# FLIGBY: The Serious Game Harnessing Flow Experience for Leadership Development

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**Abstract.** This paper discusses a unique serious game which harnesses a psychological state of Flow both as a pedagogical tool and a development target. The FLIGBY game was developed with the intention of teaching learners to understand the concept of Flow and apply this within their leadership practice. In FLIGBY, the player assumes the role of General Manager of a winery in California and must make 150+ complex decisions while managing the winery team and strategic direction to ensure the business's success. This allows for the assessment of players' skill level in 29 'soft skills' and provides the rare ability to quantify changes in players' leadership abilities. Use of the game to develop soft skills is discussed, including an extensive range of feedback provided during the game. Suggestions for future research include further interrogation of the dataset collected as learners progress through the game, along with additional measurement to assess how learners achieve a state of Flow while playing the game. Investigation of the roles of storification and socially constructed realities is also recommended.

**Keywords:** Serious game · Soft skills · FLIGBY · Leadership development

## 1 Introduction

Digital simulation and augmented or virtual reality technologies have been increasingly studied over the past twenty years and are predicted to be one of the biggest disrupters in business during the upcoming decade [1]. Of particular interest are the numerous potential applications for serious games for behavioral learning, integrating the benefits of simulation into business education. Serious games can be defined as "*digital games, simulations, virtual environments and mixed reality/media that provide opportunities to engage in activities through responsive narrative/story, gameplay or encounters to inform, influence, for well-being, and/or experience to convey meaning…*" [2]. Amongst the new ground being broken in the enhanced use of digital technologies in business and exploitation of the benefits of serious games for training, it is imperative that leadership development is not left behind. There are a number of serious games used for training purposes in several areas including health, fitness, sustainability, engineering and design. Increasingly, attention is also turning to serious games as a mechanism for developing critical leadership skills such as strategic thinking, emotional intelligence and

prioritization, often described as 'soft skills'. The importance of effective leadership in business success has been extensively studied and mapped in academic literature, along with a wealth of potential development strategies for critical soft/deep skills in modern leadership [3–5]. However, 'soft skills', although hugely impactful in businesses, can be challenging to develop as knowledge-based training methods are widely accepted to be ineffective without experiential opportunities to practice and receive feedback [6, 7]. For this reason, among others, research is increasingly turning to digital learning to explore mechanisms of interpersonal leadership skills such as collaboration, communication, negotiation and critical thinking [8].

This paper discusses a case study of FLIGBY, which is a serious game for leadership development, where players undertake the role of a general manager of a winery and must make several challenging business and human resource decisions in order to ensure the company's success. Additionally, FLIGBY's unique gameplay and storyline aim to educate players in the benefits of a psychological state of Flow; thus utilizing Flow as both as a pedagogical tool and a development target.

## 2  Theoretical Background and Originality of Contribution

### 2.1  Education on the Fundamentals of the Psychology of Flow

An established research area within the gamification of learning design is the concept of a state of Flow, defined by Csikszentmihalyi [9] as a state in which individuals are completely immersed or absorbed in the activity or task, leading to temporal concerns being minimized or ignored. The state of Flow is often discussed as 'the zone' - the optimal state for learning and intense concentration [9–11] and is a common element of successful games of all kinds. Over recent decades, many works have discussed the positive impacts of Flow on learner motivation and therefore learning success [12–16].

Beyond serious games, the concept of Flow is more widely associated with positive-psychology, a branch of the discipline which focuses on individuals' and groups' strengths, growth and contributions as opposed to early branches of psychology which centered around mental illness. It is within this branch of psychology that leadership, organizational effectiveness and societal well-being sit and where the bases for effective leadership development were founded. Across several years and based on Csikszentmihalyi's work, similarities have been drawn between the concepts of Flow and employee engagement, including clear goals, frequent and effective feedback and balance between opportunity and capacity [15]. The marrying of these concepts with Flow as an enabler of employee engagement has come to be known as Flow leadership [16], which is the central pillar of the knowledge-based learning outcome of the FLIGBY game, as discussed in the following sections. Currently no other games are designed to teach Flow leadership and develop the soft skills required for leaders to stimulate Flow experiences within their teams. Indeed, FLIGBY's unique contribution is its application of Flow theory as a learning target, which is in addition to the game's potential ability to induce a state of Flow in players as with other immersive serious games.

