadership models, with emphasis upon  
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3 single leaders, and concepts such as charisma and setting good examples, latterly this trend has been  
4 growing particularly in the light of the 'knowledge economy', which has led to different working  
5 patterns, flatter hierarchies and more distributed working communities, often multinational for  
6 example (Lichtenstein et al., 2009).  
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10 It seems there is a tension here at present, leading to new leadership models: ideas of distributed  
11 (or shared) and disruptive leadership are particularly interesting here, and are considered in relation to  
12 the model of e-leadership in games put forward here. In distributed leadership, as in collaborative  
13 learning environments, for example:  
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17 ...we see more evidence for shared or collective leadership in organizations as  
18 hierarchical levels are deleted and team-based structures are inserted (Avolio, Walumbwa et  
19 al., 2009: 431).  
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23 Pearce & Conger (2003) define shared leadership, a synonymous term to distributed leadership,  
24 according to Avolio and colleagues (2009) as  
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27 ...a dynamic, interactive influence process among individuals in groups for which the  
28 objective is to lead one another to the achievement of group or organizational goals or both.  
29 This influence process often involves peer, or lateral, influence and at other times involves  
30 upward or downward hierarchical influence (Pearce & Conger, 2003: 1)  
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34 Shared leadership here reflects some of the ahierarchical tendencies found within game  
35 environments, where leaders in guilds or undertaking group missions change over time (Reeves &  
36 Malone, 2007). In learning game environments, the tutor may not lead the learning activities, and peer  
37 groups or learners may undertake the missions with limited guidance from a teacher at all (e.g. as in  
38 *River City*, Ketelhut et al., 2010). Similarly, in complex systems leadership, 'leadership can be  
39 enacted through any interaction in an organization... leadership is an emergent phenomenon within  
40 complex systems' (Hazy et al., 2007: 2). Leadership as an emergent property is a particularly  
41 interesting and relevant concept with respect to game-based learning environments, as although these  
42 skills can be structured in design, unexpected actions and social interactions are commonplace in  
43 practice, and opportunities for taking up leadership roles along the way is significant, in fact role play  
44 in game based learning as well as narrative structures often confer power and privileges upon players,  
45 or can be earned as part of game play, making the motivation to engage and complete missions  
46 extrinsic in educational and entertainment game design (e.g, Dickey, 2006). Avolio and colleagues  
47 argue that in these types of approaches a significant aspect is that organisations and contexts for  
48 leadership are rather considered as parts of a broader complex system. Leadership in this way is part  
49 of or an emergence of parts of the system interacting together (Avolio, Walumbwa et al., 2009). This  
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3 is similar to what has, and importantly for this paper, what may be achieved in the future. As evidence  
4 of this, there is a particular trend in the research with learning game environments and this is one of  
5 adopting and utilising Big Data, that is data from wider communities and databases as part of the  
6 game environment itself, creating more complex systems of data within which the player or learner  
7 can become immersed and allowing for greater opportunities for social interaction with others (e.g.  
8 Buckingham Shum et al., forthcoming; Dunwell et al., 2010; de Freitas & Liarokapis, 2011).  
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13 In this way, shared or distributed leadership can be ‘viewed as a property of the whole system, as  
14 opposed to solely the property of individuals, effectiveness in leadership becomes more a product of  
15 those connections or relationships among the parts than the result of any one part of that system (such  
16 as the leader)’ (O’Connor & Quinn 2004, p. 423). This reflects practices in our studies of game-based  
17 learning in the *Leadership Game*, and helps to reframe how games are researched and analysed, as  
18 *systems and behaviours* emerge as properties of systems, part of *systemic changes and fluctuations*,  
19 rather than specified tasks, objectives and outcomes. However, shared leadership is a relatively recent  
20 approach and few studies have tested leadership in this way, one exception is Avolio & Bass (1995)  
21 which has evaluated ratings of the team rather than the leader. If our understanding of how to assess  
22 and test learners in these more complex systems can be made more sophisticated (perhaps by using  
23 self-reporting and in-game testing) then the processes of learning and the associated behaviours in  
24 turn may be more refined and also accurate.  
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33 Testing team results as well as individual outcomes is well within the capabilities of game  
34 environments, which lend well to this. In the *Alice* project, we have embedded a game, which teaches  
35 children best practices in safe evacuation from a building after an Earthquake, into a learning  
36 management system. This has the advantages of allowing teachers to track learning behaviours of  
37 individuals and groups playing the game allowing them to gain a fuller understanding of conceptual  
38 differences and difficulties, as well as allowing for performance to be measured and personalized  
39 according to difficulty levels in blended learning conditions (e.g. Dunwell, Petridis et al., 2011).  
40 Implemented into 26 EU languages and with embedded learning objects in the environment, in fact,  
