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ORIGINAL RESEARCH

Design Elements of Conflict: A Design Study of a Gamified Smartphone Application for Employee Onboarding

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Abstract
Gamification, the use of game-like elements in non-game contexts, has gained popularity in the field of human resources. However, little research has been conducted on the use of gamification in the employee onboarding process, specifically in terms of socializing and assimilating new employees into an organization. This study aimed to explore the design, development, and implementation of a gamified smartphone application for employee onboarding in a manufacturing company. Ethnographic data was collected over the course of 60 weeks through participation at various field sites and analyzed using thematical analysis with a human-centered design focus, examining the meaning attributed to the gamified application by different stakeholders within the organization. The results showed that different stakeholder groups attributed different and sometimes conflicting meanings to various design elements. The key finding was the identification of four bipolar design dimensions that both supported and hindered the design among stakeholders. These findings have both academic and practical implications for the design of future gamified employee onboarding tools in large enterprises.

Keywords Gamification · Content-structural gamification · Hedonic–utilitarian dimensions · Employee onboarding · Design elements · Stakeholder

1 Introduction

Society's labor market is currently evolving to oversee a future in which demographic shifts, globalization, climate change and rapid technological advances will become the norm. For the workforce to adapt to this novel order, it has been argued that lifelong learning, the constant process of acquiring new skills and develop abilities through-out a individual's life must be mandated to keep people relevant and employable (OECD, 2021).

As the workforce adapts to an increasingly dynamic job market, career changes are becoming more frequent, and this has led to increased focus on the processes of employee onboarding. Employee onboarding refers to the process that transforms newly hired into

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employees (Kammeyer-Mueller & Wanberg, 2003). It is a process in which new employees learn the values, norms, and behaviors that are expected of them within an organization. The employee onboarding process is valuable for helping new employees to become integrated into their new organization, learn about its culture and values, and become productive members of the team. The onboarding process is a resource-consuming and critical phase, since new employees have to familiarize themselves with the work culture and adapt to the workflow during this period in order to become efficient members of the organization (Caldwell & Peters, 2018). If this familiarization is absent, there is an increased risk that the recruit might resign (Kammeyer-Mueller & Wanberg, 2003). Therefore, to retain recruited talent, organizations immediately take steps to transform the new employee into a member of the organization who understands its social culture and attributes meaning and sense to the work environment (Becker & Bish, 2021; Klein & Heuser, 2008).

A successful employee onboarding process requires organizations to ease new employees' apprehensions during the transition period by helping them make sense of the new work environment and providing sufficient resources, both implicit and explicit, as employees transition into new roles (Klein et al., 2015). Presently, organizations deploy various employee onboarding approaches to facilitate new employees into becoming members (Albrecht et al., 2015; Klein et al., 2015; Saks et al., 2007). As in several other human resource management (HRM) activities (Bina et al., 2021; Thomas et al., 2022; Vardarlier, 2021), gamification has been increasingly applied in employee onboarding as a way to engage and motivate new employee and facilitate their learning and integration into the organization (Callan et al., 2015; Vardarlier, 2021). Thus, gamified employee onboarding is a process in which game design elements, the various components that make up a game, including the mechanics, rules, challenges, and feedback systems that all shape the player experience, are integrated into the employee onboarding process to enhance new employees' initial work period at the company to expedite their integration into the team. This can be done with various approaches, for instance, providing task-based missions, e.g., completing a set of employee training modules) but also using weekly challenges such as building a network at the workplace lunch with all the department co-workers or understanding company values and culture. Completing these missions or challenges rewards points, levels, or badges as incentives for the new employees to continue acclimatizing to the work environment. Even though gamified employee onboarding is a widespread practice in contemporary workplaces (Callan et al., 2015; Vardarlier, 2021) and gamification practitioners have accomplished the integration of gamification elements into employee onboarding processes since the early 2010s (Zichermann & Cunningham, 2011), academic research on this phenomenon is limited and lacking empirical investigations, especially on how to design gamified HRM technology (Thomas et al., 2022), which may contribute to the mixed results seen in workplace gamification studies. For instance, contemporary there are limited implications for making adequate design decisions for gamifying activities in the HRM context (Callan et al., 2015), and the mixed results from workplace gamification (Landers, 2019; Larson, 2020) may be due to a lack of empirical research on the design gamified technology (Thomas et al., 2022). Scholars argue that more research is needed to understand better the mixed results concerning gamification in HRM and that a first step would be to improve understanding of the influence of design elements in gamification artifacts (Bina et al., 2021; Thomas et al., 2022). Moreover, it is widely recognized that organizations are composed of diverse stakeholders with varying interests (Freeman et al., 2010) including the ongoing digital transformation of the workplace. As a result, these stakeholders have a vested interest in organizations implementing gamified technologies (Morschheuser et al., 2018; Shahri et al., 2019). Despite the widespread adoption of

gamified employee onboarding in contemporary workplaces, little is known about how the interests of various stakeholders affect the design of gamified HRM technologies. Without this deeper understanding, it becomes challenging to make informed decisions on the design and implementation of gamified employee onboarding processes. To better understand the perspectives and motivations of these stakeholders regarding the adoption and implementation of gamified technologies, further research is necessary.

2 Related Work

2.1 Gamified Employee Onboarding

An abundance of conceptual-, but diminutive empirical research has been conducted regarding the usage of gamification in employee onboarding. Although empirical investigations have indicated positive outcomes, several limitations have also been highlighted, such as insufficient description of the gamification designs that generated positive outcomes (Depura & Garg, 2012), high context-dependency and less transferability (Miller et al., 2018), undefined participant samples in terms of size and demographics (García et al., 2018), or the gamification artifact being displayed in its early development stages (Heimburger et al., 2019).

However, a conceptual paper that discussed the concerns that may arise from implementing gamification in employee onboarding particularly emphasized its design element, especially the predicament of choosing the optional game elements to achieve implementation goals due to limited implications for making adequate design decisions (Callan et al., 2015). This argument finds support in adjacent human resources domains. A systematic literature review of 35 articles related to gamified recruitment and selection identified the prevalence of mixed results regarding its outcomes (Bina et al., 2021). The authors suggested that the reason behind this mixed result might be attributed to dependence on the limited empirical research on design elements—which are the building blocks of gamification (Bina et al., 2021)—indicating the need for future studies to focus on this issue. A similar proposition was stated in another systematic literature review of 37 articles concerning the current trends and future of gamification research in human resources (Thomas et al., 2022). Two recent literature reviews (Bina et al., 2021; Thomas et al., 2022) argued that more empirical research is required to better comprehend the high prevalence of mixed results in relation to gamification in human resources. These literature reviews emphasized that a reasonable first step would be to improve one's understanding of the influence of the various design elements in gamification artefacts.

2.2 Organizational Stakeholders

Different groups of stakeholders often have varying perspectives on organizational processes, particularly those involving significant changes like the current digitalization of the workplace (Freeman et al., 2010). Stakeholders are typically considered to be knowledgeable parties who have a vested interest in the context for which a design is intended. Transformative processes are also of particular concern to stakeholder groups as they can represent both opportunities and risks for the group's informal hierarchical position within an organization (Freeman et al., 2010).

With the rapid digitalization of the workplace, stakeholders have begun to express interest in technological design and development, attempting to utilize its benefits to their advantage (Johansson, 2017; Verhoef et al., 2021). Previous studies on the role and function of stakeholders in IT implementations have revealed a growing impact of stakeholders on an organization's digital environment (Mishra & Mishra, 2013; Nancy et al., 2016). This influence can be seen in areas such as the implementation of novel technologies (García-Sánchez et al., 2018; Hickman & Akdere, 2019). The gamification research field exhibits a rising interest in understanding the function of stakeholders when executing such a design in an organization (Ferreira & Roseira, 2020; Finckenhagen, 2017; Heijden et al., 2020; Jedel et al., 2021; Wang et al., 2022).

Finckenhagen (2017) emphasized considering the context and stakeholders when creating educational gamification artifacts. The study revealed that focusing solely on students as the key stakeholders was fruitless in designing the gamification experiences. It was found that other organizational stakeholders, such as administrators and educators, played a significant role in shaping the design and functionality of the gamification system. These stakeholders-imposed conditions on the system design that required revisions; not taking these needs and the interests of the other stakeholders into account, the gamification design artifact would not have been able to be implemented successfully (Finckenhagen, 2017). According to another study, gamification implementation in a corporate environment caused conflicts between management and employees. The researchers attributed this to a one-sided gamification design that prioritized the organization's interests over those of the employees (Gimenez-Fernandez et al., 2021). Unfortunately, many similar cases of one-sided gamification design are reported in the literature (see Kim & Werbach, 2016; Lay et al., 2021).

Ferreira and Roseira (2020) have posited that middle managers are crucial stakeholders in adopting gamification in the workplace. Middle managers are often vested with trust, responsibility, and authority and possess a unique understanding of the organization that is valuable in implementing gamification. Such tacit knowledge is not typically held by other employees or upper management, making Middle managers important assets in designing and promoting gamification initiatives within the organization and facilitating its endorsement of gamified technologies (Ferreira & Roseira, 2020).

Heijden et al. (2020) conducted an interview case study with nine gamification practitioners from six different organizations, conveying high implications for comprehending and responding to the interests of stakeholder groups when implementing gamification (Heijden et al., 2020). It showed that the accomplishment of a gamification design implementation seems to highly depend on whether it addresses the interests of various groups, such as learners, team leaders, and managers (Heijden et al., 2020). Similar findings were noted in another study, emerging from interviews with 14 experienced gamification practitioners (Wang et al., 2022) who agreed that a prolific approach for successful project realization involves integrating the design elements tightly into both the learning content and the course objective (Wang et al., 2022). It is essential to consider the needs of the employees. However, it is also important to consider the perspectives of other stakeholder groups, such as middle- and line-manager, and ensure that they understand and support the implementation of gamified technology in the workplace learning environment (Heijden et al., 2020; Wang et al., 2022).

Moreover, research by Vanduhe et al. (2020) and Smy et al. (2020) emphasizes the importance of usability and technological fit in the training environment for stakeholders to accept gamified technologies successfully. Both studies suggest that a good match with the organization's digital infrastructure and valuable components for employee training are

essential factors in various stakeholders' adoption of gamification. It has also been argued that when, implementing gamification, one should also consider the organizational context of the stakeholder groups when preparing a gamification implementation (Dale, 2014; Heijden et al., 2020). It seems that organizational stakeholders function as they can either facilitate or hinder a gamification project. Neglecting the prerequisites and perspectives of these groups might risk disrupting the already complex implementation process (Morschheuser et al., 2018; Shahri et al., 2019). Therefore, it is crucial to carefully consider stakeholder groups' opinions and attitudes and make sure to design a gamification implementation that meets their needs to be effective in an organization.