## 2.2 Improving Critical Leadership Skills

Amongst the unique contributions of FLIGBY to leadership pedagogy are the measurement of leadership skills against 29 core leadership competencies, which has led to the establishment of a vast database of information concerning players' demographics and leadership skills profiles. This dataset also provides the relatively unique ability to demonstrate improvements in those skills between playthroughs at scale. A common issue in serious games, particularly those aimed at developing 'soft skills' is that concrete improvements as a result of gameplay can be difficult to demonstrate. This work provides insight indicating improvement in players' leadership skills between their first and second playthroughs, which are also considered more thoroughly is other relevant works discussing the FLIGBY game [18–21].

# 3 Presenting FLIGBY: The Flow-Promoting Leadership Development Serious Game

FLIGBY was designed and created in partnership by Mihaly Csikszentmihalyi, renowned as the father of positive psychology and Flow theory, with ALEAS Simulations, a serious gaming lab based in California and Central Europe. The leadership development focus throughout the game is in teaching learners to understand the concept of Flow and apply this within their leadership practice within a business-realistic setting.

FLIGBY is a video-based learning experience where the player assumes the role of General Manager of a winery in California and must make 150+ complex decisions while managing the winery team and strategic direction to ensure the business's success. Balance with other conflicting priorities is essential to success within the game and the winery's economic viability must be strengthened, while relationships with Turul's external stakeholders must also be factored into decision making. For instance, the player may be presented with a short video clip of two game actors in conflict and the player is tasked with choosing the most appropriate option. The outcome of this choice is then played out in via video response as situations progress and a video response follows at the end of the scene with the player's in-game advisor Mr. FLIGBY providing tailored feedback.

The ultimate aim of the game is to win the Spirit of the Wine Award, an in-game award based on satisfying all elements of FLIGBY's Triple Scorecard framework. The player's success in this endeavour depends on the weighted sum of their decisions' impacts on corporate atmosphere (60%), profitability (30%) and sustainability (10%). It is crucial for success in the game that players are able to weigh up the consequences of their actions on all three areas of the triple scorecard and base their decisions on the most prudent way to navigate the various conflicting priorities at hand. However, while the complex decisions made throughout the game and the nature of businesses mean there are interdependencies between these three factors, it is important to note that corporate atmosphere is given much more weight than other factors. This is because soft skills development is the primary functional goal of this game and also as to some extent profitability and sustainability are consequences rather than causes of business success.

The game's plot follows the newly appointed General Manager of Turul Winery in California, tasked with overseeing the recovery of the business following a downturn in organizational success and collegiate harmony brought about by the dysfunctional leadership style of the previous General Manager. A key task is to nurture an environment which encourages teamwork and promotes Flow, including bringing as many colleagues as possible into a state of Flow at some point during the game. This also sits within the context of the player being expected to manage the winery in accordance with the expectations of the Winery's owner, Bob Turul. There are many possible paths to completion of the game and the direction a player takes is dependent on the decisions they make as they go along.

