

Playful Serious Gaming for Change Management.

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Abstract: Change management is among the more difficult professional competencies to develop, and conventional training approaches produce limited retention and transfer. Serious games offer an evidence-based alternative, yet a structural design flaw undermines their effectiveness in practice: domain theory is routinely embedded as thematic decoration, allowing players to complete the game without engaging with it. This study addressed that flaw through iterative serious game design. Drawing on De Caluwe and Vermaak's (2003) colour-coded change management framework, six prototypes were developed and evaluated across two design cycles. Two designs are reported. The first enforces theoretical knowledge mechanically, requiring players to apply specific change management actions to accumulate employee support and clear phase transitions. The second, modelled on the commercial card game Exploding Kittens, sustains engagement through deception, bartering, and crisis management, but enforces theory less structurally. The prototypes reveal a central design tension: mechanical enforcement of theory risks producing a structured workshop rather than a game, while prioritising engagement risks reducing theoretical depth. Theory-as-mechanical-prerequisite is established as a transferable design principle, and the balance between instructional rigour and player engagement is identified as the primary open challenge for future iterations.

Keywords: Game-based learning, Learning mechanics, Instructional design, Iterative design, Change management

1. Introduction

Organisational change is consistently associated with employee resistance, reduced well-being, and elevated use of stress-related medication (Day et al., 2017; Orabi et al., 2023). Failed change processes can be attributed in part to insufficient employee readiness before implementation. Managerial competencies to plan, communicate, and implement change are therefore considered key success factors in organisational transitions.

This, however, is considered one of the more difficult areas of practice to develop (Thompson, 2010). Conventional training approaches are primarily lecture-based. These produce limited retention and transfer, since they do not give learners the opportunity to practise skills in conditions that approximate real decision-making. Structured professional development tools that combine theoretical grounding with active practice do represent a documented improvement over lecture-only formats (Sitzmann, 2011). This is particularly true when learning objectives are concrete and measurable.

Studies on the application of serious games report higher engagement and better knowledge retention compared to conventional instruction (Connolly et al., 2012; Mouaheb et al., 2012; Zhonggen, 2019). A persistent design problem, however, limits that effectiveness in practice. Domain theory is frequently embedded in serious games as thematic decoration. It appears in the naming of components, the colour of cards, or the framing of scenarios, without being constitutively required by any game mechanic. When theory is decorative, players complete the game without engaging with domain theory. The distinction between theory as decoration and theory as a mechanical prerequisite has been identified conceptually (Arnab et al., 2015; Plass et al., 2015), but has not been demonstrated through systematic, iterative design comparison.

This study addresses that gap by redesigning an existing change management serious game into *You Can Change*. Mechanics from well-known commercial board games are incorporated to sustain engagement, while theoretical knowledge is enforced as a mechanical prerequisite for progression.

We define Serious Gaming as: “a playful intervention to meet societal objectives”. The central research question is: *how can domain theory be integrated as a mechanical prerequisite in serious game design to improve learning outcomes without reducing player engagement?*

2. Background

Sitzmann's (2011) meta-analysis of 65 studies found that simulation-based games produced significantly higher declarative and procedural knowledge than comparison conditions. Variation in effect sizes across studies is substantial, however, and Plass et al. (2015) identify the design of game mechanics that directly support learning objectives as the most under-researched variable in the field. Arnab et al. (2015) analysed 40 serious games and distinguished between game mechanics, the rules and interactions that govern play, and learning mechanics, the instructional operations that produce knowledge change. The majority of games in their sample embedded learning content at the level of theme and narrative rather than core mechanics, and that surface-level

integration correlated with weaker learning outcomes. A further constraint is that serious games in professional contexts are often perceived as too serious, which reduces engagement and limits diffusion (Spil et al., 2021).

This study draws on De Caluwe and Vermaak (2003) as its primary theoretical framework for the game prototypes. Rather than prescribing a best practice, De Caluwe and Vermaak observe and categorise different managerial approaches to change through five colour-coded styles. The yellow style characterises the political manager who focuses on building support. The blue style represents the logistical manager who plans and specifies in detail. The red style describes the manager who steers through rewards. The green style reflects the educator who believes change follows from awareness of its benefits. The white style characterises the catalyst who views change as constant and guides rather than controls its course.

A comparable approach is taken by Bennis, & Benne (1979), later extended by Boonstra (2002). Their framework identifies three strategies for change. Power-coercive strategies impose change top-down through authority and the threat of sanctions. Empirical-rational strategies assume that employees, given sound arguments, will follow change voluntarily. Normative-reeducative strategies engage employees as intrinsic agents of change, adopting a bottom-up orientation. Boonstra (2002) adds a fourth strategy, barter, which assumes that individuals act in their own interest and will support change only when it aligns with a personal cost-benefit calculation.

The two frameworks share substantial conceptual overlap. The yellow and blue styles of De Caluwe and Vermaak (2003) correspond to power-coercive strategies; white aligns with empirical-rational thinking; green reflects a normative-reeducative orientation; and red corresponds to Boonstra's (2002) barter approach. The frameworks are therefore largely equivalent, differing primarily in that De Caluwe and Vermaak (2003) distinguish two variants within the power-coercive category.

