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Adam Palmquist

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Stakeholders' design preferences for instructional gamification

Adam Palmquist [a,b]

[a]Department of Applied Information Technology, University of Gothenburg, Gothenburg, Sweden; [b]Faculty of Social Sciences, Nord University, Levanger, Norway

ABSTRACT

There is increasing interest in incorporating game design elements in workplace learning, known as instructional gamification. Despite initial positive indications, there is still a need for a deeper understanding of how organisational stakeholders play a role in implementing instructional gamification. This study employed an explanatory sequential mixed-methods approach to identify and understand stakeholders' instructional gamification design preferences and how these preferences might impact their endorsement of instructional gamification. A survey of 231 individuals at a software company was conducted to gather data on stakeholders' preferences for instructional gamification. This was followed by in-depth interviews with eight employees to further enhance the understanding of stakeholders' instructional gamification design preferences. The quantitative findings revealed four interrelated factors concerning the instructional gamification design preferences of the three stakeholder groups. However, the qualitative findings revealed that the stakeholder groups interpreted the items differently. By integrating the quantitative and qualitative findings, the study provides a comprehensive understanding of the factors that enable or hinder stakeholders' endorsement of instructional gamification in workplace learning. The study also presents four design propositions that facilitate stakeholder endorsement of gamified learning artifacts. The findings have both theoretical and practical implications for designing and implementing instructional gamification in workplace learning environments.

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1. Introduction

As the labour market is undergoing accelerated automation and digitalisation, there is an increasing demand for an upskilled workforce, which is exacerbated by the increasing median age in post-industrial countries (OECD 2019). The half-life of employee skillsets is approximately five years (OECD 2019). In the software industry, the half-life of employee skills is 10 calendar months (Merriam and Baumgartner 2020). Thus, lifelong learning is critical to maintaining the necessary competencies in the workplace (Ritchie and Roser 2019). This circumstance has instigated a demand for a renewed approach to employee training (Aroles, Mitev, and de Vaujany 2019). The COVID-19 pandemic served as a baptism by fire for numerous corporations, suddenly and severely challenging their contemporary roadmaps to digitise the workplace environment (Howe et al. 2021). Circumstances have accelerated digital workplace learning and paved the way for various learning technologies, such as gamification technologies, which employ game design elements in non-game contexts (Deterding et al. 2011).

As organisations' procurement of learning technologies has increased (Harteis 2017; Howe et al. 2021), so also has the comprehension of the complexity associated with the implementation and integration of such technologies increased (Panigrahi, Srivastava, and Sharma 2018). Although gamification learning systems have demonstrated promising initial results in various training contexts (Landers 2019) – including traffic control (Smy et al. 2020), healthcare (Brull and Finlayson 2016; Newcomb et al. 2019), economics (Viberg, Khalil, and Lioliopoulos 2020), energy industry (Beinke et al. 2017) – there are complications regarding the integration of instructional gamification[1] in organisational digital ecosystems (Larson 2020).

1.1 Related work and problem statement

Practitioners and scholars have proposed a variety of frameworks on gamification design (Mora et al. 2017);

CONTACT Adam Palmquist adam.palmquist@nord.no Levanger, G Nordlåna 3215, Norway

however, there is limited understanding of how to implement instructional gamification in workplace learning. Thus, contemporary instructional gamification involves a resource-demanding trial-and-error approach (Hassan et al. 2018; Jedel and Palmquist 2021; McCallister 2019). Furthermore, the literature on this subject is sparse, indicating that the successful incorporation of instructional gamification is a multifaceted area that comprises design and development (McCallister 2019; Wang, Hsu, and Fang 2022; Warsinsky et al. 2021), expectations and propositions about its form and function (Palmquist 2021a), and acclimatisation into the organisation's day-to-day activity (Kolbeinsson et al. 2021). As a result, the incorporation issue of instructional gamification persists.

Researchers have attempted to identify approaches to implementing instructional gamification that may lead to inconsistent results and how to best avoid them. Seo et al. (2021) suggests that to achieve a 'goldilocks-condition' for a gamification implementation the design should balance the needs of employers and employees. From their empirical study with 18 factory workers, they proposed three design considerations for achieving these conditions in workplace gamification. Firstly, a gamification design should appropriate balance between extrinsic and intrinsic motivation factors. Designs that rely on extrinsic rewards may initially increase employee activity but may eventually lead to feelings of compulsion, exploitation, and stress (Seo et al. 2021). Secondly, a gamification design should include the appropriate number of affective elements to elicit the desired reactions from employees. When the design aligns with employee views and understanding, it is more likely to be embraced and facilitate their endorsement. However, if the design does not align with employee views, it may be less appealing and hinder implementation (Seo et al. 2021). Finally, to improve the relationship and understanding between the organisation and its employees, the gamification design objectives should align with the organisation's values and morals to create a 'positive behavior loop' that promotes beneficial employee habits (Seo et al. 2021).

Earlier conceptual and analytical research on workplace gamification has emphasised the need for a gamification design to align with the self-image of the organisation's members (Dale 2014; Raftopoulos, Walz, and Greuter 2015). This idea was recently supported by empirical evidence, as Zimmerling et al. (2019) found that the effectiveness of a gamification design depends on its alignment with users' self-images. In two experimental studies, Zimmerling et al. (2019) explored the relationship between gamification design and user characteristics and found that the degree to which participants value competitiveness in the design impacts their intention to use the gamification. This relationship was moderated by participants' perceived enjoyment of participating in the gamification as a team or individually. In the second study, the authors found that the preference for a team-based design over a user-based design, which was identified in the first study, was further supported by a larger sample size (n:426) (Zimmerling et al. 2019). These findings suggest that an appropriate 'user fit' with the design intentions of gamification elements is important for promoting usage intention among users.

Mitchell, Schuster, and Jin (2020) through their cross-sectional survey (n:291) highlight that a factor in employees' endorsement of a gamification design depend on its characteristic appearing meaningful for them. According to the authors, sustainable gamification design should offer benefits that are meaningful and valued by employees. Their cross-sectional survey revealed that extrinsic motivation factors, like social pressure or internalised guilt, can negatively impact employees' psychological satisfaction and their willingness to use gamified applications. However, when employees perceive high personal value, intrinsic motivation factors, through the gamification design, their psychological satisfaction and intention to engage with the gamified system are increase (Mitchell, Schuster, and Jin 2020).

Seo et al. (2021), Mitchell, Schuster, and Jin (2020) as well as Zimmerling et al. (2019) results indicate that the employee stakeholder endorsement of gamification stretches beyond the design appearing game-like, enjoyable and fun experience, rather that gamification technology implemented in organisations should also provide possible outlooks that are meaningful to and valued by employees suggesting possible outcomes that employee relate to. In addition to gamification designs potential impact on employee workplace engagement, the use of gamification in knowledge management has also been explored in the literature. Friedrich et al. (2020) conducted a review on 54 publications, analytical as well as empirical papers, of the current research body on the effects of game mechanics on knowledge-sharing behaviour and found that gamification can be an effective way to increase employee motivation for engaging in knowledge management activities. However, the authors also emphasised that in order for a gamified knowledge management system to reach its full potential, it is important for the organisation to have a corporate culture and organisational climate that supports and encourages such activities (Friedrich et al. 2020). The success of gamification in improving knowledge management may depend on the specific context in which

it is implemented and may be influenced by factors such as the organisational culture and the level of support for knowledge sharing within the organisation (Friedrich et al. 2020).

Previous research suggests that to accomplish a gamification implementation; the design must balance the desires and requirements of both employers and employees. It may involve finding an appropriate balance between extrinsic and intrinsic motivation, identifying and selecting the appropriate characteristics to elicit expected reactions from the intended users, and aligning the design objectives with the organisation's values. Furthermore, previous research highlights that for employees to endorse gamified technology, its design must appear meaningful to them, extending beyond being game-like and enjoyable. While previous literature presents a relatively consistent understanding of how to align instructional gamification with employee views and the organisation, it is essential to note that organisations are complex entities that involve a wide range of stakeholders.

Research has shown that the effective use of instructional gamification requires more than just appealing to users. Scholars have argued that stakeholders within the organisation should also be considered in gamification (Almeida and Simoes 2019; Herzig et al. 2015; Morschheuser et al. 2018). Despite being overlooked in gamification research for learning, the importance of considering stakeholders in gamification projects has been emphasised in the health (Cheng 2020) and business sectors (Mora et al. 2017). For instance, Heijden et al. (2020) conducted a qualitative case study involving nine gamification practitioners from various organisations and found that a successful instructional gamification design must consider the interests and needs of key stakeholders within the organisation. This includes meeting the needs of users (employees) but also convincing team leaders and managers of the value of implementing gamified technology in the workplace learning environment. These findings are supported by Wang, Hsu, and Fang (2022), who conducted a qualitative Delphi study with 14 gamification practitioners to identify key elements for executing gamification in corporate training.

Several stakeholder groups have been noted influencing the endorsement of gamification (Almeida and Simoes 2019; Herzig et al. 2015). However, regarding instructional gamification the employees, team leaders, and management in an organisation seem to be frequently recurring stakeholder groups in several studies (Ferreira and Roseira 2020; Heijden et al. 2020; Wanick and Bui 2019; Zikos et al. 2019). Therefore, as a starting point for my investigation, it would be beneficial to thoroughly and in-depth examine these three groups' instructional gamification design preferences. Such an approach would build on existing research while also providing new insights and understanding into the design preferences of these specific stakeholder groups. Identifying the factors that enable or hinder the adoption of IT-artefacts by stakeholder groups has long been recognised as crucial, as it can prevent IT project abandonment (Ewusi-Mensah & Przasnyski, 1991; Pan, 2005), avoid resource-intensive micromanagement by aligning stakeholders' perceptions and understanding of project requirements (Zarghami and Dumrak 2021), and promote project engagement through participatory design for stakeholder ownership (Palmquist et al. 2022). Landers et al. (2018) have emphasised the importance of considering various aspects when researching gamification technology, which they have categorised into four major areas:

- Game elements (predictors) refer to the features and mechanics of a gamified system, such as points, badges, and leaderboards.
- Targeted outcomes (criteria's) refer to the desired results or goals of the gamified system, such as increased productivity or improved employee skill development.
- Individual intermediary changes (mediators) refer to the changes in behaviour or attitudes resulting from the gamified system, such as increased motivation or improved problem-solving skills.
- Situational and individual circumstances (moderators) refer to the factors that may influence an individual's experience with a gamified system, such as their prior gaming experience or the task they are completing.

Previous research has primarily focused on the effects of game elements (predictors) on individual intermediary behaviour changes (mediators) in gamification (Landers et al., 2018 Nacke and Deterding 2017). While there has been a substantial amount of gamification research conducted on predictors, mediators, and their interrelationships (Koivisto and Hamari 2019), Landers et al. (2018) highlights a scarcity in previous research regarding the other two categories: *criteria* and *moderators*. The lack of knowledge especially concerns the impact of gamification criteria and the influence of circumstantial moderators on the endorsement of gamified technology. Landers et al. (2018) suggests that the criteria and moderators may play a more crucial role in the implementation of gamification than currently recognised due to their potential moderating effect on the predictors and mediators. To enhance

the overall understanding of the design, development, and implementation of gamified technologies, it is crucial for researchers to broaden their scope and not only investigate the effects of game elements on individuals' behaviour, but also to explore how the objectives of gamification interventions, as well as the contextual factors, may contribute to the success or failure of a gamification implementation.

Thus, in light of the related work, it is inferred that current circumstances necessitate that researchers in the field of gamification undertake comprehensive investigations within real-world work environments utilising thorough data-gathering techniques. This approach will enable the accumulation of a more holistic understanding of how the criteria and moderators influence the design intentions of instructional gamification, as well as their impact on stakeholders' endorsement of gamified learning technology in their workplace learning environments.

The argument and positioning of this paper is that certain conditional factors, building upon Landers et al.'s () constructs of *criteria* and *moderators*, play 2018 a role in either enabling or hindering the incorporation of instructional gamification into real-world practices, and are not sufficiently depicted and understood. Thus, a better mapping of the issue would mutually benefit practitioners and scholars interested in implementing gamification in real-world corporate training environments. In this study, enablers and barriers are defined as dichotomised concepts through the perception of *design preferences* (Stylidis et al. 2016), which define individuals' specified preferences as central to endorsing a design artifact. Hence, an *enabler* supports and facilitates incorporation because the design intention of instructional gamification corresponds with the stakeholder(s) design preferences. At the same time, a *barrier* impedes incorporation and practice, i.e. the design intention of instructional gamification diverges from the stakeholders' design preferences.

As previous empirical research on gamification has tended to rely on either qualitative (Heijden et al. 2020; Wang, Hsu, and Fang 2022) or quantitative (Friedrich et al. 2020; Mitchell, Schuster, and Jin 2020; Seo et al. 2021; Zikos et al. 2019; Zimmerling et al. 2019) data collection and analysis methods, which can generate complications regarding triangulation and validation of the findings. Given this, the current research circumstance justifies designing a mixed-method investigation (Creswell and Clark 2017) that focuses on the gamification design preferences of multiple stakeholders within the same organisation. A mixed-method design that utilises multiple sources of data, techniques, and models would provide a more comprehensive understanding of stakeholders' design preferences and how these preferences may influence their endorsement of gamification implementation in a workplace learning environment. This can be especially useful for understanding how a gamified learning technology should be constructed to align with the values, goals, and needs of the organisation and its stakeholders, and is more likely to be embraced and effectively implemented. Overall, a mixed-method approach can offer valuable insights for how to accomplish a straightforward instructional gamification implementation in a workplace learning environment.