41 the aspect of feedback in games lends well to monitoring performance and building up the acquisition  
42 of soft skills that can be retained over longer periods or can be easily brushed up after original  
43 learning (Dunwell, de Freitas et al., 2011). In addition, educational game play has positive benefits for  
44 learning and measuring soft skills such as negotiation, communication skills, cooperation and  
45 collaboration (Beck & Wade, 2006) and other soft skills acquisition according to some research is  
46 reinforced by using game-based learning approaches (e.g. Dondlinger, 2007; Protopsaltis et al., 2010).  
47 However, despite the positive literature and study findings there is still a dearth of evidence of  
48 leadership skills training in game environments and the accompanying research, so more research and  
49 implementation is required.  
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3 Avolio and colleagues define e-leadership as ‘leadership where individuals or groups are  
4 geographically dispersed and interactions are mediated by technology’ (Avolio, Walumbwa et al.,  
5 2009). Avolio and colleagues concluded that this area of the literature will be a growth area, as virtual  
6 leadership and team-based interactions mediated with technology will become more important and  
7 pervasive (Avolio, Walumbwa et al., 2009: 440-1).  
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11 The fundamental issue for leadership scholars and practitioners to address is how  
12 technology is transforming the traditional roles of leadership at both individual and collective  
13 levels by examining “how existing leadership styles and cultures embedded in a group and/or  
14 organization affect the appropriation of advanced information technology systems” (Avolio,  
15 Walumbwa et al., 2009; and quotation from Avolio et al. 2001, p. 658).  
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20 While few studies on e-leadership have been undertaken with educational games, we found two  
21 relevant studies, one early study on leadership in entertainment games was conducted by Reeves &  
22 Malone (2007); it aimed to compare current leadership models with actual leadership in multiplayer  
23 online games. They used the Sloan Leadership Model which advocated four elements: Sensemaking,  
24 Inventing, Relating and Visioning. The study was observational and included interviews and surveys  
25 with guild leaders and other players and included a large sample for surveys (=171 respondents). They  
26 found more emphasis upon Inventing and Relating elements of the model, and found evidence of  
27 more risk taking in leaders also observing temporary rather than permanent leadership roles being  
28 adopted by players. This was a notable feature that we had observed in our previous studies and in the  
29 case study of the *Leadership Game*. Leadership behaviour focused upon single individuals was not  
30 consistent within behaviour observed in game environments. Notably they concluded that leadership  
31 was made easier in the online environment which they attributed to critical in-game leadership  
32 features such as intercommunication facilities and transparency of metrics (Reeves & Malone, 2007).  
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41 Another of the few studies found in the literature review considered leadership in multiplayer  
42 online environments (Lisk et al., 2011), and presented findings from studies of leadership in  
43 *Infiniteams*, a learning game developed by TPLD, and *EVE Online* an entertainment multiplayer  
44 online game. The study focused upon teaching distributed teams of learners, and considered the role  
45 of transformational leadership in learners. While in the entertainment context a linear trend was found  
46 for leadership and guild authority, in the training game *Infiniteams* ‘no consistent link between  
47 motivation to lead or leadership self-efficacy to transformational leadership as measured in the MLQ  
48 leader self-report’ was found (Lisk et al., 2011: 8). ‘Self-reported transformation and transactional  
49 leadership behaviour was strongly linked to final team scores’ (Lisk et al., 2011: 8). The reason for  
50 this was perhaps because leadership in game environments tends to be rather more distributed than  
51 focused upon a single individual. The finding may be significant as utilizing leadership models that do  
52 not map against serious game play well could well lead to inconclusive findings and unexplainable  
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3 data. The adoption of distributed or shared leadership models or creating more emphasis upon soft  
4 skills maps better upon game mechanics and principles, a useful finding for supporting more effective  
5 educational game design.  
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9 Testing in complex systems will not be a case of taking curriculum objectives and implementing  
10 them into game and learning environments. Here, a new learning design and concept of assessment is  
11 also required that iterates in parallel game mechanics and learning objectives. For example, how do  
12 collective in-game behaviours impact upon leadership skills development? How do social interactions  
13 within social networks impact upon in-game leadership, and importantly can leadership skills gained  
14 in-game be more easily transferred into other contexts such as the workplace (e.g. Mysirlaki, 2012;  
15 Reeves et al., 2008; DeMarco et al., 2007). To answer these questions is not straightforward however,  
16 and requirements for both the development of more sophisticated serious games and more conceptual  
17 models and frameworks for supporting serious game design parameters and approaches are needed to  
18 test these and other hypotheses (de Freitas & Liarokapis, 2011). However, the interesting aspect is  
19 that games allow us to test these and other research hypotheses, and so open up new analytical tools  
20 for understanding soft skills and their formation in learning contexts.  
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### 28 **3.0: Modelling e-leadership and soft skills in game environments**