3. Redesign

Six prototypes were developed and evaluated across two iterative design cycles. The two most promising designs are reported here.

3.1 Prototype 1

Medium: Hexagon tiles

Player type: Solo/Cooperative

Timing type: Turn-based

Objective: Competitive - first to reach

Prototype 1 uses hexagonal tiles as its primary medium, drawing directly on the tile format of the existing serious game *Blik op Bestuur*.



Figure 1: Concept 1 board layout: The board layout illustrates the three-phase progression, with bottleneck positions marked at each phase boundary and the hexagonal tile grid occupying the space between them

Each player moves one tile per turn. Every tile corresponds to one of the five colour-coded styles of De Caluwe and Vermaak (2003) and carries a specific change management action.

Prototype 2

Medium: Cards

Player type: Solo

Timing type: Semi-turn-based

Objective: last survivor/highest score

Dynamics: Lying and Bartering

Prototype 2 is a card-based game derived from an earlier prototype by Spil and Bruinsma, itself modelled on the commercial card game *Exploding Kittens*.

In the first round of the game, the players play a “normal” game of you can change learning which important change mechanisms are in the cards divided in which change colour.

In the second round all action cards are taken out and players can take a new change initiative and “play” the card in hand that they think is most important and discuss what the situation on this subject is and how it can be improved.



Figure 2: You Can Change by Bruinsma & Spil

4. Analysis

The two prototypes demonstrate a progression from theory as decoration toward theory as a mechanical prerequisite, directly addressing the design flaw identified in the introduction. Serious games that embed domain theory only at the level of theme or narrative correlate with weaker learning outcomes (Arnab et al., 2015). Both prototypes counter this by requiring players to engage with change management concepts in order to advance.

Prototype 1 achieves deep mechanical integration. Each tile corresponds to a specific style from De Caluwe and Vermaak (2003), and players must understand the associated actions to manage their dice points and clear bottlenecks. Its primary limitation is that the structured, sequential format renders it closer to a facilitated workshop than a game, which risks reducing the engagement that distinguishes game-based learning from conventional instruction. Prototype 2 introduces lying, bartering, and crisis management as core dynamics, mirroring real-world change processes involving strategic behaviour, risk assessment, and interpersonal negotiation. Its connection to formal change management theory is, however, less structurally enforced. Players can succeed through social manipulation rather than conceptual understanding, which reduces theoretical depth while increasing engagement. This distinction directly reflects the argument of Arnab et al. (2015) that serious games fail when learning content operates at the thematic rather than the mechanical level.

Across both prototypes, the iterative design process produced increasing alignment between game mechanics and learning mechanics, addressing the gap identified by Plass et al. (2015). Prototype 1 excels in theory-driven progression; Prototype 2 excels in engagement, unpredictability, and social dynamics. Together, they demonstrate that learning and engagement are not mutually exclusive, but that achieving both requires deliberate mechanical integration of domain theory.

The findings of this study illustrate that a meaningful distinction exists between gameful and non-gameful learning activities, and that this distinction operates at the level of game mechanics rather than thematic framing. The central research question asked how domain theory can be integrated as a mechanical prerequisite

in serious game design to improve learning outcomes without reducing player engagement. The two prototypes developed in this study do not resolve that question entirely, but they locate the design challenge with precision and establish theory-as-prerequisite as a transferable principle.

The findings extend the conceptual distinction drawn by Arnab et al. (2015) between theory as thematic decoration and theory as a mechanical prerequisite from post-hoc classification to active design comparison. Both prototypes required players to engage with De Caluwe and Vermaak's (2003) change management framework to advance, which represents a departure from the surface-level integration that characterises the majority of serious games in professional development contexts. The iterative process demonstrated that this integration is achievable in practice.

The two prototypes, however, resolve the design challenge differently and incompletely. Prototype 1 enforces theoretical knowledge with structural rigour. Every move requires a player to interpret and apply a colour-coded change management action, and progression is gated by a resource that accumulates as a direct function of those choices. The limitation is that this enforcement produces a sequential, facilitated experience that resembles a structured workshop more than a game. Spil et al. (2021) identify this failure mode as a barrier to the diffusion of serious games in professional contexts: when games are perceived as too serious, engagement and adoption decline. Prototype 2 avoids that risk through mechanics borrowed from *Exploding Kittens*, introducing social dynamics, deception, and randomised events that sustain engagement and unpredictability. Its limitation is the inverse. Players can succeed through coalition building and social manipulation without demonstrating conceptual understanding of change management theory. Plass et al. (2015) identify this as the most consequential unresolved variable in serious game design: the degree to which game mechanics directly instantiate learning mechanics. Prototype 2 performs well on engagement but incompletely on that criterion.

5. Conclusions

The central risk in serious game design for professional development is that games drift toward one of two failure modes. They become too workshop-like, sacrificing engagement in pursuit of instructional completeness, or too playful, sacrificing conceptual depth in pursuit of fun. No single mechanic identified in this study resolves both simultaneously. This finding is consistent with the broader argument of Arnab et al. (2015) that the field has underinvested in the systematic study of mechanic-level learning integration.