Consequently, I decided to design a mixed-methods sequential explanatory study (Ivankova, Creswell, and Stick 2006) to rationalise the interface between workplace learning and instructional gamification and to identify enablers and barriers to the endorsement of gamification in the learning environment. My investigation focused on three groups of workplace learning stakeholders in their real-world settings. I gathered quantitative data from an explanatory survey of 231 personnel at Tech-Com, a transnational technology-focused company. The survey outcomes were further elaborated through in-depth interviews with eight individuals representing various stakeholders in the workplace learning environment. To rationalise the stakeholders' preferences for the incorporation of instructional gamification, I employed two recognised theoretical constructs: content/structural gamification and utilitarian/hedonic dimensions. These constructs explain the aspects required by organisational stakeholders to endorse instructional gamification in their workplace learning. The three stakeholder groups in the study were employees, team leaders (leaders), and line managers (managers).

Combining and comparing quantitative and qualitative findings enables a comprehensive understanding of a research setting and its inhabitants (Creswell and Clark 2017). I employ an explanatory sequential design, starting with a quantitative survey and ending with qualitative interviews, which allows for a deeper understanding and further contextualisation of stakeholders' perceptions of enablers and barriers to instructional gamification endorsement. In the quantitative stage of this study, my research questions (RQs) was as follows:

RQ1: Based on the constructs of utilitarian/hedonic dimensions and structural/content gamification, what factors play a role in stakeholder design preferences for gamified learning systems?

RQ2: To what degree do stakeholders' design preferences for gamified learning systems differ depending on their role in the company?

Based on the outcome of RQ1 and RQ2, the guiding question for the qualitative sequence was:

> **RQ3:** How can the identified design preferences for instructional gamification be reinterpreted into design proposals that enable stakeholders' endorsement?

The investigation is qualitative-driven because it prioritises understanding the design preferences of three stakeholder groups, which requires in-depth comprehension of the setting and the ability to identify small nuances and find the right balance between different aspects (see Krippendorff, 2005). A qualitative-driven approach is based on the understanding that qualitative data can provide more in-depth explanations and a deeper understanding of a research setting and topic than quantitative findings (Creswell and Clark 2017). The remainder of this paper is organised as follows. In Section 2, the analytical constructs employed in the investigation are defined and related works are discussed. In Section 3, the methodological aspects, such as the research setting, investigation outline, participants, quantitative and qualitative data collection instruments, and data interpreting processes, are considered. As sequential mixed-methods approaches tend to appear disorganised and confuse the reader, the methodology section includes an informative audit trail (see Ivankova, Creswell, and Stick 2006). In Sections 4 and 5, quantitative and qualitative mini-studies are presented, respectively. In Section 6, an attempt is made to answer the research questions by integrating the findings of the two mini-studies through the analytical constructs and related work discussed in Section 2. Through the analysis, I constructed four design propositions (6.1) that might propel stakeholder endorsements of instructional gamification. Ultimately, I conclude the investigation (6.2), reflect upon the study limitations (6.3), and propose possible trajectories for future investigations in section (6.3).

2. Analytical constructs

The theoretical aspect comprises two recognised constructs in gamification research and practice. In Section 2.1, I briefly outline different stakeholders in the design and organisation literature, and in Section 2.2-2.3, I introduce the content and structural gamification typology and utilitarian–hedonic dimensions, which function as premises in the study.

2.1 Stakeholders

The workplace learning environment includes various stakeholders who are interested in organisations' learning initiatives (McPherson and Nunes 2006; Rodrigues, Chimenti, and Nogueira 2021). Stakeholders are individuals or groups in a given setting – such as an organisation's workplace learning environment – which they can affect as well as be affect by it. Stakeholders have various desires, necessities, and perspectives and consider themselves influential in their setting. The implementation of IT-artifacts within a setting often draws the attention of stakeholders (Mishra and Mishra 2013; Nancy, Currie, and Whitley 2016), as the artifact may disrupt the stability of the setting and potentially affect the stakeholders' status through its design, enactment, or other consequences (Hickman and Akdere 2019).

In the design sciences the stakeholder concept has held prominence for decades (Cross 2001). The stakeholder perspective has garnered recognition and acceptance, among designers specializing in information technology artifacts (see Burek 2015; Nelson and Stolterman 2014; Norman 2016). By recognising that the aim of design artefacts often involves transforming an existing state into a more desirable one, Hodges et al. (2017) suggested that design researchers should be keenly interested in deciphering how a design artifact's intentions are negotiated amongst different stakeholder groups. It poses questions about these groups' identities, roles, preferences, and the nature of their reasoning. Consequently, the concept of stakeholders in design is fundamentally tied to both the artifact itself and its surrounding context (see Krippendorff, 2005; Liem and Bonnemaire 2015). According to Krippendorff (2005), stakeholder groups often comprehensively understand their role, function, and relationship with other stakeholder groups within their setting – a stakeholder network. In their network, stakeholders tend to prioritise their group's interests, making them inclined to take action towards an intervention, such as an IT-artifact, in their setting, whether through support or opposition. According to Krippendorff (2005), the actions and decisions of a settings stakeholders have a significant impact on the success of a design artifact's assimilation into a specific context.[2]

Explorative studies have revealed that the inclusion of stakeholders in gamification design and objective formation furnishes ownership and usability, improves overall approval, and encourages continued use (Leclercq et al. 2020; Palmquist 2021b), thereby facilitating technology acceptance and endorsement (Davis 1989; van der Heijden 2004; Venkatesh et al. 2003). In contrast, not including the stakeholders' perspectives when implementing a gamified learning system causes divergences and conflicts between organisations and their employees often because the resulting design objectives strongly favour the corporation's desires (Gimenez-Fernandez et al. 2021). Zikos et al. (2019) investigated instructional

gamification acceptance by operators and supervisors in factory environments through the lens of usability, knowledge integration, working experience, user acceptance, and impact variables. The results suggested that diverse stakeholder groups had comparable requirements for gamified learning systems but different preferences, indicating that stakeholders may report similar findings regarding gamified learning system prerequisites while ascribing nuanced meanings.

2.2 Utilitarian and hedonic dimensions of gamification

Van der Heijden (2004) stated that the different attributes of a technology reflect either the utilitarian or hedonic dimension. The hedonic dimension appeals to enjoyment-related traits and includes sensations, aesthetics, stimulation, ease, and comfort. The utilitarian dimension appeals to functional and conscious traits and includes purpose, usefulness, quality, and safety. The utilitarian and hedonic dimensions subsist in constant psychological negotiation, determining, and labeling contextual aspects. The differentiation is contingent upon the individual's feelings toward and mental image of a technology. As an adoption predictor, the utilitarian dimension relates to usefulness, while the hedonic dimension relates to ease of use (van der Heijden 2004).

The utilitarian or hedonic affinity of technology depends on the dominant design intent: utilitarian products seek to improve user performance and task efficiency, whereas hedonic products seek to provide users with a pleasurable experience and make activities more appealing. Thus, utilitarian design intent is productive use, whereas hedonic design intent is prolonged use (van der Heijden 2004). Gamification technologies are considered both utilitarian and hedonic (Hamari and Koivisto 2015). Thus, synthesising utilitarian and hedonic design intents has the potential to result in prolonged productive use. Individuals' endorsements of gamification systems depend on the correspondence between their impressions of the system and their objectives in each context (Köse, Morschheuser, and Hamari 2019). Both dimensions have been employed to describe the attraction of gamification technologies in education (Dicheva, Irwin, and Dichev 2019; van Roy, Deterding, and Zaman 2018) and training (Suh and Wagner 2017) and, conversely, to explain gamification project abandonment (Jedel and Palmquist 2021).

2.3 Instructional gamification typology

Instructional gamification can be divided into two types: structural gamification and content gamification. Structural gamification utilises game elements to guide a learner through a learning segment, such as a course, but with no changes to the learning content (Kapp 2013). Thus, this type of gamification does not make the learning content more gameful but only the structure surrounding the content, such as the learning management system (LMS). Structural gamification implementation can, for example, incentivize learners' time on tasks by integrating a progress bar into the LMS or foster daily learner retention by awarding badges for course attendance. In contrast, content gamification integrates distinct elements, mechanisms, and philosophies within the learning content, thus making it more gameful (Kapp 2013). A content gamification implementation may, for example, add a narrative across the learning content or provide learners with different (fictional/non-fictional) roles based on their previous experiences with the subject matter. Structural gamification originates from the work of Skinner (1965) on operant conditioning. The underlying idea is self-determination theory, which considers authentic human motivation to be internally driven instead of externally driven (Ryan and Deci 2017).

According to a previous study, the adoption of structural gamification design in a higher education engineering course resulted in higher attendance, more effort, and less procrastination among students (Ntokos 2019). Furthermore, DeMers (2018) discovered that a learning system with structural gamification substantially increased the degree of task assessments among research assistants. But as the duration devoted to qualitative assessments increased, negative effects were observed on other work tasks. In addition, users reported that the behaviour imposed by the gamified learning system was tedious and painful (DeMers 2018).

Smy et al. (2020) conducted a study on factors that influence user endorsement of instructional gamification in mobile learning. They found that high-quality, accessible, and context-appropriate learning content can increase the likelihood of endorsement. The results indicate the importance of instructional gamification designers prioritising these factors in order to increase the chance of endorsement (Smy et al. 2020). Araújo and Carvalho (2022) found that even when teachers had different goals for using gamification, they preferred content gamification when teaching. Palmquist (2021b) suggested that the successful integration of a gamified learning system into an analogue classroom's daily activities depends on the potential to combine the system with the teaching content. In a survey study, 375 instructors were questioned about their intentions to use gamification in their training (Vanduhe, Nat, and Hasan 2020). The study revealed that perceived

usefulness and the gamified learning system compatibility with the learning content were significant endorsement factors influencing instructors' attitudes (Vanduhe, Nat, and Hasan 2020).

To summarise, stakeholders' endorsement of software systems appears influenced by both the utilitarian and hedonic attributes of the technology (van der Heijden 2004). The appreciation of these attributes, hedonic and utilitarian, by Users complements the technology acceptance models, such as the technology acceptance model (TAM; Davis 1989) and the unified theory of acceptance and use of technology (UTAUT; Venkatesh et al. 2003). The attraction of individuals toward gamification services can be explained by using utilitarian and hedonic dimensions as models (Hamari and Koivisto 2015). The structural/content gamification typology indicates that the engagement of learners is dependent on the design of the gamification, which is directed toward structure or content (Reigeluth, Beatty, and Myers 2016). However, the construct of structural/content gamification has not been considered when discussing gamification endorsement, despite research indicating its potential influence (Araújo and Carvalho 2022; Palmquist, 2021b; Vanduhe, Nat, and Hasan 2020).

3. Methodology

3.1 Mixed-Methods

Mixed-methods research is a method of inquiry that incorporates quantitative and qualitative data to gain a holistic understanding of a research problem (Creswell and Clark 2017). The research approach can provide a more comprehensive and in-depth understanding of a research problem by combining data from both qualitative and quantitative methods (Creswell and Clark 2017). This approach has been utilised to study various topics, including the impact of IT on an organisation's transformation (Van Turnhout et al. 2014), students' persistence in their doctoral programmes (Ivankova, Creswell, and Stick 2006), and/or ambulance personnel perceptions of learning intervention (Laparidou et al. 2022). Mixed-methods research is a favourable approach for gaining a more nuanced understanding of complex research problems (Creswell and Clark 2017) which provides increased validity and reliability due to its affordance of data triangulation, thus circumventing some of the limitations of qualitative and quantitative approaches when used alone. For instance, numerical data can be used to establish relationships between variables, while qualitative data can provide rich and contextualised information that can be used to explain these relationships (Tashakkori, Teddlie, and Teddlie 1998). However, methodological challenges exist despite the stated benefits. Furthermore, the mixed-methods approach has been argued to be more resource-demanding than other methods (Creswell and Clark 2017). Additionally, the amalgamation of qualitative and quantitative data leads to a complex data collection and analysis process (Johnson and Onwuegbuzie 2004).

In the presented study, I employed an explanatory sequential mixed-methods approach to delivering a more nuanced and sensible understanding of organisational stakeholders' instructional gamification design preferences about to be implemented in their workplace learning environments. The explanatory sequential design is one of the core research designs among the mixed-method techniques (Ivankova, Creswell, and Stick 2006). It is habitually outlined in two sequences starting with the quantitative data collection and analysis, followed by qualitative data collection and analysis (Creswell and Clark 2017). The quantitative sequence often addresses the study's primary purpose, whereas the qualitative stage encourages the researcher to 'dig deeper' to explain the quantitative findings more profoundly (Creswell and Clark 2017). Applying a sequential explanatory mixed-methods approach has provided a more comprehensive understanding of the stakeholder endorsement of instructional gamification than either a qualitative or quantitative approach would have been able to achieve. The mixed-methods research design aided me in triangulating my findings, which increased the research's validity and reliability and provided a more in-depth understanding of instructional gamification by increasing confidence in the conclusions drawn. This understanding would have been more challenging to apprehend and understand if I had applied either a qualitative or quantitative approach, as it would not have been as easy to detect nuances.

3.2 Research design: overview

As quantitative approaches are often criticised for being too reductionist and qualitative methods are often criticised for being too subjective, I applied a sequential mixed-methods approach to profoundly outline the enablers and barriers to incorporating instructional gamification in workplace learning. To comprehend how to accomplish instructional gamification endorsement among Tech-Com stakeholders – how to achieve their affirmation, and which contextual factors might affect the implementation, an exploratory factor analysis to explore the interrelationships among the stakeholder

group's design preferences seemed a reasonable approach. The identified subscales from the factor analysis were reasoned to function as the initial foundation for design heuristics – providing substance to the forthcoming interview guide and a frame of reference in the analysis. In addition, such a research design could potentially furnish a more balanced and comprehensive understanding of the various topics – such as understandability, benefit, usability, power balance, positive or negative consequences, and facilitators or impediments – that previous research emphasises incorporating instructional gamification in a real-world context (Jedel and Palmquist 2021; McCallister 2019; Larson 2020; Landers 2019; Raftopoulos 2020).