#### 29 **3.1: The e-Leadership and Soft Skills Educational Games Design Model (ELESS).**

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31 A game-based e-leadership model needs to be contextualized with current literature and  
32 leadership models, but also needs to acknowledge that soft skills development and assessment in-  
33 game requires a different approach and perspective from traditional approaches in order for it to be  
34 most effective. Towards defining a model for e-leadership in the educational game context then it is  
35 worth considering the findings from the literature review undertaken above, as well as reflecting some  
36 of the key game design parameters such as motivation (e.g. Garris et al., 2002), increased engagement  
37 of learners through immersion and fidelity (e.g. de Freitas et al., 2010), importance of game rules,  
38 competition, reward system, role play and narrative for effective game design (e.g. Järvinen, 2008),  
39 the role of social skills and social learning in games (e.g. Ducheneaut & Moore, 2005), team work and  
40 long-term cooperation (Siitonen, 2009; Gorlinsky & Serva, 2009) and the importance of immediate  
41 feedback for ensuring learning (e.g. Dunwell, de Freitas et al., 2011).  
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50 In earlier work, games design models have been linked with pedagogic models, to improve the  
51 efficacy of game based learning approaches, e.g. the exploratory learning model (e.g. de Freitas &  
52 Neumann, 2009), the 'four dimensional framework' (de Freitas & Oliver, 2006) and the 'game-based  
53 learning framework' (see Figure 1: Staalduinen & de Freitas, 2011). This work has built upon  
54 pedagogic models such as experiential learning (exploratory learning), activity theory ('four  
55 dimensional framework') and combinations of the 'four dimensional framework' and the Input-  
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3 process-outcome game model (Garris et al., 2002) (game-based learning framework). These models  
4 have been tested in various studies but one of the problems with this approach has been validation in  
5 different contexts of learning and difficulties of bringing pedagogic models, game development and  
6 learning processes with dedicated tools and techniques into one model. Inherently, the problem lies  
7 with mixing processes (e.g. game design processes) with pedagogic models (e.g. activity theory) and  
8 the tools and techniques such as user-centered design and heuristics. In an attempt to overcome this  
9 problem, we have integrated flow charts to indicate process flows, and have managed to validate the  
10 'four dimensional framework' for evaluating games, game selection and for game design and  
11 assessment. However, finding the balance between game design and pedagogic models has remained  
12 the greatest challenge in terms of serious game design, echoing the requirement to find a balance  
13 between engagement and fun and learning and instructional efficacy.  
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21 **Insert Figure 1: Game-Based Learning Framework here.**  
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23 For these reasons, this model takes a different approach to modelling. Rather than approaching  
24 from either the game design or the pedagogic model perspective, we have looked at the models of  
25 leadership that best fit within game environments, and as a result aim to map the framework and  
26 pedagogic and game play elements against these models in parallel, as in practice elements of game  
27 design and pedagogic modelling are combined at the earliest stages.  
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32 In past research work in pedagogy it has been notable that much of learning in practice involves  
33 associative, cognitive and situative models (after Greeno et al., model in 1996 see: Mayes & de  
34 Freitas, 2007; the original report also reproduced in: de Freitas & Jameson, 2012). In game  
35 environments, while some studies have focused upon one or other learning model e.g. inquiry based  
36 learning (Ketelhut et al., 2010), overall the capability of games and game environments to encapsulate  
37 multiple theories and conceptual models is a notable strength, which is why in the four dimensional  
38 framework the pedagogic dimension purposefully includes the use of one or more theories and  
39 models, often in parallel. The issue with serious game design elements and mechanics is that most of  
40 them are derived from entertainment games, such as role play, rule systems, narrative, quests and  
41 missions, competitive elements, social interaction capabilities and so on. So the balance of elements  
42 will always be towards entertainment and fun, however it is perhaps a fallacy that learning cannot be  
43 fun. Zyda and others (1995) argue that a balance towards entertainment elements is critical otherwise  
44 games are no longer effective learning tools, but instructional designers and employers still see an  
45 importance in defining and achieving learning objectives, tasks or activities. To attain a balance, the  
46 elements of the new model then need to include design, cognition and practice-based implementation  
47 elements: *serious game design, soft skill and cognitive development and implementation into the*  
48 *learning environment.*  
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3 In previous work, published in this journal (de Freitas et al., 2010), we considered *learning as an*  
4 *immersive experience*. The ‘four dimensional framework’, which provides a validated and tested  
5 model and provides the engine of serious game design, is a critical characteristic of game-based  
6 approaches. In this way, the need to consider learning as the environment or *context* in which it takes  
7 place, *the learner* and how they are profiled in terms for example of ICT skills and game play  
8 experience, the *representation of the game* including the levels of immersion, interactivity and fidelity  
9 required for the game to be effective with that particular learner group, and the *best pedagogic*  
10 *approach* to be taken. The model also requires a consideration and conceptual basis for the  
11 simultaneous process of developing soft skills and leadership skills as part of the cognitive  
12 development of the learner/player within the game environment. This process takes place in parallel  
13 with the game design, as design processes are cyclical, and the process of ‘checking’ the game  
14 mechanics against the learning outcomes and requirements takes place at many stages in the  
15 participatory design process. Pacing learning, levels of difficulty as well as social interactions and  
16 references to external resources and information are mechanics for allowing this matching between  
17 game play and learning to take place. For example, the requirement of socially interactive learning is  
18 a key aspect of learning with games, therefore the need to design learning to maximise social  
19 interactions with other learners and with tutors and non-player characters in the game, and to provide  
20 immediate or fast feedback to allow the learner to gain learning benefits is paramount to this checking  
21 process. The third element of the model then has a focus upon the practical implementation of the  
22 game in the learning context. As such it has a focus upon the assessment, validation and evaluation of  
23 the game in context. The deployment of the game *in situ* brings with it the decisions of level of blend  
24 between online, game and face-to-face for example, the learning frameworks that need to be  
25 employed to ensure effective use of the game and the transparency of the assessment and game  
26 metrics and mechanics for empowering the learner/player. See Figure 2: The ELESS model.  
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**Insert Figure 2: The ELESS model, here.**

43 The ELESS model therefore brings together the three elements of serious game design, soft skill  
44 and cognitive development and implementation into the game environment. See Table I, below.  
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**Insert Table 1: ELESS model: the Three Elements, here**

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49 Although further testing of the model in different contexts needs to be undertaken, in theory the  
50 model could be used in any technology enhanced learning context or even in traditional leadership  
51 teaching contexts. The model should also be capable of being used in other soft skill training and  
52 teaching contexts. The model defines serious game design attributes in relation to pedagogic elements  
53 and theory and build upon previous research including case studies of game use in educational and  
54 informal contexts of learning. As a note, many games have been used in schools and universities,  
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3 however many more have been used in informal learning contexts, the main reason for this has been  
4 pragmatic in the sense that often formal infrastructures and connectivity restraints can significantly  
5 water down the ability to implement learning games in classrooms (Egeneldt-Nielsen et al., 2008). For  
6 example, school class durations are often too short to play out missions to completion. Therefore  
7 informal learning contexts have been favoured by researchers for studying behaviours, and for  
8 commercial developers who are required to provide less support in these environments. There are also  
9 cultural differences here, in the US less support is required by teachers for implementing game based  
10 approaches, this is possibly because of the deeper penetration of online learning courses, where  
11 individuals and teachers are given software and tutorials online rather than face-to-face, ICT  
12 capabilities could also be a factor here leading to better and quicker uptake in certainly locations than  
13 others of game based approaches. The model was tested with respect to the Leadership Game to test  
14 the validity of its premises and explore and further refine its implementation in a practical context for  
15 research and educational design improvement purposes.  
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### 24 **3.2: Case study and Discussion of the Model: The Leadership Game (LSG)**