Figure 1 shows FLIGBY's dashboard with its Flow Meter, which tracks the player's progress in inducing Flow states in their colleagues at the winery and creating/sustaining a Flow-based corporate culture. After making decisions, players will see the impact of their decisions on the moods of the Winery staff, mapped against the typical moods discussed in Flow research. In Fig. 1, it can been seen that the player's actions have moved Larry into a state of Flow, while other players remain relatively far away and the player will need to adjust their approach with these team members in order for them achieve Flow.
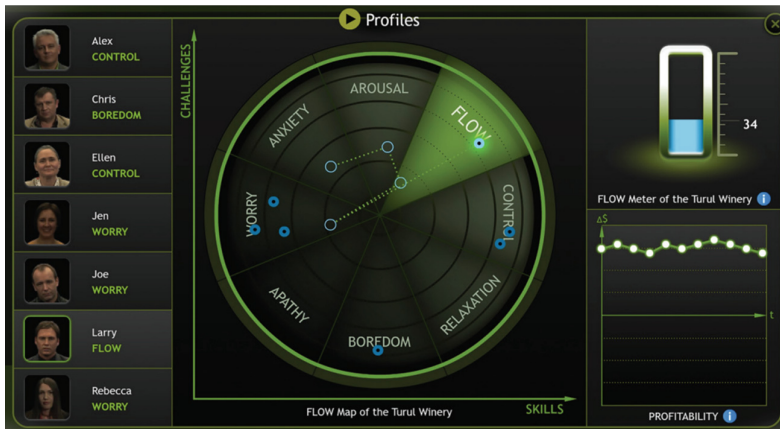


**Fig. 1.** FLIGBY's dashboard with the "Flow Meter" [17]

FLIGBY consists of 23 video scenes which take place during a season (6 months) at the Turul winery. Few players complete the game in one play-through, although this is possible; the average (mean) playing time of players who completed is 5.5 h (SD = 2.71). This is dependent on various other factors such as whether players choose to restart scenes and time spent exploring the game's multimedia library of additional Flow and leadership learning materials.

FLIGBY has been utilized as a teaching tool for several years by members of the Leadership & Flow Global Research Network and as such as been played by 9,994 unique players to date, ranging from university students and researchers to corporate training delegates. The vast FLIGBY dataset which sits behind the game contains data

from 15,642 total playthroughs and includes demographic information as well as scoring against FLIGBY's 29 leadership behaviors. On average, players complete the game 1.23 times (SD = 0.64) – although the number of plays varies from 1 play through to 10. There is considerable variability in whether players win the 'Spirit of the Wine' award, with 50% of playthroughs that win and 50% that do not. On average, players opened 26.8% (SD = 27.89) of additional media library entries. This however varies substantially between 1% and 100% depending on the player and which playthrough they are undertaking. Of all players to date, 53% were male and 47% were female. The largest groups of players were ranging in ages from 36 to 49 years (39%) and 26 to 35 years (37%). Some 13% of players were aged 18–25, while 12% of players were aged 50+. Players over the years have represented 138 different countries with the five most common being the United States of America, followed by Hungary, France, Canada and then Turkey.

## 4    Advanced Pedagogical Applications of FLIGBY

### 4.1    Focus Area 1: Measurement of 29 Leadership Skills

FLIGBY's Master Analytics Profiler (MAP) system measures the player's performance on 29 key leadership skills during gameplay (Fig. 2). Within the 29 skills measured by the MAP system, 25 are skills widely associated with good business leadership based on several decades of research. A further 4 skills (balancing skill, feedback, applying personal strengths and strategic thinking) are emphasized as having additional importance in generating Flow. FLIGBY's leadership skillset was distilled by a group of experts based on and validated in line with a range of widely used existing frameworks [21].

The player, acting as General Manager of Turul Winery is tasked with making decisions based on anywhere from two to five choices, the most and least appropriate of these having been defined and agreed by two independent expert groups [17]. Most in-game decisions require more than one of the 29 leadership skills to be used simultaneously, which is factored into the MAP system's algorithm and standardized as a percentage then used for mapping the player's strengths. A comprehensive leadership skills profile report is automatically generated for each player upon completion of the game. This includes the relative strengths and weaknesses of each player's leadership profile and is sent individually to each player. Within the report, each skill and group of skills is benchmarked against the average in the player's cohort and can be compared to other benchmark groups as requested, taking into account e.g. industry, age or leadership level.