As recommended in the literature (Creswell and Clark 2017), the sequential explanatory mixed-methods design is divided into two distinct sequences: *Sequence I* and *Sequence II*. In Sequence I, numerical data (n = 231) were collected via surveys and scrutinised to serve as the basis for the qualitative interviews – Sequence II data collection (n = 8). The sequential approach offers a suitable overview of the research context and its stakeholders. The numerical findings provided a broad picture of the research problem and helped identify relationships and, to some extent, provide seeming explanations regarding the remarkable impact that content and structural designs have on stakeholder groups' notions of instructional gamification. Moreover, the qualitative interviews were regarded as relevant, timely, and well-suited by the interviewees. The data collected in Sequences I and II were analyzed, refined, and integrated. The sequences were comprised of different stages, where Sequence I comprised three (I–III) and Sequence II four (IV–VII) stages (Figure 1). The stages are briefly outlined below:

1 I performed various research preparations, including conducting a literature review (on gamified learning system adoption), drafting preliminary survey items reflecting the constructs, participating in various preparation meetings with Tech-Com, and fine-tuning and condensing the items and scales. Afterward, I finalised the survey by controlling its reliability and validity.
2 I collected quantitative data over a three-week period in June and July 2021.
3 I uploaded the numerical dataset to SPSS and conducted a Principal Component Analysis (PCA) with Varimax rotation to uncover the datasets factor structure, which would serve as the substance for the interview guide in Sequence II. To check the factors cohesiveness among the stakeholders I ran a multivariate analysis of variance (MANOVA) in SPSS. I concluded the quantitative inquiry by analyzing and discussing the outcome of the PCA and the MANOVA accordingly answering RQ1-2.
4 Employing the sequential mixed-method techniques suggested by (Creswell and Clark 2017; Ivankova, Creswell, and Stick 2006) I outlined Sequence II based on the symmetries of Sequence I findings – the PCA identified factors. From my interpretation of the factors, I composed an opening interview guide for the subsequent qualitative inquiry.
5 The qualitative portion of the study began by communicating with the volunteer participants and ended by completing the interview guide.
6 I conducted eight virtual interviews and transcribed them over two weeks.
7 I uploaded the interview transcripts to MAXQDA and conducted a directed content analysis. I integrated the quantitative and qualitative findings subsequently performed my final analysis answering RQ3.

The study was performed in accordance with the principles stated in the Declaration of Helsinki. Prior to Stage II in Sequence I, all study participants were informed about the purpose of the study and their rights if they chose to give consent to partake. Due to Swedish [redacted for review], national law (2003:460) 3 § ethical approval for the present research was not required.

3.3. Research site: tech-Com

The case study setting is Tech-Com, a global IT company. Tech-Com produces advanced IT using applied scientific principles to generate innovative products and services. It is a parent company with several affiliates operating in many industry domains, including health informatics, extended reality, and human behaviour software. Tech-Com's market strategy, which involves scientific and applied techniques for producing pioneering IT, has demanded a lifelong learning mindset. It's approach of positioning quality over quantity in terms of innovative IT development has nourished a 'spare no expenses' reputation, especially concerning workplace learning.

The COVID-19 pandemic financially impaired Tech-Com. In 2019, it headed around 20 international offices with approximately 1,000 employees. However, by 2021, it had downsized its employees to roughly 600 individuals in 10 offices. Before the pandemic, the Tech-Com administration appointed a task group to plan and lead an immense reconstruction of the company's workplace learning, which had been deemed ineffective and responsible for knowledge asymmetry in the organisation.

Figure 1. Research design overview.

When the company received a financial blow during the pandemic, reconstruction ideas came to the fore. The core ambition of the reconstruction project was to cultivate a learning culture that enhanced the organisation's overall learning and development, for instance, by facilitating departmental knowledge exchange. The project was officially presented at Tech-Com in December 2019 and was initiated in Q4 2020, roughly half a year after the schedule due to COVID-19. The task group implemented various strategies, processes, and technologies in this first phase, including the following:

- A strategy system to identify, address, and follow up on detected organisational knowledge gaps.
- A unifying, comprehensive, and progressive custom-made learning system – Tech-Com University (TCU) – comparable to a massive open online course platform. TCU contained a variety of company-produced courses addressing all levels of the organisation.
- Enactment of special acquaintance procedures – vaguely resembling outspoken socio-cultural learning – encouraging personnel to alternate between projects, units, and offices to continue learning and sustaining their inquisitiveness.

The first phase of Tech-Com's new learning initiative received mixed reviews from the departments' personnel. Additionally, the initiative's main objective – increased knowledge exchange – had yet to be achieved. Therefore, when the second phase began in 2021, Tech-Com decided to reorganise and modernise its learning ecosystem by bringing in several external resources, such as a gamification provider, to aid in the reconstruction effort.[3] The gamification provider immediately conducted a company staff readiness analysis at Tech-Com, referred to in this study as the Strategic Learning and Development Analysis (SLDA).

The analysis focused on the integration of instructional gamification into TCU. The point of departure for the presented study is the gamification provider SLDA. Within this context, I concentrate my investigation on the instructional gamification design preferences from the perspective of three stakeholder groups engaged in the Tech-Com learning ecosystem. Tech-Com, an international enterprise, offers a wide range of formal and informal learning environments, such as MOOC-like company courses, tailored employee onboarding programmes, department-exclusive micro-presentations, and knowledge-sharing learning circles. Tech-Com´s diverse learning environments forms the basis for my research positioning and study scope, which adopt a macro-level approach to encompass several perspectives and cover a wide range of the organisations' provided learning and development opportunities.

By using an explanatory sequential mixed-methods approach, I aim to provide an in-depth illustration

and depiction of the research setting in order to better apprehend the design preferences of instructional gamification among diverse stakeholder groups in the workplace learning environment.

4. Sequence I: quantitative investigation

4.1 Method & material

4.1.1. Constructing the quantitative instrument

To compose a more comprehensive body of knowledge on instructional gamification incorporation, I searched for reports that extensively described the implementation and integration of gamified learning artifacts in authentic learning environments. In narrowing the search, I focused on contributing factors, models/processes, and user(s), which resulted in the analytical constructs described in Sections 1 and 2.

From the body of literature on gamification, 12 items were meticulously selected and integrated into the survey as four scales representing the theoretical constructs. These items were primarily derived from publications concerning gamification in adult learning contexts, as outlined in Table 1. This approach was employed to ensure that the survey items were well-grounded in existing research and relevant to the constructs being investigated, specifically within the context of workplace learning.

The intention of the gamification provider in administering the SLDA survey was to gain a comprehensive understanding of Tech-Com's workplace learning structures. This information was intended to inform the design objectives of the upcoming gamified learning system, providing insight into the specific needs and requirements of the organisation. However, my intention for participating and contributing to the survey and later the interviews was to gain a deeper understanding of stakeholders' design preference for instructional gamification and to identify factors influencing their endorsement of gamified learning technology within their organisation. Such information would provide valuable insight into how to design more suitable and implement more efficacious gamified learning systems that align with the desires and preferences of the organisational stakeholders.

4.1.2. Quantitative instrument

Each item was assessed on a 5-point continuum, spanning from 'strongly disagree' at one end to 'strongly agree' at the other. The constructs originally were represented by three items per scale. Item example is displayed in Table 2.

I adapted all my 12 items from previous explanatory and explorative research (Table 1). To reduce the possibility of common method bias (Podsakoff et al. 2003), the sequence of the items was randomised via the survey-tool randomisation algorithm for all research participants to limit their capability to distinguish questionnaire patterns.

The practitioners' items concerned educational attainment, views on knowledge-sharing, and hours devoted to personal development – interesting items but outside of my research scope. I used three practitioner items to triangulate my findings and position my discussion in a real-world case (See Appendix).[4] Due to the practitioner-driven purpose of SLDA, there were disagreements about the survey's final outline, which may have negatively affected its reliability and validity, as further described in the study limitations (6.2). The final survey outline included a total of 22 items, including those contributed by the HR specialists and the items that I provided.

To ensure the reliability of my scale's internal consistency, I ran an inter-item correlation test in SPSS. Due to the small number of items (n = 3) within my scales, this test was more appropriate than Cronbach's alpha, which has been considered to be misleading when the number of items in a scale is below 10 (Eisinga, Grotenhuis, and Pelzer 2013). The calculated inter-item correlation showed that all analytical construct scales, except for structural gamification, existed within the recommended inter-item correlation range (0.2–0.4) of item specificity (Briggs and Cheek 1986; Piedmont and Hyland 1993). However, the structural gamification scale mean (M = 0.183) was below the prescribed level of 0.2, which called for further scrutiny. To

Table 1. The sources for the items.

Construct	Items held	Construct initial source	Item source (explanatory)	Item source (explorative)
Content gamification	3	Kapp (2013)	Hallifax et al. 2019; Jayalath and Esichaikul 2020; Oluwajana et al. 2019; Silic and Lowry 2020; Vanduhe, Nat, and Hasan 2020.	Araújo and Carvalho (2022); Smy et al. (2020); Palmquist (2021a)
Structural gamification	2[9]			DeMers (2018); Ntokos (2019)
Hedonic dimension	3	van der Heijden (2004)	Dicheva, Irwin, and Dichev 2019; Hamari and Koivisto 2015; Oluwajana et al. 2019; Silic and Lowry 2020; Vanduhe, Nat, and Hasan 2020; van Roy, Deterding, and Zaman, 2018	Zikos et al. (2019) Smy et al. (2020)
Utilitarian dimension	3			

Table 2. Item example.

Construct	Question (Q)	Item wordings
Content	Q16	The learning system design shall focus on providing users with challenging learning content corresponding to their skill level.
Utilitarian	Q9	The learning system design shall focus on increasing users learning productivity.
Structure	Q18	The learning system design shall focus on users maintaining their designated learning programme.
Hedonic	Q19	The learning system design shall focus on making the learning experience pleasant at Tech-Com.

ensure the reliability of the items reflecting the analytical constructs, I checked the scale's internal consistency by constructing an inter-item correlation matrix for each item and analyzing the inter-item correlation mean. The inter-item correlation matrix revealed that one item in the scale had a weak correlation (0.104) with the other two items (0.273 and 0.173). When the weakly correlated item was removed, the remaining items were within the recommended range, with a mean of 0.273.[5] Additionally, the study's real-life setting enhances its ecological validity, making it more generalisable to real-world situations (Kihlstrom 2021; Plowright 2011). Ecological validity, a concept from applied psychology, refers to how well research findings can be applied to real-world settings (Kihlstrom 2021). While not a commonly used metric in academia, it is particularly important in applied research as studies with high ecological validity are considered more applicable to real-world scenarios than those conducted in controlled settings (Kihlstrom 2021; Plowright 2011).

4.1.3. Quantitative sampling and data collection

The study population was the Tech-Com parent company staff (~600; 56%/44% men/women distribution) divided over 10 offices in Asia, Europe, and North America. The sampling frame was the company's human resources database. The head office is located in Europe, which hosts the majority of the employees (~350). In the investigation, a cluster sampling approach was employed across the five offices in Europe to refine the study, aiming to achieve a cultural heterogeneity restrained by similarities in employee conditions, work policies, laws, and office standards in the European Union.

The survey began on June 22, 2021, and closed on July 12, 2021. In total, 322 invitations were sent, and 231 surveys were ultimately completed by Tech-Com employees, marking a 74.38% response rate. This sample size and response rate are acceptable for quantitative social science studies (Baruch 1999). The sample size is in the upper range for psychometric studies that lack a standardised scientific sample size, and a tacit praxis of approximately 100 individuals is the lower baseline for drawing basic conclusions (Anthoine et al. 2014). The sample reflected Tech-Com's employee distribution regarding educational background. However, the sample distribution was somewhat skewed regarding cooperation, favouring cross-functional teams at the expense of human resources (see Table 3).

4.1.4. Statistical analysis

To answer the first and second research questions, I conducted an PCA with Varimax rotation on the numerical dataset to identify the subscale, which was subsequently audited with a MANOVA to investigate the stakeholder group differences. The numerical data were analyzed using the statistical software SPSS.

4.1.5. Principal component analysis with varimax rotation

A PCA with Varimax rotation was conducted to uncover the factor structure of the survey items, **RQ1**. The PCA is an exploratory technique that reduces the

Table 3. Descriptive statistics of the sample.

		Stakeholder distribution			
Educational background	Dataset distribution	Employee	Leader	Manager	Responses
Doctorate	18.18%	19.12%	20.00%	14.00%	42
University (3 years or more)	71.86%	72.06%	68.89%	74.00%	166
Polytechnic	1.73%	2.21%	2.22%	N/A	4
High school diploma	7.36%	12.00%	8.89%	5.15%	17
Primary school	0.87%	1.47%	N/A	N/A	2
Total	**100%**	**58.87%**	**19.48%**	**21.65%**	**231**
			100%		
Area of Operation					
Engineering	38.96%	40.44%	42.22%	32.00%	90
Sales & Marketing	25.54%	27.21%	22.22%	24.00%	59
Operations	15.58%	14.71%	11.11%	22.00%	36
Cross-functional	10.82%	7.35%	20.00%	12.00%	25
Economy & Legal	5.19%	5.88%	2.22%	6.00%	12
Human Resources	3.90%	4.41%	2.22%	4.00%	9
Total	**100%**	**100%**	**100%**	**100%**	**231**

dimensionality of a dataset while identifying patterns and extracting underlying factors not immediately apparent, providing a clearer understanding of the data's structure (Fokkema and Greiff 2017). The goal was to find a structure with high explained variance (preferably ~70%) while avoiding over-extraction. Over-extraction was defined as a structure with at least one component mainly made up of weak or heavily cross-loaded items, a weak item was defined as an item with a main loading less than .5, while a cross-loaded item was defined as an item with a secondary loading 50% or greater than the main loading (e.g. >= .25 if the main loading is .5; Barbopoulos and Johansson 2017; Costello and Osborne 2005) Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was acceptable at .73, and Bartlett's Test of Sphericity was significant ($p < .001$). A total of four components had an eigenvalue of at least 1.0, while the scree plot showed an apparent bend at the third component and a smaller one at the sixth component. Per recommendations by Costello and Osborne (2005), multiple structures were extracted and compared, ranging between 3 and 6 extracted components. The 3-component and 4-component structures presented distinct components of at least 2 strong main-loading items per component. The 4-component structure had one component with only one non-cross-loaded item. However, the two cross-loadings in this component amounted to a maximum of 50.8% of the main loading, which was deemed acceptable. However, the 5-component structure showed signs of over-extraction, as it had one component made up of only one main loading item. Thus, the 4-component structure was selected as it was the structure with the highest explained variance out of all the acceptable structures.