25 The *Leadership Game* (LSG), developed by PIXELearning<sup>3</sup>, was used in practice during 2012 as  
26 a component in a blended leadership programme where the game was used several times throughout  
27 the duration of the course. The organisation who piloted the programme had a global, distributed and  
28 highly talented workforce and the specific audience for the leadership development programme was  
29 hand selected future leaders. See Figure 3: Screen shot of the LSG.  
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33 The following case study provides a consideration of the LSG and its training of leadership and  
34 soft skills to test and evaluate the efficacy of the ELESS model as a design aid and also for assessing  
35 existing games. Here, the game designers provide valuable input into how LSG was developed in  
36 relation to an imperative to promote learning leadership and soft skills, such as team building, long-  
37 term collaboration and distributed decision-making in the game environment. The model is therefore  
38 tested in a robust way against actual serious game design parameters in LSG and in concert with the  
39 user-based evidence extracted during the development process.  
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45 **Insert Figure 3: Screen shot of the LSG here**

#### 46 **3.2.1: Serious Game Design (e.g. four dimensions: context, learner, representation and pedagogy)**

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48 The LSG is a multiplayer serious game, where 4 individuals, each with their own mission choose  
49 how to work together and how to plan activities. By combining leadership training exercises and a  
50 sandbox style environment, players are challenged to perform, compete and collaborate in order to  
51 achieve their personal mission and the wider game objective.  
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58 <sup>3</sup> See <http://www.pixelearning.com/services-the-leadership-game.htm>.  
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3 LSG was developed to address the need of the ever growing distributed and digital workforce and  
4 had the objective to improve real-world leadership capabilities in environments that are highly  
5 distributed, global and competitive. The LSG was designed initially as an internal concept and utilised  
6 subject matter expertise from a consultancy group. However the concept has been further developed  
7 and tailored for use in several organisations. The main outcome of any soft skills intervention is to  
8 make trainees aware of concepts and practices that they were previously unaware of and to allow  
9 them to consciously develop them. Having done this, people understand why they act and react the  
10 way they do and therefore begin to take charge of interactions and actions responding appropriately in  
11 the training environment and then transferring this learning to offline situations. The game was  
12 designed to encourage this, players are encouraged in the game to consciously reflect on their  
13 thoughts and feelings throughout the learning experience.  
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20 The context of learning was in the workplace, and learners played the game from their desks. The  
21 game was designed using Flash technology and utilised animated look and feel to the game  
22 environment, with a high level of fidelity in the activities and team communications. The learner has  
23 relatively high ICT competencies due to the nature of their organisation. Over the course of the year  
24 participants (n=144), divided into teams of 4 to progress through the programme. Participants either  
25 self-organized into teams or were assigned to a team. Despite occasional technical barriers the  
26 majority of teams successfully completed the LSG experience and found it a challenging yet  
27 rewarding exercise. Approximately 80% of participants requested time to replay the exercise for a  
28 second time once they understood what was involved; they saw an opportunity to improve their  
29 performance or practice and hone coaching skills with less experienced learners. As teams progressed  
30 through the exercise they often were able to self analyse and highlight areas where they required  
31 improvement. The nature of the game requires teams to implement performance improvement  
32 immediately and this allowed teams to work through communication structures and command and  
33 control strategies in real time to evaluate the results. Participant's level, in terms of frequency and  
34 quality of communications improved, as did their abilities to think critically about the environment  
35 and challenges they were set.  
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44 A strong and appealing narrative was an essential representational design element for gaining  
45 player engagement in the first instance, and therefore the game starts in the middle of a crisis  
46 situation. From here the player in an unknown environment must decide on what to do; analyse the  
47 situation, review information around them and create an action plan. To level the playing field,  
48 players take on the role of an anonymous character, each with a unique code name. All in-game  
49 communication is text-based and tagged with the code name ensuring that all players come to the  
50 experience as equals. Therefore we attempted to create a visually open feel to the environment,  
51 presenting the world as a space station, with the vast openness of space as well as hints to further  
52 areas behind locked doors. We also wanted to ensure players continually progressed forward and  
53 therefore divided the level into zones; we were able to leverage the mysterious nature of the  
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3 environment to create barriers, such as locked doors which prevented players from going over old  
4 ground and moving in the wrong direction. These mechanics allowed us to create a limited pathway  
5 whilst maintaining an open world feel.  
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9 Another critical element of the framework design was to ensure each learner experienced an equal  
10 level of leadership training throughout the experience. In traditional team games, a leader is assigned  
11 who has specific tools and assets that can be applied to the team to provide assistance. However this  
12 structure was not appropriate as it would limit the leadership role. Therefore our goal was to foster an  
13 environment where we would encourage natural leadership abilities to evolve and come to the fore.  
14 All learners were given equal amounts of information, equal tools and equal hints. If one role required  
15 leadership at a specific point in time we were conscious to mirror that role for another learner at  
16 another point in time but within a new context.  
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22 Detailed scoring and feedback frameworks were created to provide a 360 review process. We  
23 captured team scores based on game performance but we provided the team with capabilities to  
24 perform peer reviews after each major challenge. Each player in the team had 100 points per  
25 challenge in which to divide between each member, this created an interesting dynamic where in  
26 order to reward team members you may have to sacrifice personal gain. Challenges were also  
27 weighted in terms of value and as the difficulty level increased the value of the score increased.  
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32 At the core of the experience was exploratory learning. We made a critical design decision early  
33 on in the process where we would not inform learners of the challenge they faced; we felt it important  
34 that they work out the problem for themselves. Learners reacted to this in different ways with an  
35 almost 50/50 split reaction with some relishing the challenge, and others finding it challenging that a  
36 learning exercise was not simple. We found there was a correlation between age and gaming  
37 experience with how learners approached this element of the design, with those familiar with games  
38 being more open to explore and seek answers for themselves.  
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### 43 ***3.2.2: Soft skill, leadership and cognitive development (e.g. soft skills, cognition and*** 44 ***internalisation)*** 45