While gamification has been shown to be an effective tool for engaging and motivating employees in various HRM contexts, there is a lack of research on how different gamification design elements are perceived by different stakeholder groups when considering the use of gamification for employee onboarding. Given the limited research on the design elements of gamification in the context of employee onboarding, it is important to examine the preferences of different stakeholder groups in real-world contexts. This is particularly relevant when considering the use of gamification for employee onboarding, as different stakeholder groups (e.g., employees, team leaders, and managers) may have different preferences and needs when it comes to the use of gamification.

By understanding the perspective, conditions, and destinations of different stakeholder groups, scholars and practitioners can better tailor the design of their gamified employee onboarding that emerge meaningful for the parties affected. Elevating the understanding can lead to more successful and impactful employee onboarding, resulting in improved socialization, engagement, and workplace satisfaction among new employees. The following research question (RQ) has guided the present investigation: *What relationship can be seen between stakeholders' meaning attributions for design elements in gamified employee onboarding?*

3 Theoretical Framework

Originating from a philosophical and semantic background, Klaus Krippendorff (2006) defined design and designers' work as a matter of creating meaning rather than artifacts. Krippendorff (2006) argues that the interaction between stakeholders with an artifact is as important to the design discourse as the artifact itself or the designer's intention in creating it. Designers must consider the needs and desires of their artifact's stakeholders. Krippendorff's (2006) stakeholder-centered approach to design emphasizes the creation of meaningful design artifacts that address the various ways in which stakeholders engage with and make sense of the artifacts. According to this approach, the purpose of design is not just to "change an existing situation into a preferred one" (Simon, 1996, p. 35), but to appraise several "stakeholders' paths from the present toward desirable futures" (Krippendorff, 2006, p. 29).

To consider the possible and desirable futures and/or avoid possible undesirable futures that make sense and meaning for stakeholder groups, designers must gain a *second-order* understanding of the stakeholders and their context. In order to gain a second-order understanding of how the design artefact might impact the stakeholders, it is essential to consider the various ways in which stakeholders interact with and make sense of them. Krippendorff's (2006) consider the four broad concepts for this:

- *Meaning of artifacts in use,* designers can understand how stakeholders interact with and make sense of a design artifact's intended and actual practices (Krippendorff, 2006). This can help designers identify any potential misunderstandings or misalignments between the intended and actual use of the artifact and make adjustments to meet the needs and goals of stakeholders better.
- *Meaning of artifacts in language* refers to the semantics and nomenclature surrounding a design artifact (Krippendorff, 2006). By considering this aspect, designers can ensure that the language used to describe and communicate about the artifact is clear and accurate and that it aligns with the understanding and expectations of stakeholders.
- *Meaning in the lives of artifacts* refers to the role that culture and norms play in the introduction and adoption of a design artifact (Krippendorff, 2006). By considering this aspect, designers can understand the cultural context in which the artifact will be used and ensure that it aligns with the values and expectations of stakeholders.
- *Meaning in the ecology of artifacts* refers to the relationships between a design artifact and the other existing artifacts in its intended context (Krippendorff, 2006). This concept highlights the importance of considering how a design artifact will fit into the broader system or ecosystem in which it will be used. For example, if a designer is creating a new smartphone application for a company, they should consider how the application will integrate with the company's existing information systems and technologies. If the application does not fit seamlessly into the company's existing ecosystem, it may be less likely to be adopted and used effectively.

Krippendorff's (2006) four concepts provide a framework for understanding the diverse ways in which stakeholders engage with the design and how their actions and understanding of design artifacts can shape the outcomes of design projects. By considering these concepts, designers can develop an understanding of stakeholders' conditions and desires and work with them to create design solutions that meet their needs and goals. This stakeholder-centered approach recognizes the agency of stakeholders and can lead to more successful and meaningful design outcomes that have a positive impact on the lives of stakeholders. It is particularly important in the field of information technology, where top-down technical problem-solving may not provide the necessary guidance for involving individuals, organizations, and communities with stakes in a design (Burek, 2015). This 'turn' from a technical-rational problem-solving conception to a stakeholder meaning-making conception has been recognized by scholars in interaction design and human computer interaction (Nelson & Stolterman, 2014; Norman, 2016).

Moreover, according to Krippendorff (2006), designers should recognize that the meanings, perceptions, and affordances associated with their design artifacts are always uncertain. Misinterpretations and unintended consequences can lead to unforeseen breakdowns in the meaning of an artifact—a "disruption of meaning" (Krippendorff, 2006). For example, ignoring the cultural context in which an artifact is implemented can cause difficulties. When stakeholders' meaning-making fails, they may not understand why. However, for designers faced with stakeholders who experience a disruption of meaning, it is important to find explanations for it and consider how to modify or replace the artifact narratives with a more viable one for the context. Nevertheless, this new narrative will only hold up until the next disruption occurs. Instead of resorting to temporary solutions, designers should examine the stakeholders' misconceptions and meaningful attributes aiming to prevent future disruptions (Krippendorff, 2006).

Krippendorff (2006), argue that it is important to understand that designers should not assume authority over how their designs will be used. Instead, they should consider the

various narratives that users may bring to the design artifact and try to address the narratives that might disrupt stakeholders' meaning-making in untested situations.

Krippendorffs (2006) design philosophy as a creation of meaning for the stakeholders of the artifact, by building a relation between the design object and its intention, has been adapted but also developed in several fields having a design interest. Zelenko and Bridgstock (2014) used Krippendorff's (2006) concepts to develop a framework for work-integrated learning experiences that focuses on helping students develop the responsiveness required to navigate the rapidly changing modern workplace. The framework incorporated principles from Krippendorff's (2006) to encourage students to view their professional identities as design artefacts moving through meaningful design cycles. Zelenko and Bridgstock (2014) highlighted the value of providing agency and autonomy for successfully communicating the meaning to the students. The authors proposed several meaningful principles for supporting the students, including attributes such as agency, critical and leadership capacities, and self-reflexivity (Zelenko & Bridgstock, 2014). Moreover, Zelenko and Bridgstock (2014) suggested that structuring the learning content around meta-level concepts, which are not tied to specific practices, allows for reusing these concepts across multiple contexts and fields.

Borgefalk (2021) used Krippendorff's (2006) ideas meaningful design artefacts for designing services as persuasive systems, with the goal of influencing people's behaviors and attitudes. The two design projects were for an anti-bullying and planet-centric business development. The author discussed two design projects in the light of the concepts from Krippendorff and how they could be applied in persuasive system service design (Borgefalk, 2021). Borgefalk (2021) determined that to effectively deliver meaningful service design concepts, they needed to be repackaged in narratives and metaphors understandable for the context and culture.

4 Methodology

4.1 Method

The literature implies that the domain of gamified employee onboarding remains relatively unexplored. Due to the limited number of studies conducted on digital and gamified onboarding, the current research employs an exploratory design ethnographic approach (Baskerville & Myers, 2015; Crabtree et al., 2012), leaning into the methodology of ethno-design (Rapp, 2020). Design ethnography is habitually employed in the initial stages of a design process when grounded research is required to understand individuals in specific settings. For instance, human–computer interactions frequently employ design ethnography to investigate a social context, generating design implications for such a situation (Shin & Odom, 2019).

Notably, the relatively novel practice of ethno-design takes inspiration from biomimicry (Rapp, 2020), which involves scrutinizing existing or ascending designs for insightful patterns to generate new artifacts in other contexts. The ethno-designer fieldwork compromises on identifying an artifact's design elements, instead focusing on understanding their functions, properties, and producing design implications to create novel technologies (Rapp, 2020). Design ethnography utilizes ethnographic methods to gain insights that inform design. These insights are traditionally drawn from observing habitants perform their daily practices in a selected setting (Crabtree et al., 2012). However, the ethno-design

method is more interested in identifying and analyzing specific design elements, which is the "core component of the ethno-design practice" (Rapp, 2020). Thus, an ethno-designer's lens is more concentrated than that of a design ethnographer's. It excludes the comprehensive understanding of a setting's social activity and culture and, instead, includes a comprehensive description of a setting's design element—which is of specific interest to the ethno-designer (Rapp, 2020).

Ethno-design originated from gamification design research that were conducted to identify the design elements of entertainment games that could implicate design in a gamification context (Rapp, 2017). Compared to design ethnography principles, the design element assembled through fieldwork in ethno-design is a specific type of design knowledge that has implications for design in novel technologies or contexts (Crabtree et al., 2012). An ethnographic design approach toward identifying and understanding design elements requires the ethno-designer to have a flexible footing regarding theoretical and methodological approaches in order to adapt, fuse, and even exceed these approaches to fit the context (Salvador et al., 1999). The ethno-design approach employed in this study assesses four micro-field sites, all of which co-exist in a larger setting, by employing data collection techniques—such as participant observation (Norman & Lincoln, 2017), semi-structured interviews and focus groups (Lazar et al., 2017), artifact analysis (Plowright, 2011), and data mining (Aalst, 2016)—providing a rich ethnographic record to analyze themes (Braun & Clarke, 2006) through the lens of content and structural gamification (Kapp, 2012; Reigeluth et al., 2016) as well as utilitarian and hedonic dimensions (Hamari & Koivisto, 2015; van der Heijden, 2004).

5 Materials

5.1 The Research Setting

The current study presents a case in which a gamified mobile application was developed in collaboration between a gamification studio (pseudonymized as Tungsten) and a manufacturing company (pseudonymized as Scandium). Scandium, founded in the 1910s, is a manufacturing corporation that employs around 45,000 individuals in over 100 manufacturing units. It has an industrial distributor network of over 17,000 distributor locations in 130 countries, making Scandium one of the largest public companies in the world. The design artifact in this study is a gamified smartphone application (pseudonymized as Mercury) aiming to assist new employee onboarding and socialization in the Scandium enterprise.

The Gamification of Automation stRategies For InDustry 4.0 (GARFIElD) was outlined to address the rapid workforce transition that occurred as an effect of the prompt digitalization of the production industry, referred to by the neologism "Industry 4.0/5.0." The project examined different methods to construct a functional, standardized, and scalable gamification process to increase completion and decrease dropout rates in different workplace learning situations, such as corporate training and employee onboarding. In GARFIElD, together with the University of Skövde, Tungsten aided various organizations in designing and developing several gamified solutions for workplace learning. The article's author was affiliated with both Tungsten and the University of Skövde. In the present research, Tungsten assisted the manufacturing company, Scandium in designing, developing, and implementing Mercury, a gamified smartphone

application for employee onboarding. My role in the Mercury project was primarily to observe, collect, analyze, and evaluate data.

The Mercury project commenced in the spring of 2019 with three participatory design workshops between Tungsten and Scandium. Tungsten's design and development of the smartphone application were executed during the summer and fall of the same year. Mercury alpha tests with Scandium personnel were conducted in January 2020, following which the beta stage commenced in February of the same year. Between May and July 2020, Mercury had its initial trial at Scandium. The employee onboarding learning content for the application was developed by Scandium's human resources department and an external communication agency. The primary purpose of the gamified application was to elevate the employee onboarding experience by functioning as a guide for new employees. The employee onboarding application aimed to increase job satisfaction among newly hired employees in the short term, decrease turnover rates, and retain new recruits in the long term. The expected result was that the employees would have a higher chance of completing the formal employee onboarding if the material was gamified compared to if it was not.