4.1.6. Multivariate analysis of variance

To determine any differences among the stakeholder regarding identified factors, **RQ2**, I conducted a multivariate analysis of variance (MANOVA). The four dependent variables were the identified factors from the PCA. For the independent variable, I used the survey question concerning roles in the company (Q3), where the respondents had to choose between Employee, Leader and Manager. Preliminary assumption testing was conducted, checking normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity. No serious violations were noted, except for multivariate outliers. The multivariate outliers were detected through the Mahalanobis distances test, producing a range of 37.07, above the critical range for a MANOVA with 4 dependent variables (18.47; Tabachnick, Fidell, and Ullman 2007). In checking the outliners, two respondents had scores that exceeded the critical value (36.97 resp. 37.18). Upon further examination, I found that both of these respondents provided very similar answer to all of the survey questions. Given that this response pattern was unlikely to be representative of the general population, I decided to remove these respondents from the analysis as they were likely to skew the results. This decision was further justified by the fact that their responses were so extreme that they did not align with those of the other respondents (See Appendix for further discussion). After I had rectified the outliners, the Frequency and Mahalanobis distances test was repeated to double-check the range, which landed on 16.51, within the critical range of 18.47 for a MANOVA with 4 dependent variables (Tabachnick, Fidell, and Ullman 2007). Performing the MANOVA, I scrutinised the outcome of the Box test and Laverne tests. The Box test showed an alpha-value larger than .001, inferring that the assumption of homogeneity of variance-covariance matrices was not violated. The Laverne test gave no alpha-value less than .05, implying that the assumption of the equality of error variance was not infringed (Tabachnick, Fidell, and Ullman 2007).

4.2 Sequence I: results

4.2.1. Principal component analysis with varimax rotation

The 4-component selected provided the following subscale structure (Table 4).

Because my statistical dataset holds unequal N-values (twice the Employee respondents than the Leaders and Managers combined), I had to assess the significance before analyzing the result of the MANOVA. I used two statistical tests, Pillai's trace and Wilk's lambda, commonly used to assess the significance of a MANOVA (Tabachnick & Fidell, 2013). Pillai's Trace test provided the following: F = 1.81, Sig = .073, Value = .065, partial eta squared = .03. while Wilks' Lambda gave: F = 1.82, Sig = .071, Value = .093, partial eta squared = .03 (see Table 5). The results of both tests were almost identical, indicating that the differences between the stakeholder roles in the study were not statistically significant. Interpreting the outcome, as the MANOVA showed no statistically significant difference between the stakeholders on the combined dependent variables, indicates that the PCA factors regarding instructional gamification design preferences do not differ between the stakeholder groups.

Following the PCA and the MANOVA, I began analyzing, interpreting the four factors. Each factor was thematized and labelled depending on the four factors' assortment of questions and their query (Table 6).

Table 4. Rotated component matrix (Varimax) showing the factor loadings of the 4-component structure.

			Components			
Items	Q	Item wordings	1	2	3	4
Content2	Q16	The learning system design shall focus on providing users with challenging learning content corresponding to their skill level.	**0.75**	0.32	0.12	0.01
Content3	Q17	The learning system design shall focus on providing users with personalized learning material.	**0.74**	−0.01	0.03	0.11
Structure1	Q18	The learning system design shall focus on users maintaining their designated learning plan.	**0.68**	*0.39*	0.26	−0.09
Hedonic2	Q19	The learning system design shall focus on making the learning experience pleasant at Tech-Com.	0.17	**0.78**	0.05	0.22
Hedonic3	Q20	The learning system design shall focus on simplifying training at Tech-Com.	0.14	**0.71**	0.29	−0.02
Structure2	Q21	The learning system design shall focus on expanding the learning culture at Tech-Com.	*0.37*	**0.58**	*−0.45*	0.10
Hedonic1	Q13	The learning system design shall focus on providing a gratifying learning experience.	0.17	0.03	**0.74**	0.10
Utilitarian2	Q22	The learning system design shall focus be task-oriented.	0.11	0.15	**0.73**	0.18
Utilitarian1	Q9	The learning system design shall focus on increasing users learning productivity.	0.00	0.24	0.00	**0.72**
Content1	Q10	The learning system design shall focus on providing high-quality learning material.	*0.35*	−0.33	0.10	**0.69**
Utilitarian3	Q14	The learning system design shall focus on enabling the acquisition of needed skills.	−0.10	0.15	*0.33*	**0.65**
Unrotated eigenvalue			3.10	1.65	1.12	1.06
Unrotated % of variance			28.2%	15.0%	10.2%	9.6%
Main loadings			3	3	2	3
Cross-loadings			1	1	0	2

Note: Main loadings (> .5) are in bold, significant cross-loadings (> 50% of main loading) in italics, while weak loadings (< .32) have been coloured gray for increased readability.

Table 5. Multivariate tests.

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.012	.660[b]	4.000	214.000	.621	.012
	Wilks' Lambda	.988	.660[b]	4.000	214.000	.621	.012
Role at Tech-Com	Pillai's Trace	.065	1.813	8.000	430.000	.073	.033
	Wilks' Lambda	.935	1.821[b]	8.000	428.000	.071	.033

a. Design: Intercept + Role at Tech-Com
b. Exact statistic
c. The statistic is an upper bound on F that yields a lower bound on the significance level.

Table 6. Factor labels instructional gamification.

Items	Q	Item wordings	Factor Given Label
Content2	Q16	The learning system design shall focus on providing users with challenging learning content corresponding to their skill level.	Factor 1: Personalised Skill Development
Content3	Q17	The learning system design shall focus on providing users with personalised learning material.	
Structure1	Q18	The learning system design shall focus on users maintaining their designated learning programme.	
Hedonic2	Q19	The learning system design shall focus on making the learning experience pleasant at Tech-Com.	Factor 2: Accessible and Amiable Learning Spaces
Hedonic3	Q20	The learning system design shall focus on simplifying training at Tech-Com.	
Structure2	Q21	The learning system design shall focus on expanding the learning culture at Tech-Com.	
Hedonic1	Q13	The learning system design shall focus on providing a gratifying learning experience.	Factor 3: Task-oriented and Satisfying Learning Experiences
Utilitarian2	Q22	The learning system design shall focus be task-oriented.	
Utilitarian1	Q9	The learning system design shall focus on increasing users learning productivity.	Factor 4: Purposeful and Compelling Learning Content
Content1	Q10	The learning system design shall focus on providing high-quality learning material.	
Utilitarian3	Q14	The learning system design shall focus on enabling the acquisition of needed skills.	

The factors will be comprehensively depicted in the discussion section of Sequence I.

4.3 Sequence I: discussion

In my attempt to answer RQ1 I, through the PCA, extrapolated four factors. The first identified factor, *Personalized Skill Development*, shares similarities with the second factor, as it combines two usually differentiated items from the Content/Structural Gamification typology. However, unlike the Hedonic/Utilitarian dimension, Content/Structural gamification is relatively uncomplicated to integrate with one another. Actually, it is encouraged to combine the typology depending on the setting, goal, expectations of the outcome instruction and many other situational dependent factors (Reigeluth, Beatty, and Myers 2016). Q16-18 wording has an emphasis on personal characteristics, such as

finding the right balance between the learning challenges and skills for the user (Q16) by providing a tailored learning content fit for the needs of the learner (Q18) but also assisting the users in developing learning habits and commitment by providing clear goals and expectations trough a specified learning agenda for the user (Q17).

The second factor, labeled *Accessible and Amiable Learning Spaces*, combines items from the Hedonic construct (Q19-20) with the Structural construct (Q21). The item's amalgamation indicates that the Tech-Coms stakeholder notion and conception of instructional gamification is that one of its purposes is to make 'a boring task fun'. This factor gives that a design preference of instructional gamification is that it enables a learning experience that is presented as simple, possible with low thresholds (Q19) and that it is pleasant, providing a satisfying experience and an enjoyable time (Q20). But also, that instructional gamification design should focus on social aspects of learning, such as furnishing growth for a more cohesive learning culture at Tech-Com.

The third factor, labeled *Task-oriented and Satisfying Learning Experiences*, is based on items that regularly are dichotomies in a continuum, Hedonic and Utilitarian. However, these two may complement each other; gamification is an explicit example of such interaction where hedonic and utilitarian design dimensions intermingling, together creating a gameful ambience in situations that habitually are not related to game activities. Q13 and Q22 wording might be interpreted by the respondents as Instructional Gamification shall deliver a satisfying experience when, for instance, the learning objective in a course is finished; this could indicate that instructional gamification needs to focus on providing immense feedback.

The fourth and final factor, *Purposeful and Compelling Learning Content*, is based on utilitarian or content items. This might be viewed as applicable depending on Tech-Com operating in the business field of information technology innovations which makes the grouping reasonable. Also, analyzing the items more closely, it seems that the Content item wording (Q10) is approaching a utilitarian paradigm as it inquires if the knowledge and information quality of the material shall be the focus of the learning system. An interpretation of why item Q19-20 groups with Q21 could depend on Tech-Com's workplace learning history. As described in the background previously, Tech-Com's workplace learning consisted in that the employees had to be their primus motor in their skill-development; otherwise, they would soon become obsolete to have a function at Tech-Com. The workplace learning paradigm seems autonomous and self-regulated, an approach that some individuals might commend, but not all.

In answering **RQ2**, as the MANOVA displayed no statistically significant difference between the stakeholder group's identified factors, the analysis indicates that instructional gamification design preferences do not differ between the stakeholder groups.

Sequence I findings provide a manifold of the stakeholder group's design preferences and various implications for how instructional gamification should be configurate to receive stakeholder endorsement; for instance, the instructional gamification design should focus on affording task-oriented skill development, which might be interpreted that Tech-Com stakeholder's desire for their workplace learning should resemble Deweyan experiential learning – learning by doing/learning by inquiry (Dewey 1986).

However, several details in the four factors are still too vague and imprecise to serve as actionable heuristics for robust instructional gamification design. For instance, which skills, types of learning material and features are regarded as functional for Tech-Com's stakeholders? How should the feedback mechanic be outlined; should it trigger the user's academic performance by providing summative or perhaps formative feedback, or should the feedback regard the effort of just completing the course and disregard the user's course performance? How personalised and specified shall the learning content should be? Or what defines an enjoyable learning culture? Such questions remained, concluding Sequence I. Nevertheless, the numerical findings, the subscales, would become essential in constructing Sequence II's interview guide, affording me valuable insights, which were advantageous both when interviewing the various stakeholders and interpreting the qualitative findings. The four factors' labels were to compose the initial gestalt for the instructional gamification implementation heuristics.

5. Sequence II: qualitative investigation

5.1. Constructing the interview guide

For Sequence II, I developed a comprehensive and flexible interview guide designed to gather in-depth, detailed, and nuanced information from all stakeholders, regardless of their affiliated group. This approach ensured that all interviewees had a consistent experience, allowing for a more accurate and unbiased analysis of their responses. The guide was based on the four factors identified through PCA and aimed to gather in-depth, detailed, and nuanced information on

Table 7. The interview guide.

Act	Intention
Beginning	Familiarizing the participants with the context. By briefly discussing the survey outcome, I looked for entry points to begin a more in-depth conversation.
Middle	Explicitly understanding the participants' design preferences by focusing on the desired effects of implementing instructional gamification, as well as possible facilitators and inhibitors
End	Understanding the participants' meaningful aspirations for instructional gamification that could inform its design and facilitate stakeholder endorsement

how instructional gamification technologies should be designed to meet the stakeholder's aspired preferences of such artifacts – to induce engaging learning experiences, offer appropriate instructional content, and uphold functional structures for workplace learning.

I designed the guide to act as a compass to ensure that all PCA factors were discussed, with the flexibility to adapt to the respondent's direction of the conversation to follow my inquiry if such an opportunity arose. If I were to engage in more in-depth discussions, I deliberately choose to describe all interview questions as open-ended, as they elicit more authentic and elaborate responses (Rapley 2001). However, in order to circumvent drifting (Turner 2010), I organised the interviews into three acts – beginning, middle, and end – with distinct objectives for each (Table 7).

To determine the stakeholder group's design preferences for endorsing gamified learning technologies for workplace learning, I used the following strategy: I conducted interviews and focused on their design preferences as they related to four factors identified through exploratory PCA.[6] I wanted to ask questions about the expected outcome of implementing instructional gamification and what facilitators and inhibitors the stakeholders perceived. I asked open-ended questions to gain a deeper understanding of what the stakeholders considered essential for gamified learning technologies in workplace learning. It is important to note that the stakeholder interviews were not focused on determining the most effective game elements for changing user behaviour or attitudes. This was not the intended scope of my investigation and discussing it would not align with the study's primary objective. I avoided this topic to ensure that the precious interview time was used to gather relevant data about preferences that stipulate endorsement.

5.1.1. Qualitative sampling and data collection

An external human resources specialist and I outlined a proposal when the survey was finalised. The proposal introduced the survey participants to the possibility of volunteering for follow-up interviews in August 2021. We were inspired by Baumann (1999), who reached a high number of interview participants by asking the survey participants to indicate whether they wanted to be interviewed later. Furthermore, collecting participant-identifying information in the survey stage merely for potential follow-up interviews would have added a complicated ethical layer to the already complicated investigation process. Therefore, the approach employed to recruit volunteers seemed ideal.