For game designers working in professional development, the primary implication is that theory integration must be addressed at the level of core mechanics rather than narrative or visual framing. Labelling a card with a change management term does not constitute mechanical integration. Integration occurs when a player cannot advance without correctly interpreting and applying the theoretical concept the mechanic represents. Prototype 1 demonstrates this principle in operation and serves as a concrete reference point for evaluating integration depth across other domains. Future designs should explore hybrid mechanics that enforce theoretical knowledge at bottleneck moments while affording greater freedom during the phases between them. The social and deceptive dynamics of Prototype 2 could be incorporated within a phase structure that retains the gating function of the bottleneck, preserving instructional rigour while introducing motivational qualities.

For practitioners commissioning or selecting serious games for change management training, the findings suggest that the presence of domain terminology in a game's components is not a reliable indicator of learning quality. Procurement decisions should be informed by whether the game's core mechanics require theoretical knowledge for progression. The evaluative distinction between mechanical integration and thematic decoration developed in this study could be formalised into a practical assessment instrument for that purpose.

For researchers, the study identifies mechanic-level integration of domain theory as a productive and tractable object of empirical investigation. Future research should move beyond the design phase reported here toward controlled evaluation of learning outcomes. A within-subjects design comparing change management knowledge before and after play, across conditions that vary the depth of mechanical integration, would allow the theoretical claim of this study to be tested quantitatively. Longitudinal follow-up would further establish whether mechanical integration produces transfer to the workplace, which remains the most practically significant and least studied outcome in the serious games literature.

Ethics Declaration:For this paper no ethical agreement was necessary

AI Declaration: AI was used only to improve the English grammar

References

- Arnab, S., Lim, T., Carvalho, M. B., Bellotti, F., De Freitas, S., Louchart, S., Kickmeier-Rust, M., Bhatt, S., & De Gloria, A. (2015). Mapping learning and game mechanics for serious games analysis. *British Journal of Educational Technology*, 46(2), 391-411. <https://doi.org/10.1111/bjet.12113>
- Bennis, W. G., & Benne, K. D. (1979). *Strategieën voor verandering*. Samsom.
- Boonstra, J. J. (2002). *Integrale organisatieontwikkeling: Vormgeven aan fundamentele veranderingsprocessen in organisaties*. Elsevier.
- Connolly, T. M., Boyle, E. A., MacArthur, E., Hainey, T., & Boyle, J. M. (2012). A systematic literature review of empirical evidence on computer games and serious games. *Computers & Education*, 59(2), 661-686. <https://doi.org/10.1016/j.compedu.2012.03.004>
- Day, A., Crown, S. N., & Ivany, M. (2017). Organisational change and employee burnout: The moderating effects of support and job control. *Safety Science*, 100, 4-12. <https://doi.org/10.1016/j.ssci.2017.03.004>
- De Caluwe, L., & Vermaak, H. (2003). *Learning to change: A guide for organization change agents*. SAGE Publications. <https://doi.org/10.4135/9781452229584>
- Mouaheb, H., Fahli, A., Moussetad, M., & Eljamali, S. (2012). The serious game: What educational benefits? *Procedia: Social and Behavioral Sciences*, 46, 5502-5508. <https://doi.org/10.1016/j.sbspro.2012.06.465>
- Orabi, T. A., Alfalayeh, G. A., Alhyasat, W. B. A. K., Ababne, A., Alkhawaldah, R., & Qteishat, M. (2023). Change management in business organization: A literature review. *Human Systems Management*, 43(2), 195-213. <https://doi.org/10.3233/hsm-230031>
- Plass, J. L., Homer, B. D., & Kinzer, C. K. (2015). Foundations of game-based learning. *Educational Psychologist*, 50(4), 258-283. <https://doi.org/10.1080/00461520.2015.1122533>
- Sitzmann, T. (2011). A meta-analytic examination of the instructional effectiveness of computer-based simulation games. *Personnel Psychology*, 64(2), 489-528. <https://doi.org/10.1111/j.1744-6570.2011.01190.x>
- Spil, T. A. M., Romijnders, V., Sundaram, D., Wickramasinghe, N., & Kijl, B. (2021). Are serious games too serious? Diffusion of wearable technologies and the creation of a diffusion of serious games model. *International journal of information management*, <https://doi.org/10.1016/j.ijinfomgt.2020.102202>
- Thompson, J. M. (2010). Understanding and managing organizational change: Implications for public health management. *Journal of Public Health Management and Practice*, 16(2), 167-173. <https://doi.org/10.1097/phh.0b013e3181c8cb51>
- Weiner, B. J. (2009). A theory of organizational readiness for change. *Implementation Science*, 4(1), 67. <https://doi.org/10.1186/1748-5908-4-67>
- Zhonggen, Y. (2019). A meta-analysis of use of serious games in education over a decade. *International Journal of Computer Games Tech*