5.2 The Gamification Platform

The design and development of Mercury, the design artifact, is the focal point of this study. This smartphone application visualizes employees' progression in their onboarding journey (Fig. 1).

The Mercury front-end was developed using white-label software, connected through an application programming interface (API) to a gamification cloud platform. The API links the white-label application with the gamification platform library through an API key, which separates gamification logic from the information technology's internal logic. Thus, the software combined with the API has a distinctive arrangement within the platform's framework that connects it with the API key. The API uses event-driven architecture to promote the production, detection, and consumption of—and reaction to—user-created events, which take the form of streams of messages meant for specific actions in a system for different monitoring purposes. The API is powered by event reporting, structured as explicitly pre-designated user action(s), which makes the gamification design react and provide feedback in response to user action.

The configuration allows for the hosting of multiple interfaces and design artifacts while simultaneously giving each client the ability to adapt and modify their design without affecting the designs of other clients. The standardization provided by the API simplifies the interoperability between the information technology and the gamification platform. The event scheme—termed as the behavior table—is documented in the API library.

The artifact host must tag the designated events for the API to detect them. If the events have API tagging, they are first filtered and separated from other events and then compared against the API behavior table, which resends them to the host artifact, effecting a visualization in the front-end components (game mechanics). The API connects the gamified artifact event library with the gamification library through an API key, that separates the gamification logic from the artifact's logic. The gamification API can have several appearances, depending on the information technology presentation layer.

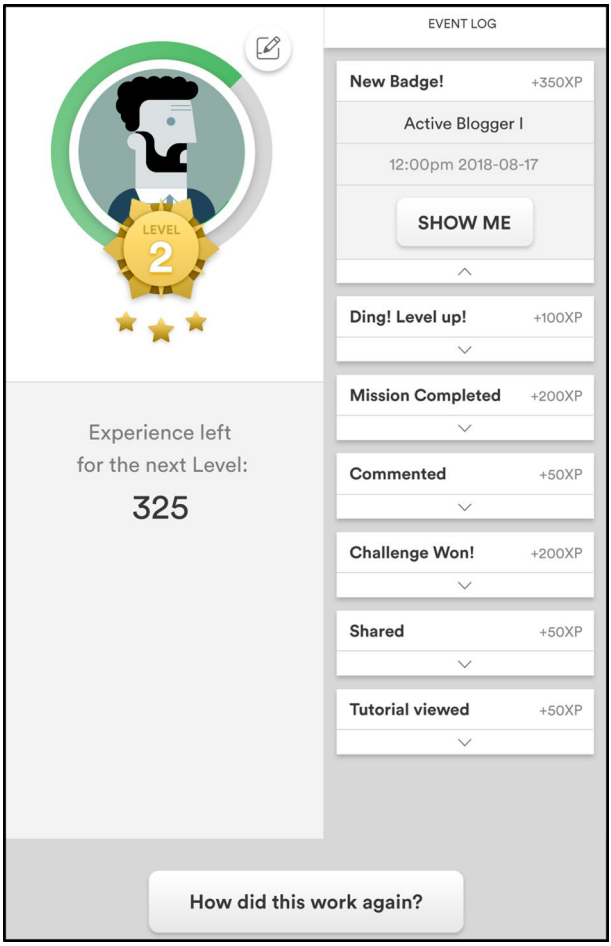

Fig. 1 Mercury displaying the avatar and level progression

5.2.1 Mercury—A Gamified Smartphone Application for Employee Onboarding

Scandium's employee onboarding was gamified through a smartphone application, branded with the company colors, logotype, and font, which visualized the progression of employees in their onboarding journey (Fig. 2). The implementation of the application gave the employees an introduction to Scandium as well as its vision and mission, which were visualized in the form of a mobile game map involving different employee onboarding tasks.

The employee gained experience points (XP) on completing a task. When employees completed all the required tasks to reach an achievement, they were rewarded with XPs. These XPs were needed to advance through the levels, that were designed to depict the course of the employee's progression. The achievement module, based on different goals and visualized by different icons (Fig. 3), served as the backbone of the gamification design.

The achievements were designed to engage the employee in completing different employee onboarding tasks in the application. When all criteria for an achievement were met, the box related to the specific task was checked. There were distinctive achievements

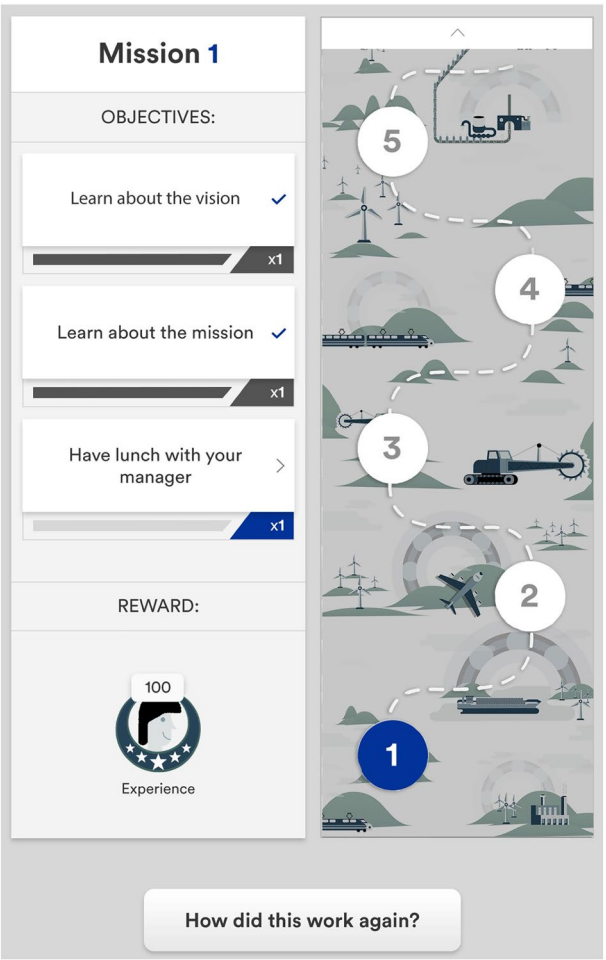

Fig. 2 The progression map with the mission objectives (i.e., employee onboarding assignments)

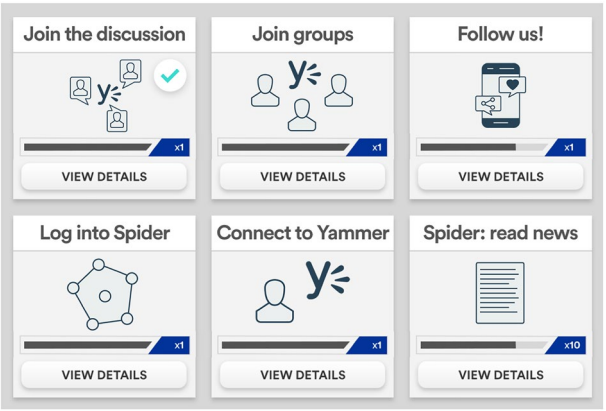

Fig. 3 Some of the achievements in Mercury

listed in the gamification design, such as finishing quizzes (Basic Quiz) and visiting the intranet several days in a row (Visit Spider). These achievements were framed according to the employee behaviors that the Tungsten gamification designers had identified together with a co-design stakeholder group during the participatory design workshop, which were deemed essential for improving the employees' probability of prompt socialization and organizational compliance. This design, therefore, resonated with the implementation aim of increasing employee socialization.

The Mercury design focused on employee socialization and compliance using several game design elements incorporated into modules (Table 1) categorized after *motivational affordances* by Koivisto and Hamari (2019). The modules were interconnected with each other design elements in the application. The epicenter of the application was a knowledge base specifically designed for Mercury, including Scandium's employee onboarding program, in a mobile learning format. The gamification design responded to the user interacting with the learning content in the knowledge base.

5.2.2 Research Sites

My fieldwork was conducted at Scandium from April 2019 to July 2020 at six sites within the Scandium setting to determine the preferred design elements for the mobile employee onboarding context. These six micro-cultures constituted the ethnographic record for informing future gamified employee onboarding designs (Table 2).

Table 1 The design elements in Mercury

Design elements	Category	Mercury module
Badges	Achievement/progression	Achievement
Progress bars	Achievement/progression	Achievement and mission
Experience points	Achievement/progression	Level
Levels	Achievement/progression	Level
Avatar	Immersion	Level
Map	Achievement/progression	Mission
Missions	Achievement/progression	Mission
Real-world events	Miscellaneous	Mission
Timer	Achievement/progression	Quiz
Quizzes	Achievement/progression	Quiz
Reminders	Miscellaneous	Tutorial
Onboarding	Miscellaneous	Tutorial

Table 2 The research sites in the study

Sites	Context	Method/data	Participants	Date
A	Three participatory design workshop(s)/Onsite	Participatory design workshops, participant observations/workshop artifacts analysis (design documents, evaluation protocols, and field notes)	6 (4 Scandium/2 Tungsten)	May–Sep 2019
B	Application of alpha testing/Onsite	Participant observations/video recordings	7 managers	Jan 2020
C	Zoom	Semi-structured interviews	4 new employees	Feb–Mar 2020
D	Onsite	Semi-structured interviews	2 team leaders	Feb–Mar 2020
E	Introduction material/Event log	Content analysis/data-mining event log	166 new employees	May–Jul 2020
F	Evaluation Meeting and Dialogs/Onsite	Artefact analysis (evaluation protocol) & interviews	2 employees from Tungsten	Sep–Oct 2020

5.2.3 Site A: The Participatory Design Workshop

Site A involves participant observations from three half-day participatory design workshops (see Bannon & Ehn, 2012) between Tungsten and Scandium. The first participatory design workshop (hereafter workshop) was held in May 2019, while the second and third workshops took place in June 2019 and September 2019, respectively. Six representatives from Scandium participated in the workshop—the project leader, the head of job rotation and employer branding, the head of social marketing, the head of learning at human resources, and an instructional designer. From Tungsten, a project leader and two gamification designers participated. The lead designer functioned as the workshop facilitator, while the attendant designer expedited the workshops. The author of this study also performed participant observation and then took part in the workshop as well but was not actively involved in the co-design process. The workshops explored, examined, and analyzed the manufacturing company's employee onboarding conditions.