46 It was our goal that the game highlight at least the common challenges of organisational life that  
47 prevent us becoming the leader we could be, namely that we all at some time:  
48

- 49 1. Deliver less than optimal performance because we constrain ourselves through irrational self-  
50 limiting beliefs
- 51 2. Act in the moment without reflecting in the moment, our emotions uncontrollably dictating  
52 our behaviour
- 53 3. Make assumptions about people, strategies projects and ourselves without any real,  
54 consistent, firm evidence  
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4. Exhibit protectionist, defensive behaviour, taking things personally
5. Over-generalise based on isolated circumstances
6. Fail to appreciate context and fail to empathise with peers
7. Choose to bypass problem-solving opportunities
8. Set unrealistic expectations based on a lack of appreciation for available resources

Based on these conceptual underpinnings, as extracted from the leadership literature, the players' experienced a journey of leadership in a high pressure situation. In this respect, we favoured a predominantly cognitive approach to coaching, incorporating some behavioural aspects. This does not mean we ignored more psychodynamic, person-centric or eclectic approaches, but instead these are left for follow-up interventions, for instance during the reflective face-to-face sessions delivered as part of the blend in dedicated group training sessions.

The LSG was developed to allow learners to experiment and hone their leadership skills in the areas of coaching, problem-solving and decision-making and team-building skills. Each of these areas included specific learning outcomes; which were mapped with game play elements, such as competition points, narrative driven tasks and mission objectives. Players are required to explore, challenge assumptions, form and implement theoretical solutions and evaluate the results in order to extend their competencies. Through this process, players understood environmental analysis, strategic thinking, creative problem-solving, effective coaching and listening skills and how to effectively contribute to team development.

Once the detailed learning outcomes were fully defined the design team set about matching them to game mechanics and challenges to identify those that would elicit, identify and facilitate each core skill. Some learning outcomes such as communication, negotiation, conflict management were more obvious than others and the high level game flow and level design was created by dividing the learning outcomes into manageable segments where we focused on the more basic skills before progressing onto more complex areas.

The pacing of information and level of challenge was essential in order to build up a foundation level of skills but also to maintain engagement and avoid cognitive overload as much as possible. As noted above, allowing learners to identify the challenge and conceptually model a solution was of great importance and therefore the pacing of hints (both explicit and implicit) required a detailed exercise of balancing to ensure designer bias and cultural assumptions were not influencing the game flow overly.

The average time for the sample under consideration (n=144) to complete LSG was 95.35 minutes. This data was captured during our testing where each team reported their completion time.

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3 The average time to completion for each challenge within the game is shown in the Figure 3. From  
4 this data we can see that at each dependency gate, where we changed the dynamic of the team, for  
5 example moving to a pair (at challenge 2) and then moving to a team of 4 (at challenge 5), the time to  
6 completion increases, and then subsequently reduces. We can surmise that the increase in duration is a  
7 result of increased conflict within the team and allows for the team to re-address relationships and  
8 communication techniques.  
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13 **Insert Figure 3 here: Average time, in minutes, to completion for each challenge within the**  
14 **LSG**  
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18 Consequently the flow of rewards and opportunities for cognitive breaks in the exercise was  
19 crucial to driving continued engagement and prevent cognitive overload. Immediately after each  
20 exercise, the peer 360 degree review and feedback sections provided a time for meta-reflection of  
21 learning outcomes.  
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### 23 24 **3.2.3: Implementation of the game (e.g. assessment, deployment and social interactivity)** 25