### 4.2    Focus Area 2: Diversity of Feedback Types

In addition to the leadership skills profile discussed previously, the player receives a plethora of continuous and immediate feedback on the impact of their decisions throughout the game. This takes several forms, the first being the resulting actions which the player sees played out in the rest of the scene. These consequences may include more, less, expanded or limited decision options to take forward. In recognition of each time the player moves a colleague into a Flow state, a Flow trophy is collected. Sustainability badges are also earned as the player makes decisions which promote/enhance the

**Fig. 2.** 29 key leadership skills measured in FLIGBY's Master Analytics Profiler (MAP) [17]

environmental sustainability of the Winery's operations. In addition to being tracked on the in-game dashboard, both of these mini-achievements also contribute to whether the player ultimately wins the coveted 'Spirit of the Wine' Award. Table 1 provides a summary of the various feedback mechanisms within FLIGBY.

**Table 1.** Summary of feedback mechanisms in FLIGBY

| During the game (instant) | During the game (available through dashboard) | After the game (cumulative) |
|---|---|---|
| Sustainability badges | Corporate atmosphere score | 'Spirit of the Wine' Award achievement |
| Mr. FLIGBY's instant feedback | Profitability index | Flashback/debriefing by Mr. FLIGBY |
| Flow trophies | Flow radar | Learner's individual skills profile report |
| Dialogue with virtual characters | Flow trophies | Predictive feedback by MAP |
| Plot surprises | Media library | Global benchmarking by MAP |

The player also receives debrief support and tailored video feedback at the end of each of the 23 scenes by Mr. FLIGBY, the player's personal in-game leadership coach (Fig. 3). In addition, Mr. FLIGBY signposts to alternative courses of action which could have been taken and the possible effects of those, as well as directing the player to

appropriate materials in the game's multimedia library to inform and/or reinforce the leadership approach taken.
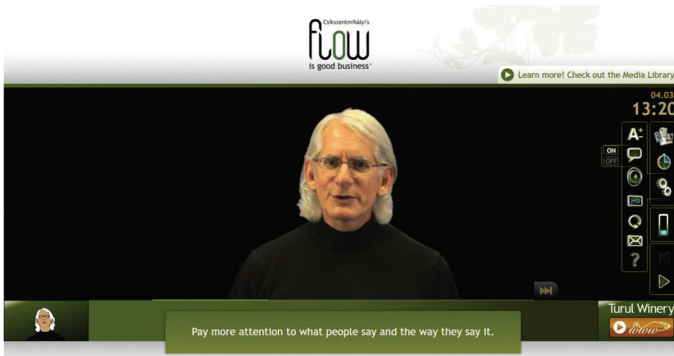


**Fig. 3.** Video debrief with Mr. FLIGBY

### 4.3   Focus Area 3: Skills Development

Within the substantial dataset gathered in the background as players complete the FLIGBY game sits the potential to explore the dynamics of digital leadership development. This continues to be explored to identify trends and development opportunities for the field. For example, use of FLIGBY has been found to allow players to identify and distinguish between transactional and transformational leadership styles displayed by actors in the game, as well as understanding the impact of each based on practice of applying them in managing a virtual company [18]. Furthermore, in a recent study Almeida and Buzady [19] supported that FLIGBY can be used successfully to develop skills in dimensions such as leadership, conflict management, diplomacy and emotional intelligence. Encouragingly, the researchers found that the number of years of professional experience students had before completing the game had a significant impact on their performance in the game, with more prior experience being linked to higher performance and less experience being linked to worse in-game performance. This study also provided validation for the FLIGBY game by presenting feedback from learners which reported the game to be an authentic representation of the challenges of a real business environment.