All workshops were outlined similarly, with a facilitator—the gamification lead designer-directing and overseeing the process and distributing different exercises to the participants. The first workshop began with a presentation on gamification by the facilitator, who stated that "gamification uses elements from games in a nongaming environment to increase user engagement." The workshops had three distinct themes, all associated with the forthcoming gamification employee onboarding artifact:

- Current situation analysis
- User-group analysis
- Goal-for-gamification analysis

The workshop exercises utilize were based upon interaction design and human–computer interaction techniques (Lazar et al., 2017; Preece et al., 2015), such as affinity diagramming, dot voting, prioritization matrix, and collaborative brainstorming in order to facilitate the sharing of participants' (tacit) knowledge within their areas of expertise. The primary goal of the exercises was to provide participants with the opportunity to actively engage with these techniques and apply them in a collaborative setting. All exercises were constructed following a similar pattern:

- An explanation of the exercise objective was provided by the facilitator
- Followed by a quiet ideation and post-it note writing session of 10–15 min (Fig. 4)
- The facilitator then started asking various reflective questions to the participants based on their post-it notes
- An open discussion on the topic ensued
- The attendant gamification designer recorded the discussions and asked follow-up questions for clarity

The facilitator's reflective questions concerned the participants' perceived notion of the target group's attitudes and opinions toward topics such as games and the group's digital experience. The facilitator also inquired about current obstacles in the existing employee onboarding program, considering the depicted target groups. Furthermore, the facilitator asked questions about Scandium's ambitions regarding the implementation of gamification and the performance indicators that should be evaluated when assessing its success. The

Fig. 4 Collaborative brainstorming at site A

workshop material was later assembled in the project's 20-page design document, which functioned as the foundation for the forthcoming gamification design (Fig. 5).

Tungsten regarded the design document, which consisted of their analysis of the users, context, and goals for the gamified onboarding, as the architectural plan for the project. Mercury's gamification design was admittedly an outcome of the workshops, while its purpose was to elevate the employee onboarding experience by functioning as a companion, increasing workplace satisfaction in the short term, decreasing turnover rates, and retaining recruits in the long term. These would be achieved by increasing new employees' knowledge about the company, thus making them feel invested in the organization.

5.2.4 Site B: Product Presentation Session

Site B includes reports from a product presentation session held at Scandium headquarters, denoted by an ethnographic record in the form of a 52-min video recording with seven department managers. The recording included a product testing session and a subsequent focus group session. This site was accessed in January 2020. The product presentation *session* included seven department managers at Scandium who were asked to provide

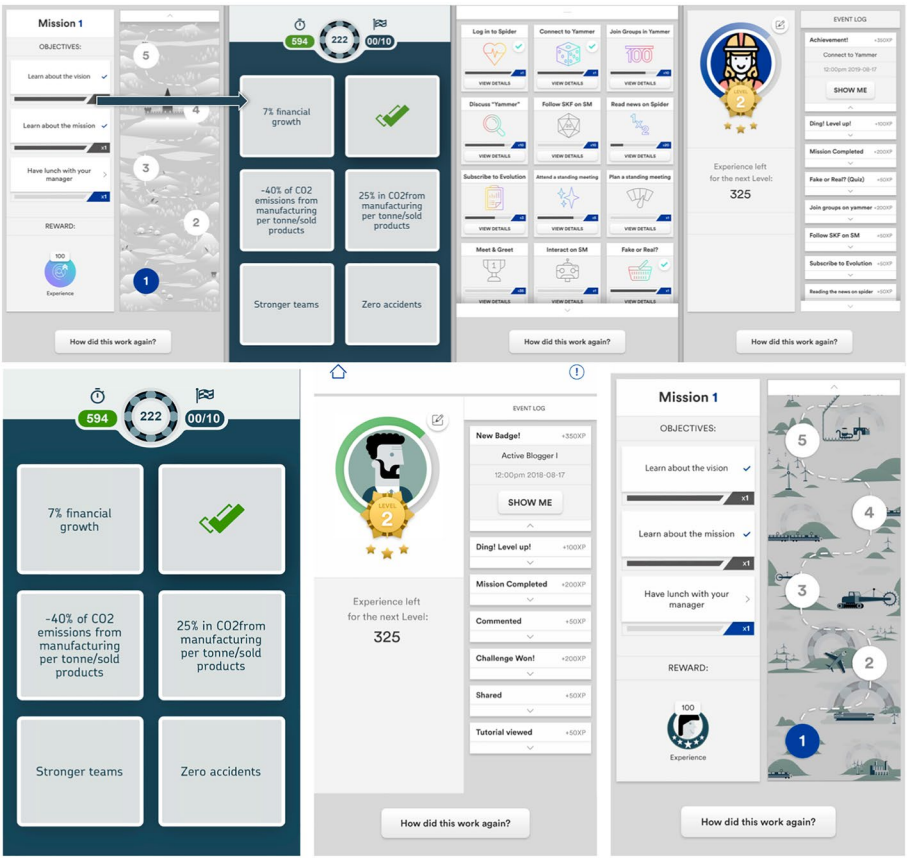

Fig. 5 Design documents showing early and late mock-ups of Mercury's graphical user interface

their opinions on Mercury and, if interested, sign up their department for a trial period that would commence in May of the same year (Site E). Besides the managers, the project leader and the lead designer (interviewed at Site F) from the co-design gamification groups facilitated and led the session.

Table 3 The four new employees

Pseudonymized name	Age	Work experience (years)
Daniella	43	19
Simon	29	10
Hans	38	16
Idris	29	6

5.2.5 Site C: Interviews with Selected Stakeholders from Beta Testing

Site C portrays the beta-testing period completed with a selected group of stakeholders. This site was accessed from February to March 2020. The data consisted of semi-structured interviews with four informants—newly recruited white-collar employees at Scandium (Table 3).

5.2.6 Site D: Interviews with Team Leaders

Site D portrays Mercury from the horizon of the team leader stakeholder during the beta-testing period. This site was accessed from February to March 2020. The data consisted of four semi-structured interviews with two informants who were team leaders (Table 4).

The ensuing discussion was related to Scandium's previous onboarding experiences and the participants' perception of the gamified application design. The final theme that emerged was the lack of specific information connected to the different departments and companies at large. Respondents 1 and 2 mentioned that it was a positive way of gathering information but that more information should have been included.

5.2.7 Site E: The Communication Agency and Mercury Trial Period

Site E reports on employment and the initial 3-month trial period. The ethnographic record provided introductory material, a video, a folder produced by an external communication studio, and descriptive metrics from 166 newly recruited employees to the application. The site was accessed from April to July 2020. During the last stage of this over a year-long project, Scandium hired an external communication agency to help facilitate Mercury's integration of the 166 volunteers, who worked in various Scandium offices across Scandinavia, for the test launch. The agency had previously been responsible for creating the user interface and graphic design for Mercury as well as for updating the employee onboarding content during the beta phase.

For the data mining approach, when organizing my mining algorithm, I set up a rule enfolding that automatically encrypted the raw data when it was collected, thus anonymizing the organized event log and its attribute values. The procedure retained the authentic event log attribute values, which were mapped onto a substitute value upon extraction from the SQL database through an automated scrambling process. This process ensured correlation between the attributes in one event to those in other events without comprehending the actual value.

The data mining was accomplished in compliance with General Data Protection Regulation (GDPR) restrictions, meaning that no IP addresses, free text, and demographic data were traceable. However, since anonymous data can be de-anonymized by combining data sources, I handled the event logs cautiously, even after anonymizing them. Therefore, the

Table 4 The interviewed leaders

Pseudonymized name	Age	Work experience (years)
Doris	33	8
Glenn	56	35

Table 5 Section of event logs

UserID	Timestamp	Event
d32aff4e-c53a-46a3-9f30-ffbf36616bf0	2020-05-27 07:30:27.432471	{'action':'enter','pageId':'2ca7c033-7ba0-41c3-8ab9-451b213f3eb2'}
278d17b3-8268-46aa-8d58-018085b827f7	2020-05-29 13:16:40.582897	{'action':'done','pageId':'2ca7c033-7ba0-41c3-8ab9-451b213f3eb2'}
034fcc4e-a950-4814-b120-dd182e51bf3a	2020-06-01 08:48:03.402796	{'action':'progressChange','courseId':'94a5b781-4c4f-4f09-922b-5ccd01e7f0c8','blockId':'b810f6db-8146-4bd6-8f9c-151361414b95','progressPercentage':3-3.33333333333333}
198cca62-7a83-45da-8da3-5990637c7d78	2020-06-03 13:00:11.792859	{'action':'view','courseId':'94a5b781-4c4f-4f09-922b-5ccd01e7f0c8','progressPercentage':'93.75'}
04fc1f0c-7df8-4f00-a402-e5cbcbc71c89	2020-06-11 06:50:31.639413	{'action':'done','courseId':'94a5b781-4c4f-4f09-922b-5ccd01e7f0c8','pageId':'3e6f5617-6ede-4917-b03d-0e517d4bac25'}
06e9f703-11bc-4c9d-ae1c-024f67076501	2020-06-11 16:11:44.229387	{'action':'enter','pageId':'417cceb7-35ef-47f5-a42a-85742e7294f8'}

event logs effectively provided me with the most rudimentary parameters: scrambled user ID, timestamp, and event (Table 5).

The data mined from the Mercury database consisted of information on the number of accounts created, individual user behavior, current user level, number of achievements completed, number of missions completed, and number of self-reports sent. The event data gathered from the trial period indicated that of the 166 new employees who volunteered to participate in the trial-period, 78 (≈47%) had downloaded Mercury.

5.2.8 Site F: Evaluation Meeting and Follow-Up Conversations

Site F includes reports from a project evaluation session a 76-min meeting with four Tungsten employees held at Tungsten's offices. Site F produced an evaluation protocol (artifact) and two recorded interviews. The interviewees were the Tungsten's—project manager and lead designer (Table 6), all of whom also participated in the evaluation meeting.

Site F was accessed from late September to early October 2020. The project evaluation meeting was a round-table discussion led by the project manager, in which the participants discussed themes such as perceived challenges, possible explanations, and learnings from the gamification project. The two interviews were conducted in the following weeks.

6 Results

Table 7 briefly presents the accentuated design elements from each site's stakeholder groups separately. The thematic correspondence between the design elements and the stakeholders is further extrapolated in Table 8. Their implications for the gamified employee onboarding design were examined in the discussion session.

6.1 Design—In Theory and In Practice

The self-reporting element was designed to nudge the user to reflect upon and evaluate the employee onboarding assignment after completion, thus providing the new employees with a meta-cognitive exercise. The gamification co-designers proposed the self-reporting element in the workshops based on several assumptions originating from a variety of factors, such as social cognitive (Bandura & Walters, 1977), sociocultural (Vygotsky, 1978), and constructivist theories (Piaget, 1977), that would enable new employees to monitor their progression through intentionality, consideration, self-regulation, and self-reflectiveness, thus increasing their sense of coherence as well as facilitating responsibility and workplace satisfaction. Self-reporting was deliberated by the co-design stakeholders as an appealing feature, since the analytics on how other new employees respond to this would afford a reflection on the new employees' work situation.