26 As noted above team performance was evaluated on two criteria, overall team performance as  
27 well as a peer review of each individual. Challenges were weighted in value against difficulty level  
28 but also strength of elicited learning outcome. A detailed score breakdown was provided to learners  
29 upon completion of the exercise where the scoring was explained in detail. It was essential that the  
30 language used to explain the scoring and learning outcomes was identical to the language used in  
31 other frameworks to enable learners to make the connections between the LSG and other training  
32 exercises.  
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38 The blended approach allowed learners to come together at points throughout the course in face-  
39 to-face training but also enabled them to connect virtually through other means such as the group  
40 forum. These tools provided reinforcement for concepts highlighted in the gaming environment. One  
41 participant noted:  
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45 *Some of the managers don't work on this site, but they're telling people what to do and*  
46 *assuming everything works the same way as it does over there, but it doesn't. The game really*  
47 *allows you to see that first hand; at the beginning you think everyone sees what you see, but*  
48 *the secret is to always check assumptions and check understanding. That way you don't get*  
49 *misunderstandings.*  
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53 As the players progressed through the environment, dependency gates prevented progress without  
54 help of other game players, ensuring collaboration in a competitive framework, thereby creating  
55 complex relationships and interdependencies between the players. A participant noted:  
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3 *I was so focussed on winning the game that I didn't work well as a team with the others.*  
4 *It's like life, where you want to shine and be noticed, but to do that you sometimes have to*  
5 *help others. Once you see the value of the team you realise you need everyone, and to win as*  
6 *an individual you need to win as a team.*  
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10 The structure of the environment was crucial to the progression of all members of the teams, as  
11 the dependency gates made it essential that team members progressed at similar speeds through their  
12 defined paths.  
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15 From the study, we found that the game indicated elements of shared or distributed leadership, a  
16 move towards flatter hierarchies of social organization and creative use of technology to provide  
17 different perspectives upon the training sessions and activities. Internal workshops were used to  
18 gather data from participants and qualitative data was sought after each play experience. Facilitators  
19 listened in to some teams who used telephone communications, to evaluate the team's performance  
20 and captured workshop related feedback. One trainer noted;  
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26 *At the beginning learners weren't really interacting with each other, but I observed a real*  
27 *change in the way they began working together, the communication and the energy levels*  
28 *became much higher. This is something they need to think about when interacting with their*  
29 *teams in their day jobs; where face-to-face communication, focus and energy gets faster*  
30 *results.*  
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35 An internal forum was also used to allow participants to post comments about the training. As the  
36 data was sensitive qualitative data was provided to the design team and follow up questions were  
37 issued where required.  
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41 As the LSG was a tool to be used as part of a blended approach we did not lock the experience  
42 down in a prescribed framework; teams were encouraged to self-organise and deliberately were not  
43 given guidance on how to use the tool. This resulted in some interesting 'problem solving' or  
44 'cheating' dynamics as teams devised the most effective ways to win the game. For example, some  
45 teams decided to share their identities to ease communication, some arranged planning meetings, or  
46 picked up the phone to work through issues using verbal communication. The most ingenious teams  
47 would use screen sharing software to see the challenges from each other's perspectives. There were  
48 some who tried to beat the game and manipulate other users for personal gain, for example there was  
49 a game session where each player claimed to be the CEO of the organisation. Overall the high replay  
50 request rate, for a game designed to be played through only once, was a measure of its efficacy in  
51 terms of playability.  
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3 The case study has demonstrated how the ELESS model can be used as a design tool for  
4 improved educational and training game design in the areas of soft skills and leadership, and for  
5 validating and evaluating existing game design. Soft skills imply different design constraints and  
6 approaches to hard skills development (Morgan and Adams, 2009), leading to a requirement to  
7 reconsider pedagogy, representation, context and learner requirements. Game environments allow for  
8 3D design of learning experiences that can aid learning soft skills and in particular multiplayer games  
9 such as the LSG proffer opportunities for leadership skill formation and development in ways that  
10 allow learning to be rehearsed and reflected upon in a safe virtual environment.  
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#### 16 **4.0: Conclusions and future research work**

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18 The dearth of literature in this new emerging area of e-leadership is due to its relatively recent  
19 nature, and a growth in this literature base is expected to take advantage of the benefits and growing  
20 uptake of technology enhanced learning. As part of this trend, game-based learning offers a real  
21 potential for applying leadership soft skills training and education in a system where more  
22 sophisticated measures of leadership can be measured and evaluated more convincingly than in  
23 conventional face-to-face settings, and more in-step with new models of leadership such as e-  
24 leadership, distributed (and shared) leadership and complex systems leadership which lend well to the  
25 complexities of game environments.  
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31 By taking soft skill development and pedagogic design, alongside the strength of serious game  
32 design, more effective learning for soft skills may be effected in existing and new game environments.  
33 New research here is necessitated however, particularly in the game design and scientific study of  
34 social interactive learning and exploratory learning in guild-like games and inquiry learning  
35 approaches in science education and STEM teaching and learning. Games can capture social  
36 interactions and help to engage and motivate learners in sophisticated environments, through links to  
37 learning management systems and feedback systems using user behaviours.  
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43 The study here presents a new model where an equal consideration of serious game design is  
44 treated in parallel to soft skill and cognitive development. While the implementation and deployment  
45 of games in formal learning setting can be problematic due to the constraints of formal learning  
46 infrastructure, a new approach to utilizing game-based approaches as a leading component of learning  
47 design changes the emphasis from tutor towards the learner, and makes learning more engaging and  
48 motivating, supportive of behaviour and attitudinal changes and easier to tally with soft skills and  
49 cognitive development. The ELESS model can be used to frame the design parameters of soft skill  
50 and leadership games, and can be used to assess, validate and test existing games.  
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56 The emphasis upon social interactivity in game-based learning necessitates a new traversal of how  
57 soft skills may be taught and assessed in the future, and with the more complex systems, more  
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sophisticated methods of learning are emerging to engage learners. Future research lines are numerous but include: testing of the ELESS model in different contexts of learning, lending more game-design led approaches to instructional design and reconsidering the infrastructure of traditional education to allow for greater creativity in experience design, pedagogic modelling and practical game-based learning implementation and deployment.