The proposal clearly stated that participation in the interview process was an opportunity to contribute to Tech-Com's workplace learning environment by contributing to a holistic understanding of employees' conditions and ambitions. Thirty-one survey participants volunteered for the interviews. The primary selection criteria were that the interviewees needed to have worked at Tech-Com for a minimum of 3 years and have 4 years of post-graduation work experience, which disqualified 5 of the 31 volunteers. The secondary criterion was the intention to compose a set reflecting the survey participants' distribution. To better understand the stakeholder groups, I prioritised heterogeneity among the interview participants, selecting 12 candidates from various departments and educational backgrounds. The human resources specialist interviewed the other 19 of the 31 volunteers and asked similar but not as design specific inquiries. Emails were sent to the candidates, which 4 volunteers did not reply, leaving 8 participants for the interview session. The interview participants were men and women whose ages ranged from 28 to 54 years. All the interviewees worked at various Tech-Com departments (Table 8).

Although the stakeholder group's demographic characteristics were not the focus of my investigation, I conducted a superficial assessment of the interviewees (Shaughnessy, Zechmeister, and Zechmeister 2014). I composed my superficial assessment on demographic characteristics such as age, gender, work-life experience and education level, which did not yield any considerable differences. Through my assessment, I disclosed that there were no substantial differences in the demographic profiles between those who preferred to be interviewed. The circumstance indicates that demographic factors did not influence the decision to participate in an interview; thus, the sample might be representative of the population (Shaughnessy, Zechmeister, and Zechmeister 2014).

5.1.2. Qualitative analysis

All the interviews were conducted and recorded with Zoom software due to the COVID-19 pandemic and Tech-Com's geographical spread. Each session was conducted in English and lasted approximately 40 minutes.

Table 8. Interviewees.

Name in Study	Educational background	Role	Stakeholder	Years at Tech-Com	Years of working experience
Manager 1	MSc. in Engineering	Line Manager	Manager	3	22
Manager 2	Licensed psychologist & MSc in Organisational Psychology	Human Resources Manager	Manager	7	21
Leader 1	MSc. in Computer Science	Product Supervisor	Leader	8	18
Leader 2	MSc. in Engineering & B.Sc. in Organisation Development	Team Leader	Leader	2	7
Employee 1	BSc. in Computer Science	Junior Developer	Employee	3	5
Employee 2	MSc. in Engineering	Business Specialist	Employee	7	9
Employee 3	MSc. in Engineering	Industry Designer	Employee	3	8
Employee 4	PhD. in Computer Science & MSc. in Engineering	Research and Development Specialist	Employee	9	13

The interview procedure was carefully conducted due to the nature of the project, for instance none of the interviewees had to engage in the interview session while being on the Tech-Com premises. The participants were pseudonymized during the transcription. If an interviewee referred to identifying details that could expose his or her identity, these details were redacted from the transcript. All the interviewees were invited to review their transcripts, which none desired.

The prepared transcripts consisted of 24.3423 characters on which I performed a directed content analysis (Hsieh and Shannon 2005). Directed content analysis is a deductive–inductive approach that utilises existing theory – Content/Structural Gamification and Hedonic/Utilitarian dimensions – and previous findings – mainly the PCA from Sequence I – to extend but also better define the research scope. In the content analysis, I derived the initial coding categories from the existing related literature (Table 1) and the PCA Factors from Sequence I. Based on the literature (Table 1), I developed operational definitions for the coding categories and started the initial coding using MAXQDA's *keyword-in-context* (five-word spread), from which I sorted the data into predetermined categories (Kuckartz and Rädiker 2019). I applied predetermined codes to related topics that could potentially be relevant (Hsieh and Shannon 2005). In addition, I completed a superficial reading of the transcript to determine if I had missed anything, resulting in 261 codes distributed across 11 categories. In the second coding phase, I focused on the relevant codes that could not be categorised and analyzed whether they represented a new category or a subcategory of an existing category. I used word frequencies (lemmatised words) and labeled the data to represent a new category or subcategory of existing codes. Moreover, I cross-referenced the data with the word combination's function and determined that four new categories and one subcategory existed, resulting in 21 categories containing 432 coded segments. From these generated categories, I started deductively and ended inductively, drawing conclusions and generalisations where possible. Omitting irrelevant statements: reexamine or reassess based on the coding scheme.

In my analysis of the interview transcriptions, I utilised the human-centered design approach as outlined by Krippendorff (2005). The approach emphasised the importance of ensuring that design artifacts appear meaningful for their intended stakeholders. It acknowledges that the stakeholders construct meaning by decoding explicit and implicit cues transmitted by the design artifact. By taking this approach, I aimed to gain an in-depth understanding of the three stakeholder groups' instructional gamification design preferences regarding what aspects they saw as enablers or barriers that might influence their endorsement of gamified learning technology. I focused on identifying, grouping, extracting, and interpreting various statements made by stakeholders about the real-world conditions of Tech-Com learning environments. This process helped me to gain a nuanced and comprehensive understanding of the contextual factors that impact the stakeholder groups, while also taking into account their various perspectives and aspirations regarding gamified learning technologies. I used my analysis of the interviews as a basis for suggesting tentative design trajectories and implications that, in my opinion, could inform the design of instructional gamification to make it meaningful for the stakeholders, and thus increase stakeholder endorsement.[7]

Various critical tendencies and patterns were revealed concerning the PCA-identified factors. As Tech-Com is a company with high experience in behaviour technology, the interviewees expressed that a gamification implementation in their novel learning system could contribute to solving various issues with the contemporary workplace learning situations. However, precisely by what definition and effort instructional gamification should contribute to Tech-Coms' current workplace learning predicament was indistinct

and often incongruous. The variance depended on which stakeholder group described and defined how instructional gamification should be outlined in connection to the four factors.

Hence, while analyzing the transcripts and codes, it became more and more evident that the stakeholder groups had different interpretations and conceptions of the survey items and their formed factors. The lack of cohesiveness among the stakeholder groups contradicts the outcome in Sequence I; thus, the stakeholder's different apprehensions of the purpose of instructional gamification and how it would contribute to Tech-Com's workplace learning promptly became the focal point in the analysis.

5.2. Sequence II findings

5.2.1. Factor 1 personalized skill development

Regarding the stakeholders' characterisation of Factor 1, there was a noticeable difference in their opinion regarding the ideal form and function of a delineated and personalised gamified learning system. The divergence existed between the employees and leaders, on the one hand, and the managers, on the other hand, and it was concerned with whether an instructional gamification implementation at TCU should take the shape of a high-end knowledge hub, a peer-to-peer learning platform or management system that provide standardised and scalable corporate learning content. Manager 2 stated:

> Tech-Com is today a large enterprise that operates in different countries, and there it is noticeable that part of the knowledge sharing does not work. It is difficult for new people to get acquainted and understand the whole organization not learning their job […] you need to have the same determination to understand the organization. It is not a natural process as at other companies. (Manager 2)

Manager 2's statements suggest that managers favour instructional gamification design to expedite higher compliance among the employees, ensuring that all directives and regulations given by the management are comprehended, applied and hopefully respected. This was not the contemporary situation at Tech-Com, as Manager 2 indicated that the dismal compliance and the inadequate knowledge-sharing and communication had caused a deprived company onboarding making it complicated to be newly employed at Tech-Com. Moreover, according to Liza, the managers implored instructional gamification, which was delineated as providing more structure to the workplace learning environment, and providing a better overview and insight into what kind of personalised learning efforts the employees needed to contribute and remain valuable to Tech-Com. On the other hand, instructional gamification that encourages employee and team independence would yield incoherence at Tech-Com, adding a layer of complexity to becoming a lifelong learning organisation. Manager 1 stressed one factor that contributes to the problem with independent and personalised learning:

> We have problems in departments with a lot of knowledge sitting with certain people and there is no sharing of that knowledge if the personality of that person is not the type who shares.

The managers further implied that instructional gamification that amplifies the design of the corporate-created learning content would be recognised and much appreciated by the organisation. Having control over the learning content would for instance facilitates quick organisational rearrangement and provide a more unified corporate mindset regarding Tech-Com's vision and mission.

However, the Managers conception of delineated and personalised instructional gamification design was distinct comparing with how the employee stakeholder group perceived it. as they did not consider such a notion. According to the employees, a forthcoming instructional gamification implementation in the TCU platform would be welcomed, but it should not incentives corporate-produced materials such as mini-courses or entire learning programmes. Such instructional gamification design would solely be regarded as extraneous and contrived. The stakeholder group view seemed to depend on the lack of trust in the course providers' experience and unfamiliarity rather than the disapproval of the idea of gamified content:

> A programming course, for example, this is nothing that I would want human resources to plan. Because they don't have the insights […] being an IT professional, if you don't learn your whole life, you will be out of the game very, very soon. Because there are so many new things that happens in IT. When I went to university, they didn't even have books because the moment they were printed, they were already ancient. (Employee 1)

The employees projected that a specific and personalised instructional gamification at Tech-Com's should afford them more independence and facilitate their self-regulated learning. Thus, they did not care for a gamified learning system that stipulated a more confined and regulated workplace learning experience consisting of obligatory learning content with organised learning goals. Furthermore, they did not want workplace learning to depend on other departments, risking

outdated skills due to for instance human resources inexperience in software development.

The leaders expressed that the teams should welcome an instructional gamification implementation if its design promoted originality rather than conformity. From this perspective, a gamified learning system should be an instrument for elevating learning, not a tool for upper management to increase compliance metrics or control if all employees have taken all the mandatory courses:

> If you want to be a competitive company that attracts the best talent, you also need to be at the forefront of learning, providing support. (Leader 2)

Leader 2 conveyed that instructional gamification that would try to silently enforce individual development plans for the teams and their members, with the intention to retain more insight and control over them, would be counterproductive as it would impede the existing creativity and innovation within and among the teams, hence the entire company. Instead, the leaders would have endorsed an instructional gamification design that was outlined to propel the team members to improve their current skills or learn new ones depending on the team's contemporary necessity.

5.2.2. Factor 2 accessible and amiable learning spaces

Factor 2 depicts that (re)-constructing and further developing a sociable corporate culture was both essential and exciting. Management claimed that this was most effective at the beginning of a new career; thus, a respectable starting point would regard the socialisation of newcomer employees, which was regarded as a weak spot in most departments:

> It (onboarding) is very different depending on where you work. For example, R&D or Management has a solid onboarding where they are introduced to a "network" that will assist with different things. Otherwise, it is more of 'oh, it's probably someone else who will help that poor new guy in the room. (Employee 2)

The employee stakeholder admitted that the hard-lined and tough initiation phase of newcomers could, to some extent, be attributed to a lack of structures, especially in some departments. An improved team onboarding process would benefit the teams as well as decrease the workload for the team members when newcomers join the various teams. However, the employee was unsure whether instructional gamification alone would fix that problem, as it seemed too entrenched in the corporation's mentality.

However, utilising gamification for other social events in the organisation was regarded as a low-grade effort from Tech-Com HR-department to increase employee compliance with the corporation's new business strategy, termed 'New Tech-Com'. Addressing the management stated issue that Tech-Com lacked appropriate learning structures that affected the recruitment process, the employees stated that a new employee at Tech-Com would either 'make you or break you.' Leader 1, whom Tech-Com had employed for almost a decade, expressed that the challenging initiation phase had traditionally been regarded in the departments as a method:

> to separate the wheat from the chaff […] identify early those we can work with and those on which we cannot.

The Leaders concurred that employee socialisation and onboarding procedures were lagging areas in that the focus has always been on developing advanced IT products and expressed that an instructional gamification design that specifies helpful structures could be attractive for the teams:

> Providing structure, a more systematic way of working with organizational learning will imprint it better than just stating that we are such an organization. (Leader 2)

5.2.3. Factor 3 task-oriented and satisfying learning experience

Factor 3 generated both responses and engaged discussions about how and in what way instructional gamification at TCU would be the most beneficial. The Managers shared that a more structured and task-orienting learning organisation would aid the company at all levels:

> There is a rather unstructured approach (workplace learning) […] We have not had a large influx to our training courses, you know. It is a neglected area and something that the management is requesting a lot. But having said that, learning is not particularly organized at Tech-Com. (Manager 2)

Manager 2 conveyed that the contemporary structures regarding employee socialisation and otherwise were neither task-oriented nor satisfying and if instructional gamification could concentrate on creating better structures for such things, it would be highly regarded by the management stakeholders. The other interviewed manager, stated that some tasks just needed to be done:

> No, but what I mean is that there are some things you need to do to be a good soldier. Let's take a concrete example here. We (Tech-Com) maintain a fire training course which is not very popular or rewarding, but it is something that must be done. Even if it doesn't give much for personal growth. (Manager 1)

Manager 1 underscored that an instructional gamification design that would encourage the employee to take

the required courses 'that just needed to be finished' without arguing and debating too much about it would have been welcomed. Manager 1 expressed that several similar idiosyncrasies existed and that some of the teams at Tech-Com had become 'over-empowered,' causing them to make decisions that benefitted the department or team, not the organisation as a whole. Several Leaders did not have all the essential information to make informed and effective decisions, which in the past had resulted in flawed decisions that caused more problems than they had solved. If the instructional gamification design aided in that regard, management would appreciate it.

The employee stakeholders were positive towards instructional gamification linked to them accomplishing daily work tasks or participating in a development project. Likewise, if the gamification design kept attention on spreading such knowledge to other parts of the organisation. However, some employees expressed uncertainty about addressing such issues through a gamification design. Solving such issues with technological solutions would end in an encumbrance and increased workload, a way for Tech-Com to make its developers work harder with topics that were beneficial for Tech-Com, but not for them, for instance, development documentation:

> I am just saying that I do not want to gain a lot of stress and pressure from Tech-Com. That I need to chip in more hours because of this (the instructional gamification). (Employee 2)

Developers' documentation and instructional gamification seemed to be a searing topic in the organisation as Employee 3 also mentioned it and questioned whether it was to be regarded as a form of knowledge sharing taking time form the employee workplace learning:

> Do we need or want to document more? It takes more time, and does it really matter? Will it be useful? Or do we just want to be faster and more agile? But then be prepared to reinvent the wheel? It's the eternal issue here. (Employee 3)

The employee statements stress that a gamified learning system should not be used to increase company influence over workplace learning. If the instructional gamification would make the learning environment more applicable, hands-on, and task-oriented it would be endorsed by the employee. Though it seemed highly dependent on which learning task and if the employee stakeholder perceived agency and ownership over the assignment.