Table 6 The Tungsten employees

Pseudonymized name	Role	Age	Gamification work experience (years)
Serge	Lead designer	29	3
Jean	Project lead	31	1

Table 7 The design elements stressed by the stakeholders

Micro-culture stakeholders	Identified design element	
	Meaningful design elements	Meaningless design elements
Site A: co-design group	Structural gamification	Content gamification
	Hedonic dimension	
	Self-reporting	
Site B: managers	Tutorial	Self-reporting
	Missions	Hedonic dimension
	Structural gamification	Content gamification
Site C: newcomers	Tutorial	Structural gamification
	Content gamification	
	Achievements	Improved rewarding in the gamification
	Levels	
Site D: team leaders	Tutorial	Self-reporting
	Content gamification	
Site E: 166 volunteers	N/A	Self-reporting
		Game-language
Site F: mercury providers	Structural gamification	Content gamification
	Scalable Design Artefact	Restrained technological possibility

Table 8 Thematic correspondence between the design elements and stakeholders

Theme	Design element	Stakeholder groups
Design: in theory and in practice	Self-reporting	Manager
		Gamification co-designers
		Leader and employee
		Gamification provider
Employee learning or employee compliance?	Structural/content gamification	Manager
		Gamification co-designers
		Leader and employee
		Gamification provider
"Scandium is a traditional company"	Hedonic design dimensions (semantic/juiciness/playfulness)	Manager
		Gamification co-designers
		Leader and employee
Importance of a clear communication	Tutorial	Manager
		Leader and employee
Technological fit	Function	Gamification provider

The design element outlined in Mercury for this feature included reflective statements on recent assignments in the employee onboarding program, insights on Scandium as a company, and newcomer wellbeing, which had to be responded to through a 5-point Likert scale. Upon answering, the user gained a minor amount of experience points. However, the gamification co-designer's intention with this design element was not well received by the

management stakeholders, who regarded the self-reporting element as excessively complicated and difficult to comprehend:

> I do not understand the purpose behind it. After a few minutes, all I want to do is 'click-click-click' to get rid of it. I do not understand self-report […] I do not understand what is in it for me.

The stakeholder groups communicated that self-reporting slowed down the flow in Mercury and hindered rapid progression in the gamified onboarding. Moreover, they expressed that this element was not as comprehensible as the rest of the gamification design elements, which exhibited a 'more seamless' integration with Mercury. The self-reporting element was perceived as complicated and was deemed to consist of too many touchscreen interactions to be worth the effort. The data mining regarding the self-reporting module revealed that 27 of the 78 new employees ($\approx$35%) had not submitted any self-reports, while those submitted by the rest of the participants varied between 1 and 54 reports (Table 9), indicating a rather low interest among the new employees during the trial period. Nevertheless, the event data provided another insight—a clear outlier who reached level 368, which was far more than the other participating new employees (Table 9).

Table 9 Self-reports done in the trail-period

Self-reports	Number of users
1	6
2	4
3	6
4	4
6	3
7	3
8	2
9	5
11	2
14	1
18	1
19	2
22	1
23	1
24	1
26	1
27	1
31	1
39	1
41	1
48	2
52	1
54	1
808	1
Sum	52

This same user-id had submitted 808 self-reports. When I investigated the anomaly, it was revealed that the user had submitted the reports without completing the activities. This indicated that self-reporting as a design element could be used for abusive purposes in the absence of supporting features, such as cool-downs. Since this outlier did not affect the achievement mechanic, the user-id still had to complete a given mission to gain achievements, and not just self-report.

Moreover, the evaluation protocol for the Mercury application project noted that while the self-reporting module was based on a thorough review of research on metacognition and how to promote self-reflection through digital devices, it was challenging to incorporate these concepts in a gamelike way. The gamification providers recognized that the self-evaluation design element had potential as it provided additional tasks for the user to complete during the employee onboarding journey. Still, it was not as successful in the real-world context as they had hoped. It was determined that while the idea of self-reflection and metacognition was sound, the implementation of the module did not align well with the rest of the features in Mercury and had a different pacing than the other gamification design elements. To make the self-reporting module more effective, it would be necessary to better integrate it with the overall design and structure of the Mercury application.

6.2 Employee Onboarding Aimed at Knowledge or Compliance

The gamification co-designers considered structural gamification to be an essential design element to make Mercury as user-friendly as possible. Focusing on the structure instead of the content would make the application scalable and ready to be employed for usage in other departments at Scandium. The gamification co-designers stated that Mercury would be "easier to peddle" to the various department managers if it did not interfere with their own, more specialized employee onboarding material. At the same time, the co-design stakeholders agreed that content gamification would be difficult to effectively incorporate into various departments due to varying specialized materials.

The gamification co-designer's idea of determining structural and generic gamification design elements in Mercury appears to appreciate the management stakeholders. Structural gamification was deemed a prolific approach for connecting Scandium branches in other countries with Mercury. Therefore, Mercury had to be generic in order to fit Scandium's different branches and departments, communicating the company's overall vision, mission, objectives, and values to all new employees. The primary purpose of Mercury, the management stakeholders stated, should be to make employees a part of departments within the company quickly and enable them to construct networks within the corporation.

However, implanting structural gamification into Mercury in favor of comprehensive gamified content was not equally appreciated by the employee stakeholders, who described that the employee onboarding content soon became too superficial and generic to be of any help in their daily work. All of the newly recruited employees noted that the employee onboarding application lacked specific content connected to their departments and companies, emphasizing that the existing information was too broad. The stakeholders claimed that the micro-learning approach, involving one-pagers and quizzes, was initially joyful and innovative. Nevertheless, the more onboarded the group became, the more they sought profound learning content. These circumstances were stressed as a significant challenge, as the stakeholders needed more comprehensive content to perform their tasks properly:

> Starting using the app, I think it was uncomplicated […] The good thing about the app is that it informed me of what to do next. Defining the (onboarding) objectives has been very good. But now its missteps on things like exactly telling me who to contact.- Simon

Moreover, several employee stakeholders expressed that because of the lack of comprehensive information, they had stopped using the application when searching for information on Scandium, since more up-to-date information could be found elsewhere.

Furthermore, the Tungsten project evaluation protocol emphasized the importance of close collaboration with the department responsible for the smartphone applications content, but at the same time they stressed that the collaboration made them loose agency in the project, as they were becoming more dependent on the content provider. Even is this collaboration has functioned well, there were concerns regarding the upscaling of the project. It would become resources demanding if every department at Scandium would require a tailored employee onboarding material. The open-ended interviews with the Tungsten lead designer and project leader revealed that the gamification provider was hesitant to use employee onboarding content provided by external sources due to concerns about lack of control over the content outline:

> Last time, Scandium had a suitable onboarding content that they wanted to add a gamification layer. A ready-made concept and (onboarding) material that had been established and tested […] This upcoming project is something else. […] There is no content, which makes it much more challenging to do targeted gamification for a material you don't have seen and don't know if it will work on its own merits. - Jean, Project Leader

Using content provided by external sources can be challenging for gamification providers because they may feel they need more control over how the content is implemented. Such lack of control can create uncertainty and make it difficult for gamification providers to ensure that the content aligns with their goals and meets the prerequisites of their gamification design, which can be noted in the statement of the lead designer:

> You have to remember that a third-party (content) provider have a product that they offer and we are restricted by what they want to go for. That's how it is. - Serge, Lead Designer

The gamification providers require insight, adequate communication and cooperation with content providers to feel secure that the content provided can effectively be integrated into their gamification projects and achieve the client's desired outcomes. Establishing clear guidelines or agreements between the gamification and the content providers to ensure that the content is used in a way that is consistent with the gamification providers' vision and goals would be successful.

6.3 Importance of a Clear Communication

The management stakeholders displayed that the Tutorial feature, intended to help new employees navigate the application from the beginning, was considered a dynamic design element. The stakeholders deemed the element essential because Scandium's employee onboarding program was overloaded and suffered from content abundance. Due to Scandium's sizable and diverse workforce, a number of different nudge elements were necessary

to encourage new employees to complete their employee onboarding process. If Mercury were to be successfully incorporated into the corporate ecosystem, it would have to be easy to access and navigate, have straightforward instructions, and a clear intention, all of which were considered in the Tutorial feature. The management stakeholders expressed that the tutorial design element's explanatory purpose and friendly nudges functioned simultaneously as scaffolds and propellers, driving the employees forward in using the application. This design element was a significant feature for a large enterprise such as Scandium. Likewise, team leaders conveyed that they too found the Tutorial element favorable because it made the company structures more comprehensible for new employees and provided a more manageable information flow to them, compared to Scandium's intranet:

> You read about Scandium's mission, vision, and so on. The more you read, the more you realize how complex the company is. It is good to get help with what to focus on since you tend to drown in all the information otherwise- Doris

Moreover, the Tutorial element made tedious activities, such as memorizing the company values, vision, and mission, more comprehensible by providing a map that displayed the employee onboarding progression (see Fig. 2). According to the evaluation protocol and feedback from the lead designer, Serge, a key success factor for the Mercury application project was conducting participatory design workshops that involved several stakeholder representatives.

By involving the right people in the workshops and maintaining a good relationship with them, the project was able to benefit from diverse perspectives and expertise, leading to the development of a stronger and more effective application. This also facilitated the endorsement and adoption of the Mercury application by various stakeholders within the company. The relationship was noted as important especially during the trail-period of Mercury, as the provider sensed having support from the workshop representatives. According to the evaluation protocol, it was determined that would not be possible to just refabricate the stakeholder constellation, as it is not solely determined by professional roles, but that more care should be put into picking stakeholder workshop participants in the future.

6.4 "Scandium is a Traditional Company"

The co-design stakeholder's views on the hedonic dimensions of gamification were subjected to much discussion. In all the workshops, there was a persistent emphasis that using the gamification artifact had to be perceived 'as fun for the new employees'. The artifact needed to provide new employees with a different, more game-like experience than an ordinary onboarding. At the same time, there was a recurring statement that the artifact should not come out as "too fun," indicating that Scandium would not be pleased if the artifact design appeared eccentric. Nevertheless, during the workshop, there seemed to be some confusion within Scandium about exactly where this line should be drawn.

The management stakeholders were more concerned about their notion and acceptance of hedonic design elements than the co-design stakeholders. The former stressed that Scandium was "a traditional company" and that the Mercury application could not come through as something that appeared to be designed for teenagers, else they (and their department) would withdraw from the project. Instead, they suggested that the gamification elements should be designed as straightforward and uncomplicated as possible. Animations and visualization elements could be included, but it was strongly emphasized that such elements had to be discrete and could not be perceived as juvenile, due to Scandium's position

Fig. 6 A frame from Mercury's introduction video

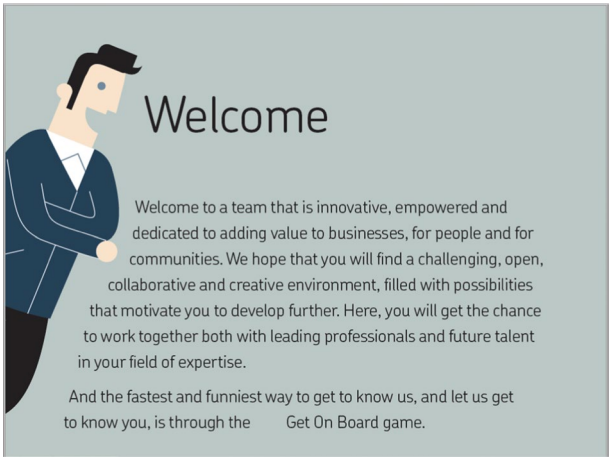

Fig. 7 Page 1 from Mercuries Information pamphlet

in the business field. The managers participating in the demonstration at Site B, however, seemed to approve of Mercury's hedonic dimension.