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Figures:

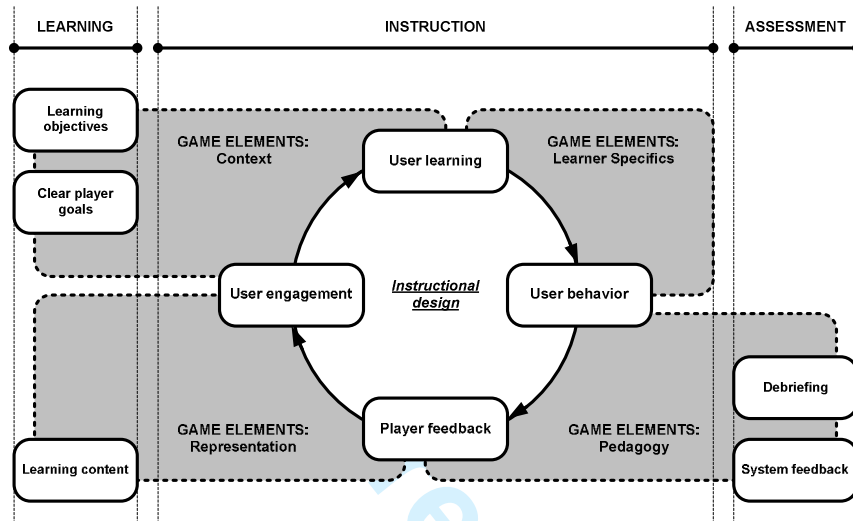


Figure 1: Game-Based Learning Framework here. Reproduced from Staalduin & de Freitas, 2011.

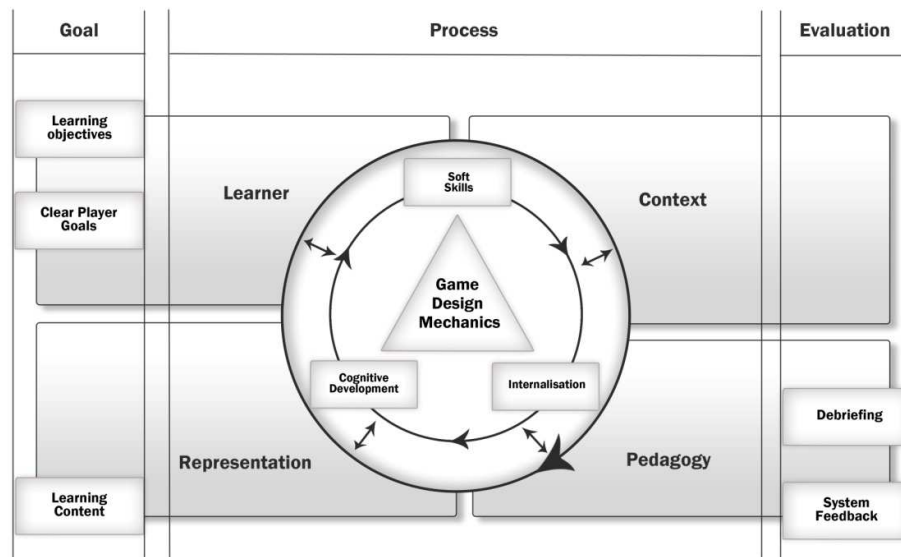


Figure 2: The ELESS model

<b>1) Serious Games Design</b>	
Context	<ul style="list-style-type: none"> <li>▪ Open environments versus closed environments</li> <li>▪ Mapping and sharing knowledge of the environment</li> <li>▪ Institutional support</li> </ul>
Learner/Player	<ul style="list-style-type: none"> <li>▪ Multiplayer or single player</li> <li>▪ Directed action in teams and as individuals</li> <li>▪ Learner/player control: interactivity</li> <li>▪ Difficulty level (multi-levels)</li> </ul>
Representation	<ul style="list-style-type: none"> <li>▪ Fidelity: level of realism (high to low)</li> <li>▪ Interactivity: narrative, quests, missions, closed and open scenarios</li> <li>▪ Immersion: actions, difficulty levels</li> </ul>
Pedagogy (associative, cognitive, situative)	<ul style="list-style-type: none"> <li>▪ Exploratory learning (de Freitas &amp; Neumann, 2009)</li> <li>▪ Experiential learning (Kolb, 1984)</li> <li>▪ Inquiry learning (e.g. Ketelhut et al., 2010)</li> <li>▪ Social interactive learning (e.g. de Freitas &amp; Liarokapis, 2011)</li> </ul>
<b>2) Soft Skill and Cognitive Development</b>	
Soft skills	<ul style="list-style-type: none"> <li>▪ Leadership skills: e.g. decision making, team communications, strategy development, tactics</li> <li>▪ Management skills: e.g. time prioritisation, interpersonal skills, communications, financial management, written skills</li> </ul>
Cognitive development	<ul style="list-style-type: none"> <li>▪ Pacing of information flow: what, where and how much information do you give</li> <li>▪ Conceptual modelling: present information in a way to allow the learner to draw conclusions</li> <li>▪ Cultural assumptions: in game play and information</li> </ul>
Internalisation: Debriefing; Individual and Peer Based Affect Development	<ul style="list-style-type: none"> <li>▪ Emotion and Information processing; pressure, music, suspense, time balance with desired learner actions</li> <li>▪ Reward and goal achievement</li> <li>▪ Stability and Instability</li> <li>▪ Self Image</li> </ul>
<b>3) Implementation into the Learning Environment</b>	
Assessment and Validation	<ul style="list-style-type: none"> <li>▪ Assessment of performance measures through team interactions</li> <li>▪ Transparency of game assessment metrics</li> <li>▪ Applicability of KPIs</li> </ul>
Deployment and implementation in Learning Contexts	<ul style="list-style-type: none"> <li>▪ Learning frameworks</li> <li>▪ Tutor-based materials and training</li> <li>▪ Blended learning approaches</li> <li>▪ Learning Management System Integration</li> </ul>
Social Interactivity	<ul style="list-style-type: none"> <li>▪ Social interactions in-game and extra-game including continued interaction post event</li> <li>▪ Support Frameworks with Peers, Mentors and Coaching (including experienced players and new players)</li> <li>▪ Disruptive social interactions (flaming)</li> </ul>