The Leaders expressed that an instructional gamification design that enacts arrangements to visualise that the teams had completed a difficult and challenging task would be embraced by the stakeholder group. Such gamification design would establish that Tech-Com trusted its employees to engage in self-directed and flexible workplace learning, but foremost cared about the result at the end of the day. Thus, all imposed structures had to be well-defined and appear meaningful for the teams otherwise, they will quickly become a hurdle that would be treated with mistrust:

> (I)f there is no clear purpose or goal with a structure, it becomes more like "What is the purpose of this?" and "Is this really the right way to do it?" or "Honestly, is this destination we desire?" (Leader 1)

The Leaders deemed a gamified learning system that provides guidelines rather than intrusive structures, such as automated reminders for attending the backlog, to be effective and unlikely to cause friction in the teams. The leaders expressed that a gamified learning system design that specifies helpful structures could be attractive.

> Providing structure, a more systematic way of working with organizational learning will imprint it better than just stating that we are such an organization. (Leader 2)

5.2.4. Factor 4 purposeful and compelling learning content

Regarding Factor 4 the interview responses demonstrated a difference between the three stakeholder groups. The interviewed Leaders expressed that the contemporary design of TCU did not provide the support needed for the teams to excel; instead, it assigned various mandatory courses that took time to develop the critical skills required to stay competitive. Thus, an instructional gamification design with the intention to solely 'augment' TCU instructional design was regarded as purposeless and would instead cause annoyance than oblige the current issues with Tech-Com's workplace learning.

The Leader interviewees expressed that a gamified learning system design that 'nudges' learners – *their* team members – to spend precious learning hours on courses that do not contribute to team goals would discourage endorsement among the Leader stakeholders. The previous strategy of independent and agile teams self-determining which skills were needed to deliver high-end products, which was the standard before Tech-Com's workplace learning reconstruction, was viewed as a contributing factor to Tech-Com becoming a domain-leading company:

> Tech-Com is doing well because of people's passion for their work. The person that is doing well is the one who continuously learns, re-blogs posts when they come out, and reads tech books in their free time. A lot of it is driven by individuals, and Tech-com benefits from it. (Leader 1)

Thus, instructional gamification designs providing and fostering learning independence regarding skill development were considered essential for the Leader stakeholder group, indicating that a gamified learning system that empowers learner autonomy would be appreciated.

In the employee view, a gamified learning system combined with Tech-Coms' previous learning arrangement would stand out, making the employees feel appreciated for all the extra hours they invest in their personal development. Employee 3, stating that she invests approximately 16 hours aloft her 40-hour workweek to stay tuned for her position at Tech-Com, expressed:

> Our core business is developers who produce high-end technology. And to do that, you must look for information all the time. It is based on people themselves Googling and searching for information and reading scientific articles to understand the latest in research and so on. This is super important and vital for us.

Instructional gamification that pushes the employee to be updated and tuned for their occupation, though on their terms, would be appreciated among the employees. However, implementing and enforcing another paradigm of knowledge acquisition focusing on the corporate strategy strategies were regarded as sub-optimal for the employee, simply attempting to parasitise on the culture of determination to comprehend and self-develop that existed previously at Tech-Com. The employee stakeholders would welcome instructional gamification that incentivizes and empowers meaningful peer-to-peer learning. She designates that an instructional gamification design that functioned as a corporate gamified learning hub, such as *Stack Overflow*, would be superior and more appreciated by the employees than an LMS delivering mandatory company courses. Employee 3 further elaborated and described that *Stack Overflow's* gamification design intention is to incentivize meaningful participation by recognising skills and knowledge rather than attendance and course performance metrics. Nevertheless, as *Stack Overflow* is an open platform, Employee 3 explained that critical problems or questions could not be stated on the platform due to the risk of disclosing company secrets. Therefore, *Stack Overflow* was impossible to use effectively for Tech-Com employees. Employee 1 and 4 also recognised the notion of instructional learning design with more of a credential, questioned-based, and peer-to-peer approach, suggesting that instructional gamification in such's form implemented in the TCU platform would have been appealing to the employee stakeholder group.

The leaders and employees share similarities regarding in Factor 4, but with a slightly different focus. Both require more mandate over the instructional gamification design, urging it to be a further development of the previous workplace learning strategy, but while the employee seems to want this for their personal growth, the Leaders see it as a potential win-win condition. If the employees are allowed to pursue their personal development independently, it will benefit the teams in one way or another. The Mangers notion of Factor 4 differs from the other two groups.

The managers desired the forthcoming instructional gamification implementation would provide better structures at Tech-Com concerning employee competence development by raising awareness and interest in the company-created learning material. A more cohesive company learning agenda would provide better productivity by retaining the right skills for the different teams' which would consequently lead to accomplishments in necessary contemporary fields, such as artificial intelligence. Tech-Coms' previous learning culture emphasised a strong and independent team culture and was regarded as an approach that, in the end, costs had started to outweigh the benefits due to a lack of structures:

> Structures, appropriate arrangements, and documentation are lacking […] We talk about how we should outline proper arrangements, for example, documentation, but so much transpires. There isn't any adequate fundamental structure. (Manager 2)

The company's past independent learning culture has influenced the organisation making it hard to centralise and reorganise workplace learning in the organisation. With that said, the management stakeholders were adamant that instructional gamification should not be a way to enact structures that are only valuable to Tech-Com, stressing that the lack of structures had made it complicated for new employees to be properly onboarded into the corporate culture. Consequently, Manager 2 explained, the lack of fundamental corporate structures had caused newcomers at Tech-Com to resign and/or be employed by the company's contenders, which was a significant problem during the contemporary 'war for talents'. Hence instructional gamification design that hortative to much autonomy and independence for the teams and their members would impose concerns among the managers. However, a design that provides serviceable structures regarding learning, onboarding, and similar would have been considered more appropriate by the managers. The structure dearth at Tech-Com was an element that the managers described as a genuine hazard jeopardising

the company further; thus, it would not be beneficial to encourage such design.

5.3. Sequence II discussion

Throughout the interviews concerning the PCA factors, there are convincing indications that the stakeholder groups at Tech-Com regarded the intent and concept of instructional gamification differently. Moreover, hearing members from the three stakeholder groups reflect and discuss how they preferred the design intention of instructional gamification in the light of the identified factors offered in-depth and valuable insights portraying substantial discrepancies between the manager, leader, and employee stakeholder groups, which could turn out become both barriers and enablers in an instructional gamification project.

In the interviews, it was evident that Tech-Com personnel were strongly inclined towards the utilitarian intent and benefits of gamification in workplace learning, increasing productive use (van der Heijden 2004). They acknowledged that incorporating instructional gamification elements would increase activity and engagement regarding workplace learning. The stakeholders' design preferences for instructional gamification were that the implementation should have the objective of making the personnel work harder to acquire new and relevant skills. The implementation should strive to provide better and more precise learning content, facilitating the learning process and making it more efficient and effective. This would also strengthen the overall workplace learning culture, making it more resilient against competition in its field of business. If instructional gamification design and intent include considerations of the aforementioned aspects, it may facilitate endorsement from all stakeholder groups.

The general notion of utilitarian benefit exists among all stakeholder groups, but there are discrepancies in the direction in which it is perceived and applied. Managers seemed to primarily have the organisation in mind, focusing on the benefits that gamification would bring to the company as a whole. On the other hand, employees had a more individualistic perspective, focusing on how gamification would benefit their own personal and professional development, as well as their future careers within the company. These differing perspectives highlight the importance of aligning the goals and objectives of gamification initiatives with the needs and expectations of all stakeholders to ensure the success of the implementation. The hedonic aspects of gamification were regarded in the sense that it should make workplace learning easy to interact with rather than incentivize prolonged use of them (van der Heijden 2004). The stakeholders' notion indicates that instructional gamification with an abundance of hedonic aspects and traits would be regarded as ineffective and could be a barrier to implementation. To some degree, the findings align with previous research on instructional gamification in workplace contexts, which suggests that gamification should not be implemented for the sake of gamification alone, as such projects are seldom successful (Heijden et al. 2020; Wang, Hsu, and Fang 2022).

A barrier hindering employees' endorsement was that they dreaded that Tech-Com HR-department would come to create, in the employees' view, unnecessary courses, assignments, and other irrelevant learning materials. An employee concern was that the instructional gamification design would be used to push this corporate content, which would be appropriate for the employee's highly regarded learning and development time. The employees argued that in these cases, a gamified learning system would only lead to a higher workload because employees still need to acquire 'accurate knowledge'; thus, instructional gamification would solely contribute to tension in the organisation. The finding aligns with other studies that depict the importance of appropriate content and usability for adopting instructional gamification (Araújo and Carvalho 2022; Palmquist, 2021b; Smy et al. 2020; Vanduhe, Nat, and Hasan 2020).

An enabler for the employee stakeholder endorsement of instructional gamification was the sense of ownership. Employees desire having control, insight, and ownership over various aspects, affecting them, in the workplace learning environment. The stakeholder group also expressed desire to self-determine and self-directing their own learning objectives. In order to be perceived as meaningful, instructional gamification for the stakeholder group its design should primarily aim to empower employee learning by allowing them to determine the importance of knowledge and skills to pursue and develop, benefiting both the company and the employees. Moreover, gamified learning technologies that promote agency and self-confidence in the learning process are highly preferred. The findings suggest that designing instructional gamification to empower employees with agency and control, through a sense of ownership, will increase the likelihood of endorsement. The employee's statement in my paper that gamification must promote personal gain to be accepted aligns with the findings of Mitchell, Schuster, and Jin (2020) that when employees perceive high personal value through the gamification design, their satisfaction and intent to engage with the gamified system increase. To some extent, my findings align with

previous research that affirms the need for perceived ownership in gamified learning system implementation (Oluwajana et al. 2019). My findings add to the previous research by indicating that employee stakeholders desire to determine, direct, and govern their own personal development.

In contrast, Managers at Tech-Com indicated that a barrier to their endorsement of instructional gamification was if its design promoted excessive autonomy in the workplace learning environment. The stakeholder groups given rationale was that Tech-Com, struggles with decentralisation, which has led to the formation of 'work silos' in various departments in the organisation. The decentralisation in the company had obstructed essential undertakings such as planning company knowledge-management, enabling workforce knowledge-sharing, or assisting newly hired in their employee onboarding into the organisation. The extent of the decentralisation was to such length that the management stakeholders regarded it as a potential threat to the organisation's pending future. Therefore, an instructional gamification design that promotes a self-regulated or self-directed learning in the organisation, resulting in further independence for teams, was seen as a barrier to endorsement for this stakeholder group. My finding that managers tend to favour technology that enforces company-imposed structures aligns with the idea that gamification in workplaces often prioritises organisational needs over those of employees, as noted by Larson (2020). This is similar to the argument made by Seo et al. (2021) that gamification designs should promote the values and morals of the organisation.

However, due to the in-depth nature of my findings they offer some nuance to previous research. Previous papers have to some extent depicted gamified technology as a power struggle between employees and the organisation, where the latter is wielding gamification as a whip disguised as a harmless game (Kim and Werbach 2016) or as a neoclassical problem which weighs heavy on every modern manager's shoulder (Deterding 2019). In my analysis, however, the managers' concern seems to be that integrating a gamified learning system might result in more self-propelled autonomous teams within Tech-Coms' current learning and work culture – which is what Tech-Com is aspiring to rationalise and reduce.

The team's high autonomy has instigated issues that burden and impedes the company's recovery after the COVID-19 shock. The stakeholder group depicted an excessive department autonomy with faint direction as problematic and challenging as it made knowledge-management hard to overview and nearly impossible to direct, thus thwarting the company's capability and the impending need to evolve preparing for the future. Moreover, the stakeholder groups indicated that self-propelled teams habitually created a certain 'work culture,' which often lacked the deftness to respond to rapidly changing conditions, either external or internal.[8] The managers stated that this kind of 'culture' did not facilitate the growth of new team members in the company, contributing to the recent loss of talent for Tech-Com, which was beneficial for the competitors. The managers' statements suggest several barriers to instructional gamification implementation, which seem to derive from Tech-Com's previous laissez-faire learning culture.

Manager design preference, endorsement enabler, for a gamified learning system is that it would afford them improved insight and control over the company knowledge-base, which would make decision-making considerably easier and sincere, such as delegating resources among the teams and departments or providing adequate arrangements for newly employed staff. Furthermore, management stakeholders favoured a gamified system that would improve their influence over the kinds of instructions conducted by the teams so that they would be better prepared for the future.

The Leaders explicitly alleged that they would not welcome a gamified learning system that was a substitute for a performance management tool. The stakeholder group's barrier to endorsing instructional gamification seemed to stem from Tech-Com's novel learning initiative, which this stakeholder group explicitly disproved. If the instructional gamification functioned as an extension of TCU or New Tech-Com, the Leaders would not endorse the learning technology in their teams.

Instead, an instructional gamification design that enables teams to be more independent and agile in their knowledge and skill acquisition was favoured. A design that empowered team members to choose the format and scope of their knowledge acquisition and skill development was identified as a core characteristic and objective for the Leaders, which claimed it was the genuine approach to learning at Tech-Com. According to the Leaders, the enterprise's prominent position depended on its previous boldness in enabling its teams, putting them in the front seat in charge of their own development, which was necessary for becoming domain pioneers. This 'narrative', the Leader indicated, needed to be sustained because it functioned as a 'beacon' – i.e. a recruitment strategy – attracting top talent to various Tech-Com departments. The Leaders' explanations and views indicate that their design preferences of instructional gamification would be that it worked towards engaging and stimulating the already skillful

teams at Tech-Com. Such design was more attractive for the Leader than having a chummy corporate culture.