However, it would turn out that the hedonic dimension was not substantially dealt with yet, which was revealed on entering Site E, which involved the communication agency and the Mercury trial period. Initial communications were sent from the agency to the 166 volunteers who had signed up for the trial, approximately three weeks before launch. The email included a text depicting the purpose of the application:

> Scandium has developed a new way to onboard new employees, in addition to local activities. Our ambition is to have an onboarding experience that is exciting, modern, and fun. We have created a game […] The onboarding game is global. The target group is both white- and blue-collar…

The email also contained a link to a YouTube video and an information pamphlet about Mercury. The one-minute-long YouTube video exploited the game aspects of the employee onboarding application to a large degree, to the tunes of a Super Marioesque soundtrack with different cartoonish avatars bouncing around (Fig. 6).

At the same time, the subtitles described Mercury as a *game* that provides a fun way to learn about the company's values, history, products, assignments, leadership requirements, and also how to get acquainted with other colleagues.

The video ended with the tagline: "By the time you are finished, you will feel so at home that it feels like you have been here before. What are you waiting for?" The pamphlet contained the same cartoonish graphical tone with the same avatars providing additional information about Mercury, which was referred to as "the get onboard game" or simply "the game." The pamphlet described Mercury as a way for new employees to gain knowledge about the company, their team, and themselves: "The fastest and funniest way to know us and let us get to know you is through Mercury—Get on Board Game." (Fig. 7).

The communication agency's email, introduction video, and the pamphlet seemed to have created some tension at Scandium regarding Mercury, because the time afterwards and throughout the rest of the project was marked by a more reserved tone in the co-design stakeholder group; the atmosphere in their project meetings became more restrained and the previous unformal tone became formal. Moreover, analyzing the mined data provided additional information that suggested something was amiss. Of the 78 new employees, 51% had not progressed beyond Level 1, 54% had not completed Mission 1, and 65% had not received any achievement (Table 10).

A survey was sent out, but none responded. Depending on how Mercury had performed during the demonstration and beta-test periods earlier in the same year, it seemed that the low engagement could not entirely depend on the new employees' lack of appreciation for the employee onboarding application, since they had agreed to be a part of the trial. Based on the low attendance of volunteers in the Mercury trial, findings from Sites A and B, and informal talks with individuals from the gamification co-design team after the project ended, it was revealed that the introduction video and pamphlet in Site E seemed to have crossed the unstated, therefore vague, line for what the management stakeholders deemed acceptable in the organizational context.

Moreover, Mercury's hedonic dimensions were multifaceted, thus also affecting the newcomer stakeholders who displayed ambivalence toward the hedonic dimensions. For instance, the new employees expressed that removing the "gamelike fog (of war)" on the

Table 10 Levels, missions and achievements from the mercury trial

Level	Users	Mission	Users	Achievements	Users
1	40	1	42	0	51
2	10	2	11	1	10
3	10	3	9	2	4
4	3	4	2	3	4
6	6	5	1	4	1
7	1	6	2	5	5
8	3	7	1	6	2
9	1	8	1	9	1
10	1	0	3		**Sum: 78**
11	1	10	1		
12	1	11	2		
368	1	16	1		
	Sum: 78	17	1		
			Sum: 78		

map (Fig. 2) would improve their experience. Making the whole map observable and each mission viewable in advance would be an improvement. Expanding the map would also allow new employees to observe the tasks for upcoming days, thus giving them more control over their employee onboarding journey. The game-like overview regarding their employee onboarding process was deemed annoying and stressful.

At the same time, the employee stakeholders expressed that the current iteration of Scandium's gamified employee onboarding lacked vital game elements, such as competition and sufficiently enjoyable rewards, that would encourage participation:

> It is good with competing elements; it would become more motivating if more people started at the same time. Then it becomes shameful if you do not do it. I would do more if I knew that someone watched and followed up on what I was supposed to do with this. […] You do not do a lot in the game. The only thing is that you read a text, answer some questions, and self-report. - Hans

Hans' statement displays that he became less motivated to participate because Mercury did not include proper game elements, such as employee competition and leaderboards.

6.5 Technological Fit

The evaluation protocol for the Mercury application project identified several challenges faced by Tungsten, particularly in the tech department. As a provider of a gamification API rather than a white-label smartphone application, Tungsten faced an increased workload in the project, including the need to dedicate a special team to the Mercury project which caused delays in other gamification projects. Additionally, the coding and development for the Mercury project was found to be non-scalable, meaning that it could not be easily reused in other projects and required significant resources to maintain. As a result, the tech department determined that if a company that was seeking to implement gamification did not have the proper technological infrastructure and their gamification request needed to be implemented as a standalone product rather than integrated into an existing information system, the project may not be worth pursuing.

7 Discussion

7.1 Implications of Design Elements

In this section, I move from the stakeholder meaning-making themes records to a series of implications for the design elements identified when outlining the gamified employee onboarding technology. Each design implication refers to the meaning-making themes described above.

- Meaningful Design Element
- Meaningless Design Element
- Disrupting Design Element

Even though gamification is currently gaining attention as an attractive approach for employee onboarding, it is poorly understood. Thus, it is vital to substantially comprehend gamification to prevent unproblematized interpretation of employing it in real-world contexts. Accordingly,

this study used a design ethnography approach, analyzed through the content and structural gamification lens, to investigate and identify the design elements which could be considered beneficial by the company's various stakeholders. The analysis also discovered that the stakeholders had conflicting notions about the design elements of Mercury that could be considered beneficial, depending on their position in Scandium.

7.2 Meaningful Design Element

7.2.1 Tutorial

All the stakeholders in the study conveyed their approval of the Tutorial design element, since it was considered a beneficial feature for expediting organizational socialization. The step-by-step tutorial provided in Mercury was attributed meaningful by its various stakeholders, primarily for its contributions to improving the existing employee onboarding process in Scandium's departments. The employment of gamified tutorials to guide and assist new employees in learning about the company and growing faster into their roles was attributed to be of meaningful usage. However, there were some variances among the stakeholders in what the meaning-making consisted of. The management stakeholders declared the Tutorial as meaningful because Scandium already had an abundance of material in their employee onboarding program, wherein the design element was an efficient way for the new employees to receive tangible guides that propelled them through the foundational employee onboarding material in a step-by-step manner.

The leader stakeholders expressed that the Mercury tutorial made sense because it aided new employees by presenting the excessive and overwhelming amount of company information in the form of manageable pieces suitable for particular contexts and formats, thus being more meaningful than the previous method. Moreover, although the leaders expressed an affirming perspective toward the Tutorial design element, they doubted that it would contribute to quicker socialization for the new employees than the previous method. Rather, they depicted the Tutorial as a practical procedure for providing new employees with more suitable, defined, and uncomplicated knowledge about Scandium, compared to the overwhelming, redundant, and comprehensive information provided previously. Likewise, the Tutorial furnished meaning to the newcomer stakeholders as well, who stated that this design element provided them, what can be metaphorically described as, a pair of organizational support wheels which prevented them from falling off the bike during their initial period at Scandium—a period that has been deemed critical in employee onboarding for the recruited talent to stay in the company (Kammeyer-Mueller & Wanberg, 2003). Thus, the Tutorial functioned as both a banister and a trajectory during the initial phases of the employee onboarding process. However, during the later stages, the new employees expressed frustration at the Tutorial not developing at the same pace as they did, failing to provide sufficient informatization and aid during the later stages of their onboarding.

The co-design intention with the Tutorial element comes forth as an amalgamation of the meaning contributed by the three other stakeholders. It should function as a handrail for Scandium new employees, delivering small informative fragments concerning the company history, structures, processes, vision, and mission. Mercury's Tutorial was the design element that all stakeholders agreed upon. Even though the stakeholders contributed different meanings to the design element, the corresponding

ways that they suggested seemed to fit into the notion of gamified employee onboarding of all the stakeholders. There is a high probability that this meaning attribution has a contextual dependence, since Mercury is an employee onboarding application, which makes its guiding attributes relevant for the application's purposes.

7.3 Meaningless Design Element

7.3.1 Self-report

The design element's theme, both in theory and practice, depicts a direct critique of the self-reporting design element. Even though self-reporting is common in gamified software in various forms, especially in the field of health and well-being (Johnson et al., 2016) as well as crowdsourcing (Helmefalk, 2019), this study's findings do not align with other studies that included gamified self-reporting, which indicate that it can be a gratifying and valuable experience (Hall et al., 2013; Reiners & Wood, 2015). In the case of Mercury, the management and newcomer stakeholders noted that they could not grasp the purpose of the self-reporting task in the application. This task was considered as aggravating, since it impaired the flow of the application, forcing the user to retrace their recent actions, reflect, and then report on such activities—a cumbersome process which was considered stale by the management and the new employees.

The management stakeholders remarked that this design element merely represented an abundance of "clicking" around in the application, indicating that the cues for conducting the self-reports appeared far too often to feel like an unpretending thing. The management did not comprehend self-reporting as an understandable activity that would oblige new employees to get accustomed to and familiarize themselves with the organization's measures that could transfer them faster into their job functions. Apart from the abundant "clicking," the newcomer stakeholders remarked on the ambiguity of the self-reporting design element, reporting that the task lacked any association with the gamification design. It did not fit naturally into their onboarding context, and also did not contain an explicit purpose or an obvious goal. It became a meaningless activity wherein the purpose and objective of conducting the self-reports were not clearly understood.

This argument supports the findings from the data mining conducted during the trial period that conveyed limited application usage (see Tables 9, 10) as well as abuse of the self-reporting element. The data mining exercise revealed that a user reached level 368 in the application exclusively by self-reporting. The clickstream showed no indication that the participant employed a macro or an auto-clicker. The leader's stakeholder group, who were generally positive toward several features in the Mercury application, did not acknowledge the self-reporting feature. However, they did not declare any direct reason behind this. Thus, the contemplative and reflective purpose of implementing the design element did not seem to function as planned.

Distinct from the Tutorial element which appealed to the other stakeholders' senses and imbibed meaning into Mercury, the co-design stakeholder's intention with the Self-reporting element did not seem significant to the other stakeholder groups in the study. Consequently, the self-report did not make much sense when it was operated, as expressed literally by the manager at Site B, but instead seemed like a design element that felt awkward and came forth as meaningless. There might be several reasons behind this, two of which seem most legible on scrutinizing the issue from a human-centered design viewpoint. Firstly, the self-reporting needed to be conducted too frequently, as conveyed by the

management and newcomer stakeholders as well as partly by members of the co-design team and in the Tungsten post-project assessment document. The document noted that Tungsten lacked a proper understanding of Bandura's theories of social learning (Bandura & Walters, 1977) when designing and developing the design element in Mercury, resulting in a number of assumptions and speculations about the functionality of the design element in relation to other gamification elements in the ecology as well as its execution in an employee onboarding context.