**Table 1: The ELESS model, the three elements.**

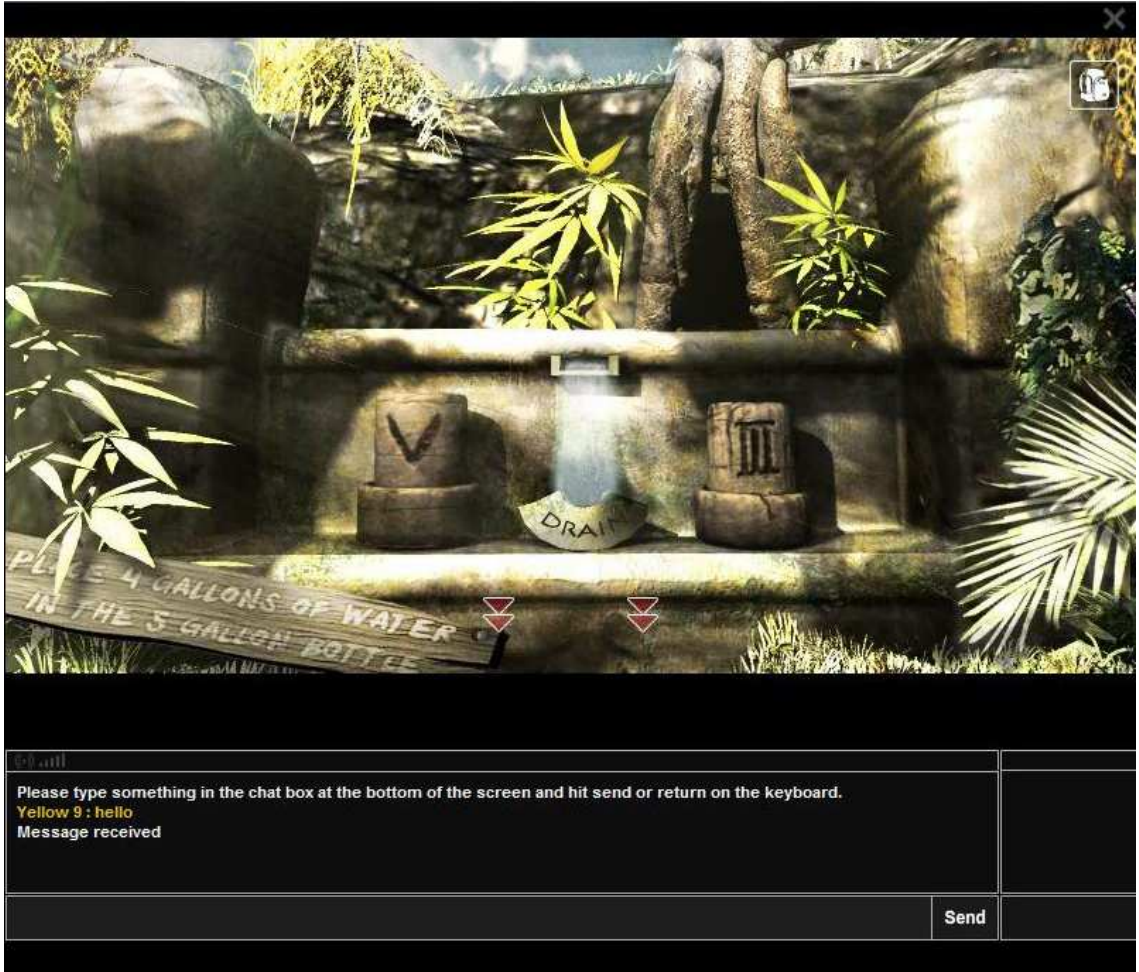


Figure 3: Screen shot from LSG

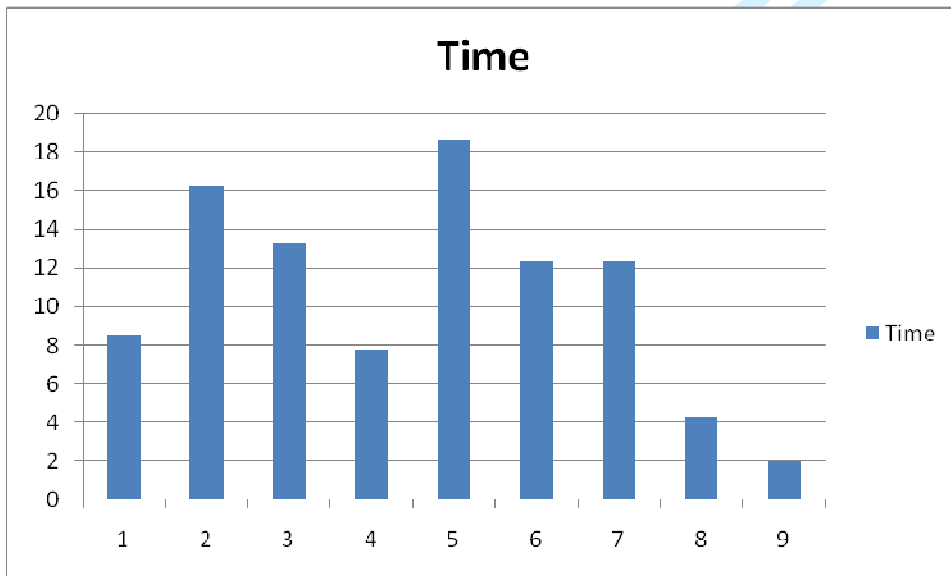




Figure 4: Average time, in minutes, to completion for each challenge within the LSG

Peer review only

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