6. Integrating the findings from sequences I & II

Integrating the quantitative findings from Sequence I with the qualitative findings from Sequence II gives the stakeholder groups different conceptions and preferences regarding the four factors from the PCA. Regarding the study purpose, the aim is to identify enablers and barriers to the endorsement of gamification in the learning environment by defining stakeholders' design preferences of such technology; the study shows that even if the stakeholder's design preferences seem to correspond, which would have been a valid interpretation based on the PCA and the following MANOVA conducted in Sequence I. However, after the analysis of interviews in Sequence II, a substantial diverge discrepancies in the stakeholder conception and attribution of all the four factors is displayed. The perspectives, interpretations, and opinions of the three stakeholders regarding the survey items vary greatly, and the degree of divergent preferences is noteworthy, warranting further investigation.

The results may be attributed to a variety of factors, including the discursive and complex nature of questions pertaining to the company's learning culture and future skills requirements. These types of questions elicit information about participants' behaviours, context, beliefs, thoughts, and feelings, which can influence the intended meaning and significance of the questions for different groups. This, in turn, may have led to divergent responses when participants were given the opportunity to elaborate and expand upon their answers.

Krippendorff (2005) addresses the semantics and nomenclature surrounding design artifacts transpire in an abstract language before being put into practice. Language can contribute to the initial acceptance and acquisition of artifacts depending on how it frames what the artifacts can accomplish and whether they are worth their attention. Language is broadly acknowledged to play a crucial role in design – research and practice (Burek 2015). Designers employ specific terminology that directs and shapes an individual's attention, perceptions, and realities through categories, identities, metaphors, and narratives (Krippendorff, 2005; Liem and Bonnemaire 2015). It is likely that the stakeholders' perceptions of what constitutes a 'Satisfying Learning Experience' (Factor III) or what composes a 'Purposeful and Compelling Learning Content' (Factor III) vary based on the groups' identities, employed metaphors, and perceived narratives. As stated by Krippendorff (2005), stakeholders may have varied and potentially opposing interests in relation to the purpose of a design artifact, but they must all recognise the design artifact as conveying meaning in order to incorporate it into their common practices. Moreover, my presented finding reflects the indication given by Zikos et al. (2019), displaying that supervisors and employees attribute different notions, values, and concepts to the term usability in gamification. Interestingly, when I interpret my findings, it gives that although the interviewees demonstrate a different connotation towards instructional gamification, there seems to occur a mutual understanding within the stakeholder group regarding the four PCA factors. The stakeholders' corresponding and like-minded interest in instructional gamification, as indicated through Sequence I, might have widely different connotations, as indicated through Sequence II. Thus, to response **RQ3,** I provide four proposals drawn from my analysis of the three stakeholder's instructional gamification design preferences I identified as corresponding factors in Sequence I and in Sequence II conceptualised into design propositions for facilitating instructional gamification endorsement. These proposals are presented in Table 9 along with the supporting evidence and reasoning for each suggestion.

The first design proposition aimed at facilitating stakeholder endorsement suggests that instructional gamification should provide personalised learning experiences, tailored gamification that incentivizes and retains behaviours and habits that enable a cross-functional, knowledge-sharing workplace learning environment. This approach should supply interesting and applied team-challenges that promote skill development and knowledge innovation through friendly competition in specific, agreed-upon areas beneficial for both the organisation and its personnel. This design proposition addresses the employees' aspiration for fostering engagement and motivation by providing a sense of ownership in their learning process. Additionally, it addresses the need for an up-to-date knowledgebase and applicable skill development as desired by leaders, by encouraging teams to apply their learning to real-world, cross-functional challenges. By focusing on specific, recognised areas of development preferred by managers, this approach also ensures that the type of skills development that gamification incentives is aligned with the organisation's goals and objectives. Overall, this design proposition aims to create a more engaged, motivated, and creative workforce using instructional gamification.

The design proposition, contextualised from Factor 2, proposes that instructional gamification designers

Table 9. Design propositions for instructional gamification.

Factor	Groups	Endorsement Enabler	Endorsement Barrier	Design Proposition
Factor 1 Personalised Skill Development	(E)mployee	Expediate self-regulated learning	Increase in corporate-managed learning initiatives	The first-factor design proposition: Instructional gamification that incentives self-regulated learning (E) and cross-functional practical knowledge innovation among the teams (L) in specified agreed-upon development areas (M).
	(L)eader	Encourages knowledge-innovation	Performance tool disguise as learning tools	
	(M)anager	Overview and insight into what tailored learning efforts various teams needed	Decentralized and autonomous departments with distinctive learning initiatives	
Factor 2 Accessible and Amiable Learning Spaces	(E)mployee	Smoother onboarding in the teams	Strained cross-team socialisation	The second-factor design proposition for instructional gamification that affords structures and incentivizes team members to better include newcomers in their teams' endeavours and arrangements (E, L, M)
	(L)eader	Enhanced socialisation and onboarding procedures	N/A	
	(M)anager	Healthier socialisation process for newcomers	N/A	
Factor 3 Task-oriented and Satisfying Learning Experiences	(E)mployee	Applicable learning-by-doing	Superfluous structures which increase workload	The third-factor design proposition suggests instructional gamification that allows learning to conducted inside the everyday processes (E) which could be monitored (L) and better systemised (M).
	(L)eader	Informative metrics on team's task completion / progression	Intrusive structures	
	(M)anager	Systematized and strategy-oriented instruction	Over empowerment of teams	
Factor 4 Purposeful and Compelling Learning Content	(E)mployee	Learning hubs for peer-to-peer knowledge-sharing.	Compulsory learning occasions not contributing to own growth	The fourth-factor design proposition is instructional gamification implemented in a transparent digital learning hub (E) with information about the team's current competence (M), the skills encouraged by the organisation to currently maintain, and the benefits of acquiring them (L).
	(L)eader	The autonomy to determine the team's learning pursuits.	Enforced courses that does not contribute to the teams' purpose	
	(M)anager	Directed and cohesive learning strategy	Self-selected and nontransparent learning agendas disconnected from organisations vision	

should aim to create a structure that not only motivates existing team members' skill development and includes newcomers in the learning activities, but also provides incentives for them to do so. This can be achieved through elements such as incorporating team learning encouragements (co-op missions), reward mechanics that take into consideration the team's seniority, juniority, skillset, and development needs, and providing rewards or recognition for teams that successfully include and integrate newcomers, while also considering the organisation's internal knowledge-base and how every member of the learning team benefits from the team's composition. Additionally, to take advantage of gamification's strengths, providing directed and timely feedback for both senior employees who include newcomers in their knowledge development endeavours and newcomers making their current skillset and learning interests known. Overall, the design proposition goal is to incentives behaviours and maintain habits constructing a supportive and inclusive environment where newcomers are encouraged to participate and contribute, and where team members are motivated to actively include them in team activities and decision-making processes regarding the learning activities.

My third design proposal for instructional gamification suggests a method of integrating learning into everyday processes, allowing for more seamless and efficient learning. This can be achieved by incorporating instructive elements into tasks and activities that are already being performed, such as providing real-life scenarios or problem-solving exercises related to the work being done. The proposal emphasises the use of a quantified-self design that incorporates elements of the Internet of Things, wearables, and dashboard design to create a monitoring and evaluation system. The dashboard allows intended users to easily track their progress, self-evaluate, and apply learning strategies that are more suitable for them or identify gaps in their current approaches. Additionally, the gamified system should incentivize behaviours and habits that promote reflection on how personal skill development aligns with the organisation's learning goals and provide rewards for mutually beneficial outcomes. Furthermore, leaders and managers can also use the dashboard system to monitor ongoing learning initiatives, track progress, and identify areas where users may be struggling, enabling timely interventions. By using various charting and visualisation elements, such as Skill Trees or Tech Tracks, it becomes possible to see synergies among the initiatives conducted in the workplace learning environment, thus allowing for the identification of areas for improvement and making necessary adjustments to the instructional approach. It is of utmost importance that the quantified-self design is transparent and principled, making it clear to everyone what variables are monitored in the system and why. Otherwise, it will

have difficulty gaining endorsement. Its design must provide each affected stakeholder group with the information that other stakeholder groups receive. It should not be viewed as a gamified performance management tool, but rather as an instrument that facilitates gameful learning experiences. Overall, the design proposal aims to integrate workplace learning as a natural and ongoing process, rather than a separate and disconnected activity. This approach leads to a better understanding of the organisation's current knowledge base and improved skill development among personnel.

The fourth design proposition is to incorporate instructional gamification into a transparent learning platform, a hub, hosted by the organisation. This platform will provide users with a clear understanding of their current level of competence within the organisation and the skills the organisation prioritises for development. Additionally, the platform will clearly communicate the benefits of acquiring these skills for the individual employee and the organisation. The gamified learning platform outline is different from traditional learning management systems that typically focus on providing corporate courses. It serves as a platform for users to ask and answer questions, vote on questions and answers, and edit them, creating an interactive corporate wiki. To encourage engagement and maintain user habits, users can earn points for participating in the platform and receive recognition for their shared skills and knowledge. To ensure high-quality contributions, double-blind certification is used, where both identities are concealed, preventing favouritism and centralisation of knowledge within specific groups. The certification process is also incorporated into the instructional gamification configuration. The design proposition aims to provide users with recognition and acknowledgment for their valuable skills and knowledge, as well as their willingness to share them with others. Additionally, it aims to motivate users to actively develop their skills and share their knowledge in a meaningful way. Furthermore, it allows users to track and understand the impact of their efforts on the organisation's overall competence and professional development.

The sequence's integration provides valuable understanding and insights for both gamification practitioners and scholars, which will be depicted in the following paragraphs. The present study I want accentuates stakeholders interesting factors that may facilitate or obstruct a gamification implementation. Thus, the practical implication of the finding is the contribution to the contemporary, rather vague, topic of how to ensure accomplishment – e.g. best practices – implementing a gamification project in an organisational learning environment (Morschheuser et al. 2018). The different stakeholder conceptions of instructional gamification noticed in this study provide a provisional explanation as to why instructional gamification has been successfully integrated (Zikos et al. 2019), discarded (Jedel and Palmquist 2021), or caused organisational conflicts between the employees and the mangers (Seo et al. 2021). The results support the importance of considering the perspectives of key stakeholders when implementing gamification projects in organisations (Herzig et al. 2015; Palmquist 2021b). The stakeholder approach is common when implementing gamification in business and health but seems overlooked in the learning field (Mora et al. 2017), which might depend on the stakeholder concept prereferral presence in the learning sciences.

Furthermore, in the study I identify several moderators and criteria (see Landers et al. 2018) that I regarded having an influence instructional gamification endorsement. Even building upon these constructs my finding adds that stakeholders might view the moderators of a setting different as well as having dissimilar view on what the criteria should be for an instructional gamification. For instance, an enabling moderator for employee stakeholders is if the gamification gives them a sense of ownership, as they desire to influence, insight, and trust over various aspects that affect their learning endeavours. Employees expressed a desired criteria for the gamified technology to allow for self-determined and self-directed learning – however, this conflicts with the management's perspective at Tech-Com. According to Tech-Com managers, an impeding moderator for instructional gamification is when its design promotes excessive autonomy in the workplace learning environment. On the other hand, an enabling moderator for a gamified learning system at Tech-Com would provide managers with improved insight into the company's knowledge, making decision-making and organisational rearrangement substantially easier. Additionally, management stakeholders had criteria for a gamified system is its ability to expand and increase their insight and influence over the types of learning endeavours conducted by teams and individuals within the organisation to better prepare for the future. The leader stakeholder explicitly stated criteria was that if the gamified tool emerged as a performance management tool, they would not be interested. Instead, an instructional gamification tool empowers teams to select the format and scope of their knowledge acquisition, and skill development would be approved.

In a more theoretical sense, the finding contributes to understanding the stated issue of the lack of

gamification adoption in organisations (Landers 2019; Raftopoulos 2020). Approaching the gamification adoption issue from a stakeholder interdependence perspective complements the incentives and understandings already available, such as the lack of innovation in gamification (Raftopoulos 2020) as well as the overuse of rhetorical gamification in organisational settings (Landers 2019). The findings also add one piece to the puzzle of why, in general, gamification displays excessive mixed results when reviewed systematically (Koivisto and Hamari 2019). The stakeholder perspective likewise might offer some insights into why some studies that have depicted the successful employment of instructional gamification have failed when trying to recreate the study with a similar design framework in a comparable setting (Nacke and Deterding 2017).

6.1 Conclusion

My justification for using a sequential explanatory mixed-methods study design was to provide a more comprehensive understanding of the enablers and barriers of three stakeholders' endorsements of instructional gamification. As I was granted unprecedented access to this study material, the mixed-methods sequential design seemed to be a more reasonable approach than either qualitative or quantitative approaches alone could achieve, as it allowed for the real-life findings from Sequence I to inform and shape the research questions and approach used in Sequence II.

The primary contribution of this research is the identification and comprehensive portrayal of three stakeholder groups that may be predicted to have similar inducements regarding technology endorsement in their learning environments. The key finding is the discrepancies between stakeholders and organisational complexity. However, the study results reveal their disparate ambitions but also their interdependencies, suggesting that instructional gamification implementation is complicated. However, I regard the disparities not as a problem that obstructs gamification designers' creativity but rather as a trigger for conceiving holistic designs that address several stakeholders' preferences without making design trade-offs. If a designer is determined to make trade-offs, it will sooner or later transpire. Conversely, if the designer is determined to find prolific intersections connecting stakeholders' ambitions equally, it will probably transpire.

The different stakeholder groups' enablers and barriers represent design opportunities for creating stakeholder-centered instructional gamification. The results, arguably, point to an urgent and significant research problem that does not vanish merely by describing the superficial differences between groups. The 'stakes' of employees, managers, and leaders outlined in this investigation provide a platform for future researchers interested in the subject. The roles of organisations' stakeholders, ambivalences, and dependencies in endorsing instructional gamification imply a vast research field that demands further investigation.