The first rationale echoes Krippendorff's argument that a designer must apprehend an awareness and understanding of the contemporary design discourse where the design artifact is intended to be employed (Krippendorff, 2020). This further augments the argument that gamification providers must be proficient in the characteristics of the context where they deploy a gamification design (Callan et al., 2015; Morschheuser et al., 2018). Second, it should be noted that the management, newcomer, and leader stakeholders had not experienced the full extent of the design element, as they had used Mercury in its beta stage. Thus, there were not enough accumulated self-reports to help them consider what other users would respond to, which is an essential feature to incentivize self-reflection. Consequently, the co-design stakeholder's complete intention with the design element was never exhibited in the application.

The second rationale stresses that the intention and purpose of the self-reporting element were not well communicated in Mercury or, to the best of my knowledge, in any other medium. The lack of understanding may have resulted from the stakeholders' failure to see any convincing explanation or benefit that self-reporting could provide (Krippendorff, 2020). Thus, the co-designers failed to enroll the other stakeholders into the intention, concept, and meaning (Krippendorff, 2006) of the self-reporting element. The lack of meaning can be derived from the fact that the purpose of the self-report might not have been communicated sufficiently, which is perhaps necessary with a design element that is not among the most common, and consequently not as self-explanatory as other game elements (Helmefalk, 2019; Koivisto & Hamari, 2019). Thus, when applying uncommon, novel, or innovative gamification design elements to the employee onboarding process, their intention and purpose must be properly transmitted for them to attribute meaning.

7.3.2 Function

The outcomes from Site F indicate that Scandium had difficulties implementing a gamification system due to its low digital maturity and poor technological fit with Tungstens' gamification solution. The gamification implementation had to be scaled down and simplified to fit the mobile format. These issues hindered the lead designer's ability to fully realize their gamification plan, resulting in a simplified and downsized version that was claimed not to be as inspiring or influential as it could have been.

Additionally, Scandium's digital infrastructure required the development of custom solutions, which were more resource-intensive and less scalable than a more contemporary approach, which also caused additional problems; because not all employees were given smartphones when they started at Scandium, thus onboarding became exclusive—depending on if the employees wanted to use their smartphones.

This finding aligns with the research by Vanduhe et al. (2020) and Smy et al. (2020), which highlight the crucial role of technological fit in successfully adopting and using gamified technologies. Both studies indicate that a strong alignment with the organization's digital ecosystem is crucial in determining gamification's effectiveness and usefulness. As

the digital infrastructure at Scandium seems to have affected the gamification design, technological features, and implementation of the gamified employee onboarding initiative, it may be necessary to address these as real issues for gamification for employee onboarding and gamification in HRM in general. Krippendorff's (2006) concept of the ecology of artifacts addresses design artifacts' relationships with the other artifacts already existing in the intended context. Ecologies of artifacts are complex and intricate and need to be recognized, considering their potential for implementing gamification. Implementing gamified employee onboarding in HRM, there is a need for gamified technology to function with the digital ecosystem's the workplace. The presented study depicted circumstances emphasize the necessity for organizations to carefully consider the compatibility of gamified technology with their existing systems and processes to increase gamification's benefits for all stakeholders affected.

Ensuring a technological fit exists can help ensure gamification initiatives' success and improve the overall meaning-making of the technology. Ensuring this contributes to the stakeholder's meaningful attribution of implementing gamification in the organization. Thus, having a finer understanding of the organization's digital infrastructure beforehand might improve the technological fit of the gamification artifact with the other artifacts already existing in the intended context.

7.4 Disrupting Design Element

7.4.1 Content and Structural Gamification

The thematic analysis displayed the existence of a dichotomy between the management and employee stakeholders regarding their design preferences for structural and content gamification. The disruption of meaning, for the stakeholder, depends on the artifact's design intention—either affording designated learning content, which was depicted as meaningful by the new employees, or affording structures facilitating organizational protocol which was expressed as meaningful by the administration and co-design stakeholders. In the case of Mercury, the management stakeholder group seemed to contemplate that the application should contribute to the organization holistically, while employee stakeholders considered the application a tool for personal growth. The management group sought a more generic and structural gamification design to make Mercury valuable for a more significant part of the organization. For the application to be incorporated as a tool in Scandium's employee onboarding program, its gamification design must be generic and aligned with structural gamification design principles.

Employees aspired to become more efficient in the organizational environment by using the application, since it rendered a personalized employee onboarding experience through the elements associated with content gamification design principles. The aspiration to become extraordinary by utilizing the application contributed meaning to the employee stakeholders. For some of them, this meaning-making process appeared to be compulsory.

Meanwhile, the management stakeholders attributed meaning to a structural gamification design practice envisioning that it would assist in essential activities, such as making a routine out of reading the weekly newsletter among new employees, and subsequently help speed up organizational socialization. On the other hand, the new employees attributed meaning to Mercury's gamified content as making them more efficient in their new roles. The stakeholders remarked that Mercury's high-quality content initially made significant contributions until its quality started to decline, as a result of which the meaning of using

Mercury declined as well—ultimately driving some within the stakeholder group to stop using the application for their information-seeking needs.

The new employees' behavior corresponds to the stated concern about structural gamification—if a participant does not regard the experience as challenging, exciting, rewarding, or meaningful enough, engagement will decline rapidly (Reigeluth et al., 2016). Previous studies have conveyed that determining whether an instructional gamification design shall focus on the content or the structure depends on the applied situation (Kapp, 2013). The findings of the present research indicate further depth in the typology regarding the organizational stakeholder meaning-making of gamification in employee onboarding contexts. Therefore, a proposition for the design element would be that it needs to be harmonized to a certain degree so that it is suitable and meaningful for both the stakeholder groups and could, hypothetically, facilitate implementation and increase the probability of a positive outcome.

Moreover, in retrospect, the co-design stakeholders at Scandium appeared to have some tacit knowledge about this, when they expressed that Mercury would be "easier to peddle" to the departments if the gamification design stressed more on company structures than on department content. The co-design stakeholders agreed that not using the explicit terminology and focusing on achieving habit-building among new employees, implying their preference for structural gamification, was the more prolific trajectory as it would appeal to more departments. The reason behind this could be because the various departments at Scandium had similar arrangements regarding their processes—for instance, involvement in weekly meetings, information sharing, and communication. In contrast, as a comprehensive enterprise, the departments had a more dissimilar and specific focus for their manufacturing products, making gamification that focuses on content more inert and less applicable.

7.4.2 Utilitarian and Hedonic Dimensions

The theme "Scandium is a traditional company" indicated that the utilitarian-hedonic dimension, as a gamification design element, had divided meaning among the stakeholders, disrupting it between the gamification co-designers on one side and the new employees and management on the other. The disruption originated regarding the extent of playful and gameful attributes (hedonic) as opposed to valuable and beneficial attributes that Mercury outlines. For the new employees, the extent of gameful attributes in Mercury disrupted the stakeholder meaning, because it complicated their day-to-day activities and obstructed them from organizing their work. Regarding the managers, the disruption of meaning depended on the extent of playful attributes in Mercury, but more importantly those surrounding it, which crossed the line of acceptable norm in the Scandium corporate context.

The co-design stakeholder attributed meaning to the hedonic dimensions of gamification to make the Scandium employee onboarding more enjoyable by adding playful elements, such as the fog of war mechanic, to the attributes. The co-design stakeholders knew that an excessively playful application could create friction within the over a century-old manufacturing company. This awareness seemed to be absent in the external communication agency, which could have caused the issue with the introduction video and information pamphlet that seemed to have triggered a ripple effect in the entire project. Disruption in the stakeholders' meaning might occur when the expected experience and the actual experience of the design artifact do not match (Krippendorff, 2006). In the current case, the newcomer and the manager stakeholders stated that disturbances caused due to the hedonic

dimension concerned their unbalanced expectations or misinterpretations of gamification. The meaning of an artifact in use refers to the understanding that stakeholders have of the intended and actual benefit of the artifact (Krippendorff, 2006). The construct considers the factors that influence how people understand and interact with artifacts and the environmental and social context in which they are used; the meaning is shaped by how it fits with and supports human activities and the ways in which it affords specific actions and behaviours. The meaning of an artifact in use is also influenced by the dynamic nature of usage and the social context in which it occurs.

Furthermore, the lack of coherent language misguided the newcomer stakeholder groups in their meaning-making processes. A possible intricacy of contributing meaning towards Mercury might stem from Scandium's internal communication that interchangeably referred to the application as a "Digital onboarding tool," "onboarding application," "the onboarding game" etc. According to Krippendorff, the meaning of an artifact in language, depending on how stakeholders deliberate a design artifact makes it meaningful, the semantics that surrounds a design artifact language directs stakeholder attention, structures perceptions, and constructs realities (Krippendorff, 2006). The circumstance in the current study produced counterproductive expectations about the application that were not met on engaging with it, especially among the new employees. When stakeholders experience artifacts and the expectation does not match, disruptions in the meaning occur (Krippendorff, 2006). Mercury led stakeholders to expect something contradictory to what is experienced when using it. The employee stakeholders communicated that the game lacked essential mechanics, such as contests and leaderboards. The newcomer stakeholders commented that Mercury lacked characteristics that are standard features in entertainment games, such as peer competition. Their notion indicates a disruption in participant meaning-making (Krippendorff, 2006) due to the application lacking in standard game features. At the same time, the mobile game-like features were perceived as excessive. The employee stakeholders stated that hedonic design characteristics, such as the fog of war feature on the map, did not spark the users' curiosity by preventing them from discovering and charting the Mercury map, similar to an entertainment game context. Instead, the users pleaded for more agency to better organize their work tasks. The new employees had regarded Mercury for something that it was not, which affected their conception of its purpose, which, by extension, affected their user experience. Other studies have depicted a similar finding regarding hedonic–utilitarian design properties (Köse et al., 2019).

Regarding the management stakeholders, the disruption of meaning lay elsewhere. During the product presentation in January 2019, the stakeholder group expressed the importance that Mercury had to embody as a part of Scandium's corporate spirit—indicating that it should not appear like a mobile game for teenagers. Hence, the promotion video and pamphlet, not the application itself, might have escalated their meaning-making process. The notion that the promotion video and pamphlet were connected to the application made the Mercury project stray too far away from the norm for what was considered tolerable at Scandium—especially considering that the manager stakeholders had expressed concerns that the Mercury project would come through as juvenile and closely resemble an entertainment game, during the application demonstration at Site B. Related research has noted similar concerns regarding discussions on gamification incorporation in organizations' workplace learning environments (Palmquist, 2021). According to Krippendorff (2006), Meaning in the lives of artifacts addresses not just the artifact's intended use or functional properties but also the cultural context in which it is used and understood. Cultural context refers to a group or society's shared beliefs, values, practices, and behaviors. plays a significant role in shaping how individuals perceive and make sense of the world around them.