Initial analysis of the average level of competence in each of FLIGBY's 29 key leadership skills provides encouraging insight into the efficacy of FLIGBY as a developmental tool. This analysis found all skills except for two to have improved between playthrough 1 and playthrough 2. Those two skills which saw a decline were diplomacy (by 1.06%) and perhaps unsurprisingly regarding players' second playthrough, information gathering (by 1.82%). Table 2 below shows the skills which enjoyed the biggest improvement (more than 5%) between first and second playthroughs.

These initial findings provide encouraging support for FLIGBY's efficacy as a leadership development intervention and introduce useful nuances regarding which skills

**Table 2.** Skill Improvements from first to second playthrough

| Skill | Playthrough 1 | Playthrough 2 | Improvement |
|---|---|---|---|
| Stakeholder management | 64.08% (SD = 14.66) | 72.88% (SD = 15.72) | 8.81% |
| Entrepreneurship (risk-taking) | 66.09% (SD = 11.86) | 74.08% (SD = 14.00) | 8.00% |
| Future orientation | 67.69% (SD – 10.33) | 75.29% (SD = 12.75) | 7.60% |
| Time-pressured decision-making | 58.32% (SD = 11.73) | 65.90% (SD = 12.88) | 7.58% |
| Recognizing personal strengths | 68.11% (SD = 10.36) | 75.54% (SD = 12.61) | 7.43% |
| Empowerment | 61.58% (SD = 14.27) | 68.08% (SD = 15.42) | 6.49% |
| Strategic thinking | 63.14% (SD = 10.43) | 69.61% (SD = 12.67) | 6.47% |
| Active listening | 63.44% (SD = 11.49) | 69.82% (SD = 13.74) | 6.39% |
| Balancing skill | 64.96% (SD = 10.88) | 71.19% (SD = 21.52) | 6.23% |

may be most effectively developed through playing the game. Data presented here gives indicative insight into how the game has been played and experienced since its inception; more statistical data and in-depth analysis can also be found presented in other relevant publications [18–21].

## 5   Limitations and Directions of Future Research

This work introduces a demonstrative case study of FLIGBY as a unique pedagogical tool and in brief discusses encouraging results indicating concrete and measurable improvements in learners' soft skills between playthroughs. A limitation of this work is that it does not investigate these interactions in depth or seek to explain effects. Other relevant publications are available investigating these effects [18–21] and future research is also recommended to interrogate and explore the vast dataset containing the results of the 15,642 total FLIGBY playthroughs which have taken place to date. Within this investigation are opportunities to complete cross-cultural comparisons between players from around the world, as well as cross-industry comparison and comparisons based on other player attributes such as age, gender, current occupation and seniority level. More longitudinally, further research is recommended to assess whether understanding of Flow theory gained through playing FLIGBY leads to behavioral change in the workplace and how this could be linked to organizational success. It is anticipated that this learning could also be used to develop Flow-based games for other disciplines beyond leadership, such as sports coaching and mental health promotion.

A limitation of the FLIGBY game itself and surrounding protocol is that it does not currently include functionality to assess whether players experience a psychological state of Flow while playing, although players do typically report experiencing Flow

during gameplay. A direction for future research is to assess players' Flow experiences at various points during the game using established Flow scales and semi-structured interviews. Future iterations of the FLIGBY game would also benefit from functionality to establish baseline measurements for learners in each of the 29 FLIGBY leadership skills, in order establish before and after measurements and therefore the success of developing skills during the game.

Beyond FLIGBY, the authors continue ongoing work to investigate and converge current and emerging academic thinking regarding serious games, Flow and soft skills development. This is with the aim of synthesizing an explanatory model outlining the bases of effective immersive serious games utilizing Flow for enhanced leadership development. Investigation into the role of 'storification', i.e. use of narrative to engage and immerse learners [22, 23] as a catalyst for group Flow and the development of socially constructed realities is also a key recommendation for future investigation.

## 6   Disclosure Statement, Funding and Acknowledgements

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