6.2 Limitations

The limitations of this study concern the survey and the generalizability of the findings. An explicit limitation is the methodological problem regarding the survey design. As the study was accomplished in the field setting, where I followed a group of practitioners, gamification, and human resources consultants contracted by Tech-Com to solve a direct practical problem, we had different agendas with the survey. This is addressed in Section 3.3. As I did not have direct control over the survey design, several academic standards for designing a survey (Gideon, 2012) were not met (e.g. considering the type of item that best examines a concept, avoiding the double-barreled question, assessing the relevance and quality, conducting a test run in a small representative group) regarding the practitioner's item. These limitations in the survey design may have affected the respondents' answers; therefore, 3 of the 14 practitioner designed items was used in the analysis (What role do you have in the company?) to determine the stakeholders in the study. The other two practitioner items (What is your highest completed education? In what area do you operate today?) were used only descriptively. As my survey items were included as part of a larger practitioner questionnaire, demographic variables typically present in similar studies are absent. The demographic information collected in Sequence I is limited and only includes respondents' educational background and their stakeholder group affiliation. Including variables such as gender would have provided a more in-depth understanding of the sample, for example, enabling the use of chi-squared test to analyze whether there is a different proportion of men and women among the respondents compared to everyone who received the mail invitation to the survey. This limitation should be acknowledged, especially by those interested in applying my findings in either practitioner or academic gamification endeavours.

Furthermore, as this study was conducted as part of a practitioner-driven development project aimed at improving Tech-Com's workplace learning, it was not possible to conduct a pilot study to validate the survey instrument used. My investigation was only a minor component in the SLDA data collection process.

Conducting research in the wild often requires trade-offs to be made during the research process, which can affect academic rigour. In this study, such constraints included a limited amount of time for collecting data and fixed financial resources established in advance by Tech-Com's enterprise. These circumstances made it infeasible to conduct a pilot of the survey instrument. Researchers and practitioners should take this limitation into account when building on my findings, as it may affect their validity and generalizability.

Another limitation of my investigation is that my findings may be context-dependent to the IT-sector. Tech-Com is an IT company with a business focus on innovative IT technology, which creates a complex workplace learning culture. The stakeholders strong emphasis of having control over processes and technology in the learning environment may not be as prevalent for companies in other sectors. Therefore, it would be necessary to replicate this study in a different context with a larger population. Additionally, the qualitative data collection in Sequence II had a limited sample size, as the eight interviewees represented only three different groups. This resulted in a limited number of representative from the stakeholder groups, Leaders and Managers, which may limit the findings and should be taken into consideration when interpreting the results. Future studies should aim to interview additional stakeholders representing the Leader and Manager groups in order to acquire results with higher trustworthiness. That my findings indicate contextual dependence should be considered, given the design implications for instructional gamification. Design is highly situational and can be affected by factors such as culture and the intended audience. It is important to note that my design propositions require careful thought and consideration to ensure proper fit and should not be considered universally applicable principles for instructional gamification. I caution researchers and practitioners to exercise caution when implementing my design propositions in their design artifacts.

6.3 Future work

The implications of the findings in this study indicate that further investigation is required regarding stakeholders whose conflicting design preferences impact gamified learning system incorporation in workplace learning. Several research trajectories occur, as this study is based on a technology development company where the workforce appears to have high autonomy regarding skill acquisition. Thus, it would be interesting to conduct a similar investigation within a corporation in another branch of industry with a different hierarchal culture and firmer workplace learning outline, for example, in the automotive industry. Correspondingly, the informants in the study seemed to have ample gamification literacy, possibly because Tech-Com operates human behaviour software, thus having detailed design preferences regarding the gamified learning system. Stakeholders in other industry branches may not even consider learning system design intentions or preferences. Hence, investigations concerning how stakeholders' gamification literacy impacts gamified learning system endorsement would be interesting.

In the present study, the design preferences appear cohesive within the stakeholder groups; however, if so, why so? An educated guess is that the preferences might differ depending on the stakeholder's position in the organisation; this would be interesting to understand further. Suppose the employed scales in the presented paper should be used in future investigations; future researchers could draw from the qualitative findings from Sequence II and add additional items to the quantitative survey. For instance, better nuances of the same aspects could be achieved with modification of the scale items.

Moreover, a popular design approach in gamification is User-Centered Design (UCD, Mora et al. 2017). The UCD focus on the users and their needs in each phase of the design process. Thus, the result of the presented study problematises employing the UCD approach in instructional gamification because it appears that the user's need is not the immediate focus of the other stakeholders. Further research should be conducted to determine if the UCD is a problematic approach for instructional gamification and, if so, what approach would be more suitable for designing gamification in workplace learning.

Finally, it would be of significance to investigate the extent to which the stated design preferences impact stakeholders' gamified learning system endorsement compared to other predictors identified in research regarding IT, such as usefulness/ease of use (Davis 1989) or social influence (Venkatesh et al. 2003). There is also a need for a better understanding regarding the design discourse that gamification is about to be implemented.

Notes

1. I utilize the term instructional gamification, which defines a learning format conducted by adults in informal learning environments dissimilar from each other (e.g., on-the-job training, employee onboarding programs, and company-provided courses).
2. In order to prevent potential confusion with theories such as stakeholder theory, it should be noted that my

use of the term 'stakeholder' in this study is rooted in a design-oriented perspective. I am employing the term in a manner akin to how it has been utilized by researchers like Krippendorff (2005), Nelson and Stolterman (2014), and Norman (2016).

3. This study was then conducted as a result of this effort.
4. The items used regarded the respondent's educational attainment; their current Tech-Com department area and their current role whitin Tech-Com (See Table 3).
5. All four Inter-Item Correlation Matrix for my scales are presented in the Appendix section.
6. Being: (1) Personalized Skill Development, 92) Accessible and Amiable Learning Spaces, (3) Task-oriented and Satisfying Learning Experiences, and 4) Purposeful and Compelling Learning Content
7. It is worth highlighting that my approach diverges from design methodologies that adopt a techno-rational perspective, which tend to prioritize the direct functional capabilities of design artifacts, such as their ability to improve efficiency. However, this perspective often overlooks the meaningful aspirations and perspectives of stakeholders, which was the purpose of my investigation.
8. It is important to note that when the interviews were conducted, the COVID-19 pandemic has forced the paternal company to resign ≈ 40% of the staff.
9. Depending on the outcome of the inter-item correlation test, one item needed to be removed.

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ORCID

Adam Palmquist http://orcid.org/0000-0003-0943-6022

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Appendix

Table A. Inter-Item Correlation Matrix

Inter-Item Correlation Matrix			
	Hedonic1	Hedonic2	Hedonic3
Hedonic1	1.00	.138	.191
Hedonic2	.138	1.00	.436
Hedonic3	.191	.436	1.00
	Utilitarian1	Utilitarian3	Utilitarian2
Utilitarian1	1.00	.231	.157
Utilitarian3	.231	1.00	.336
Utilitarian2	.157	.336	1.00
	ContentGAM2	ContentGAM3	ContentGAM1
ContentGAM2	1.00	.357	.139
ContentGAM3	.357	1.00	.177
ContentGAM1	.139	.177	1.00
	StructureGAM2	StructureGAM1	
StructureGAM2	1.00	.273	
StructureGAM1	.273	1.00	

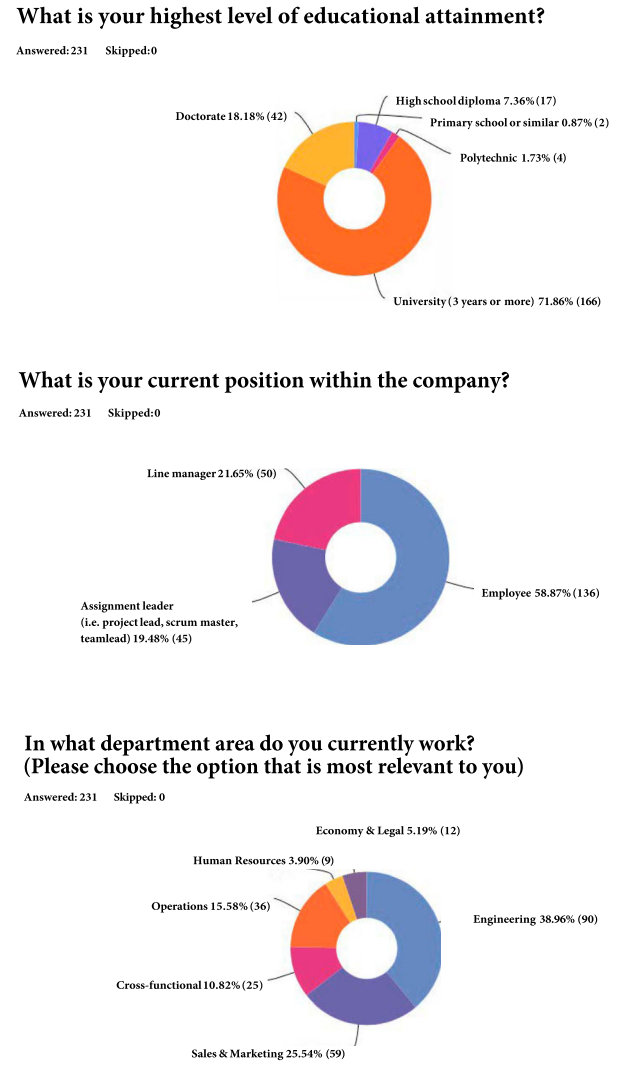

Figure A. Stakeholder questions and outcomes used in the presented study.

Through the Mahalanobis distances test, it was found that there were multivariate outliers with a breadth of 37.07. This is higher than the critical range of 18.47 needed for a MANOVA with 4 dependent variables (Tabachnick, Fidell, and Ullman 2007). Since my range was 37.07, it indicated the presence of multivariate outliers in my data file. Further investigations were required to determine the number of cases involved and how much they differed from the remaining cases. During my examination, I discovered that two respondents had scores higher than the critical value, which were 36.97 and 37.18, respectively. After removing these outliers, I reran a Mahalanobis distance test, giving the range of 16.51, within the critical range of 18.47 for conducting a MANOVA with 4 dependent variables (Tabachnick, Fidell, and Ullman 2007).

Table B.

Mahalanobis Distance (multivariate outliers included)		
N	Valid	231
	Missing	0
Mean	3,98	
Median	2,71	
Std, Deviation	4,10	
Range	37,08	
Minimum	,10531	
Maximum	37,18	
Mahalanobis Distance (multivariate outliers excluded)		
N	Valid	229
	Missing	2
Mean	3,76	
Median	2,70	
Std, Deviation	3,32	
Range	16,51	
Minimum	,10531	
Maximum	16,61	

Aguinis, Gottfredson, and Joo (2013) recommended presenting research findings with and without outliers. By doing so, readers are empowered to make informed decisions about which results they consider more relevant or accurate, reinforcing transparency and maintaining a high standard of data integrity. In the context of the study, the two MANOVA analyses, MANOVA 1 and MANOVA 2, differ in terms of the inclusion or exclusion of two outliers (36,97 & 37,18). Comparing the results between the two analyses yielded the following: The influence of outliers, whether included or excluded, does not significantly alter the baseline value of the dependent variable (the Intercept) across various groups or conditions. Equally, the role at Tech-Com demonstrates a consistent effect on the dependent variable, a fact that holds true irrespective of the outlier inclusion or exclusion.

Intercept:

- MANOVA 1, which includes the outliers, has a slightly smaller Pillai's Trace value for the Intercept (.008) compared to MANOVA 2 (.012), indicating a larger effect size in the second analysis.
- However, in both MANOVAs, the Intercept effect is not statistically significant, as indicated by the high *p*-values (.776 and .621 for MANOVA 1 and MANOVA 2, respectively). This suggests that the baseline value of the dependent variable does not significantly differ across groups or conditions.

Table C. MANOVA 1 & MANOVA 2

MANOVA 1 (including the two outliers (36,97 & 37,18))							
Effect		**Value**	**F**	**Hypothesis df**	**Error df**	**Sig.**	**Partial Eta Squared**
Intercept	Pillai's Trace	.008	.445b	04.00	216.00.00	.776	.008
	Wilks' Lambda	.992	.445b	04.00	216.00.00	.776	.008
Role at Tech-Com	Pillai's Trace	.066	14.58	08.00	434.00.00	.068	.033
	Wilks' Lambda	.935	1.851b	08.00	432.00.00	.066	.033
MANOVA 2 (excluding the two outliers (36,97 & 37,18))							
Effect		**Value**	**F**	**Hypothesis df**	**Error df**	**Sig.**	**Partial Eta Squared**
Intercept	Pillai's Trace	.012	.660b	04.00	214.00.00	.621	.012
	Wilks' Lambda	.988	.660b	04.00	214.00.00	.621	.012
Role at Tech-Com	Pillai's Trace	.065	14.33	08.00	430.00.00	.073	.033
	Wilks' Lambda	.935	1.821b	08.00	428.00.00	.071	.033

- The partial eta-squared values (.008 and .012) indicate that the Intercept explains only a small amount of variance in the dependent variable in both analyses.

Regardless of whether the outliers are included or excluded, the baseline value of the dependent variable (Intercept) does not significantly differ across groups or conditions. The effect size for the Intercept is small, indicating that it explains only a small amount of variance in the dependent variable.

Role at Tech-Com:

- MANOVA 1, including the outliers, has a slightly larger Pillai's Trace value for the Role at Tech-Com effect (.066) compared to MANOVA 2 (.065), indicating a smaller effect size in the second analysis.
- However, in both MANOVAs, the Role at Tech-Com effect is marginally significant ($p < .05$), as indicated by the lower p-values (.068 and .073 for MANOVA 1 and MANOVA 2, respectively). This suggests that the different roles at Tech-Com influence the dependent variable.
- The partial eta-squared values (.033) are the same for both MANOVAs, indicating a consistent amount of variance explained by the Role at Tech-Com effect in both analyses.

The Role at Tech-Com has an influence on the dependent variable, irrespective of whether the outliers are included or excluded. The effect size for the Role at Tech-Com is moderate, suggesting that it explains a moderate amount of variance in the dependent variable. The differences between the MANOVA 1 & 2 analyses primarily lie in the effect sizes for the Intercept and Role at Tech-Com, while the overall interpretation of the findings remains consistent.