The finding regarding the Utilitarian-Hedonic dimension indicates that there is a necessity for thoughtful attribution of the gamification design elements when implemented in a digital tool designated for the employee onboarding process in an organization. In this case, Tungsten used concepts from mobile games in the ideation of Mercury, which may have seemed reasonable as they had embarked on developing a smartphone application. However, compared to mobile games which are often engaged with a hedonic ambition (Hamari & Koivisto, 2015), employee onboarding is a utilitarian process conducted for the purpose of expediting newcomer socialization in the organization (Kammeyer-Mueller & Wanberg, 2003). Thus, design element attributes, such as fog of war on a map, that are planned to visualize newcomer progression must be carefully considered before being employed. Alternatively, an endgame rule employed in MMORPG to retain and obtain the application's players seems disconnected in a corporate program with a clear and finite goal. This is another design implication is the need to communicate gamified solutions that are about to be implemented in an organization. Since communication on Mercury within Scandium had been vague, it became problematic for the organization's stakeholders to cope with the realized product due to unbalanced expectations (Krippendorff, 2006).

The project and process around the design development of the application should have been more transparent, which could have avoided confusions among the stakeholders in the project. The importance lies in aligning communication with the design and intention, so that employees are not misguided in their expectations (Klein & Heuser, 2008). The findings indicate that there is a need for straightforward communication regarding the purpose of gamification design elements when implementing them in digital tools designated for employee onboarding processes in organizations. Moreover, the result strengthens the argument put forth by previous studies that managers have valuable understanding of organizations, and few employees or line managers have such tacit knowledge that could be helpful in outlining gamification and organizational networks, which can contribute to facilitating the organization's incorporation (Ferreira & Roseira, 2020).

8 Conclusion

Mercury's gamification designs were established based on generic structural gamification that accentuates hedonic dimensions, similar to casual mobile games. The present study displays that the combination of these design elements does not appear ideal for gamifying employee onboarding. The intentions of the hedonic design element contradicts with the purpose of the onboarding as a finite process (Klein et al., 2015) by incentivizing prolonged usage, but not necessarily productive usage (van der Heijden, 2004). Likewise, employee onboarding has traditionally functioned as a concept that has relied on up-to-date instructional content to provide newcomers with the necessary, specific, and practical skills for their roles (Klein et al., 2015). In contrast, structural gamification designs provide a behaviorist habit-building arrangement that aims for compliance of the participants (Reigeluth et al., 2016). The study findings suggest that the design pattern of the hedonic and structural elements in employee onboarding yields general disruption among various stakeholders, since they go against the attributes of an employee onboarding process, which may have violated the unwritten yet significant psychological contract reflecting the joint obligations between an organization and its employees (Caldwell & Peters, 2018; Rousseau, 1995).

Two primary sources of meaning-making conflicts—disruptions—were uncovered *between the stakeholders' meaning attributions of* Mercury´s *design elements*. The first meaning-making conflict regarded the constructs meaning in the lives of artifacts. The meaning in the lives of artifacts conflict had a basis in the usage of game-like and playful features communication in the gamified technology. As some stakeholders, managers and employees found it disruptive, and others saw it as necessary for the technology to be meaningful, the gamification provider Tungsten. The extent to which the providers of the gamification used playful and game-like (hedonic) attributes in the employee onboarding process affected the meaning-making of the technology for both employees and managers. Some employees felt that the hedonic attributes disturbed their day-to-day activities and complicated the onboarding process. While the managers were inappreciative of the gamified technology's playful "look and feel", perhaps because such kind of design did not align with traditional corporate norms at Scandium. It has previously been emphasized that when designing a gamification artifact, it is crucial to consider the cultural context in which it will be implemented (Dale, 2014; Heijden et al., 2020). My findings align with previous research and additionally indicate that the context can significantly influence how stakeholders attribute meaning to the gamification.

The other stakeholder meaning-making conflict regarded the meaning of artifacts in use and derived from the design intention of the gamified technology, Mercury. The polarizing distinction was drawn from whether the gamified onboarding journey contributed to useful learning content or whether it imposed company structures on the new employees. Design elements that afforded designated learning content to the novel employee were depicted as meaningful instruments by the employees and the team leaders. However, the design elements that afforded structures that facilitated organizational protocol were described as meaningful by the managers. Mercury's gamification designs were established based on generic structural gamification that accentuates hedonic dimensions, like casual mobile games. The present study displays that the combination of these design elements does not appear ideal for gamifying employee onboarding. The intentions of the hedonic design element contradict with the purpose of the employee onboarding as a finite process (Klein et al., 2015) by incentivizing prolonged usage, but not necessarily productive usage (van der Heijden, 2004). Likewise, employee onboarding has traditionally functioned as a concept that has relied on up-to-date instructional content to provide new employees with the necessary, specific, and practical skills for their roles (Klein et al., 2015). In contrast, structural gamification designs provide a behaviorist habit-building arrangement that aims for compliance of the participants (Reigeluth et al., 2016). The study findings suggest that the design pattern of the hedonic and structural elements in employee onboarding yields general disruption among various stakeholders, since they go against the attributes of an employee onboarding process, which may have violated the unwritten yet significant psychological contract reflecting the joint obligations between an organization and its employees (Caldwell & Peters, 2018; Rousseau, 1995). This discovery partly addresses the concerns raised by Callan et al. (2015) and Thomas et al. (2022) who highlighted that one of the challenges in using gamification in HRM is selecting the appropriate design elements to achieve the goals of the technology implementation. Additionally, my findings add complexity to making sound design decisions as the stakeholders within the organization appear to have distinct perceptions and meanings attributed to gamified technology.

In a larger context, regarding the direct User's design elements preferences, my findings provide nuance to those of Zelenko and Bridgstock (2014) in regard to the creation of meaning for stakeholders in the design of an artifact. While I found that stakeholders (consisting of novel employees who are new to their jobs) preferred learning content to be

tied to specific practices, Zelenko and Bridgstock's results showed that their stakeholder group (consisting of higher education students undergoing internships) preferred content structured around meta-level concepts in order to make the internship process more meaningful for them. It is possible that the different results could be attributed to the fact that Zelenko and Bridgstock (2014) focused on higher education students undergoing internships, while my research focused on novel employees who are new to their jobs. It is also worth considering that the preferences of the stakeholders may vary depending on their level of experience and familiarity with a particular field or practice. My findings are more consistent with Borgefalk's (2021) findings; stakeholders must understand and approve of the concepts conveyed through the design artifact. Gamified employee onboarding must be communicated with understandable metaphors and convincing narratives fitting the cultural context. The design elements applied should be able to interconnect with the concepts and matters being conveyed, which can be seen in the endorsement of the Tutorial, in that context. for effectively encouraging stakeholders to endorse it in the cultural context in which it is to be understood and used. My findings suggest that the creation of meaning for stakeholders in the design of an artifact may depend on the specific context and needs of the individual or group.

The Mercury case differs from prior studies conducted on gamified employee onboarding (Depura & Garg, 2012; Miller et al., 2018) because of its outline being as generic as possible, instead of being department specialized to satisfy the needs of a large organization. Scandium mandated a superficial and scalable employee onboarding gamification design to make the smartphone application scalable. However, the new employees who participated in the beta test session in this study noted that the content was too shallow to provide the information they needed. This finding aligns with previous research on employee onboarding which suggests that more personalized and structured processes would better predict employee adjustment with the onboarding process (Saks et al., 2007). The implication for the design elements presented in this study may be vastly generalizable, yet one-dimensional. Overall, the study offers valuable insights into how various stakeholder groups view and prefer different design elements in the context of gamified employee onboarding. It can inform the design of future gamified employee onboarding programs, helping to improve the conditions and objectives of the relevant parties. The study has a relatively long research period, covering the entire process from concept to product. It also includes a large amount of data collected from a real-world setting, which makes it highly ecologically valid (Plowright, 2011) and useful for both practitioners and scholars.

9 Limitations and Future Research

There are several limitations to the presented study that should be taken into consideration when interpreting its findings. Firstly, the small sample sizes of the focus groups and semi-structured interviews may have led to a lack of diverse perspectives, which could restrict the generalizability of the findings to a wider population. Secondly, the study only focused on a single manufacturing company, so the results may not be generalizable to other types of organizations or industries. Thirdly, the study used a solitary case in its design, which may not allow for comparison with other cases or for developing more generalizable conclusions. However, conducting research *in the wild* has been argued to provide high ecological validity (Kihlstrom, 2021)—defined as the degree of

naturalness of a research context and the practical actions that indicate the extent to which the research findings reflect real-life settings. Although scholars, do not regularly contemplate ecological validity, practitioners still seek it (Plowright, 2011). In ethnographic design research, like this case study, the researcher has limited control over the site when the study commences, which is one of the criteria for achieving ecological validity (Plowright, 2011).

In addition, most of the presented ethnographic records, except the interviews, consist of authentic stakeholder interactions, situations, and organizational environments that presented discovered rather than constructed findings (O'Reilly, 2012), which likewise affords ecological validity. These characteristics imply that the present research should be valuable for the applied sciences and the industry alike.

Regarding the design implications of the study, it is essential to note that the study did not aim to provide specific and precise design instructions for gamified employee onboarding tools. Instead, the study offers broad indications of which design elements different stakeholder groups attribute meaning to in employee onboarding. Additionally, the study did not assess the effectiveness of the gamified application in terms of its impact on employee socialization and assimilation into the organization, so it is unclear whether it was successful in achieving its intended outcomes regardless of the stakeholder's diverse meaning-making of it. Additionally, the manufacturing company included in the study is long-term and deeply rooted in the nation where this study is conducted, which may have influenced the managers' reactions regarding the hedonic aspects of the gamification design. It is important to note that the findings of this study, which are based on ethnographic records from a small number of informants, should not be considered comprehensive or definitive. The findings of this study provide design implications based on the daily practices and current arrangements of the case study organization. It is important to consider that the design elements identified in this study are specific to the case study organization and may not necessarily be applicable in other settings. The design elements identified in this study may be adaptable for use in other settings and could inform the development of new design artifacts. The design implications of this study should be further tested in a more controlled and experimental research setting. Additional studies on the design elements and their impact on the various stakeholders in gamified corporate employee onboarding meaning-making are needed to validate and support the claims of this study. Future investigations should contemplate applying the preferable design element stated by the stakeholder group to evaluate whether the combination of these elements has a heightened effect on comparable stakeholder groups. Moreover, future studies should evaluate the effectiveness of incorporating the meaningful design elements identified in this study, such as proper and useful tutorials at field sites, and avoiding those that were identified as undesirable, such as self-reporting, in order to determine their impact on the integration of gamified employee onboarding.

It is imperative to understand that ethnographic records from a handful of informants do not warrant robust design. The findings are design implications based on the daily practices and contemporary arrangement of an investigated setting. Even though ethno-design focuses on design elements, the sites in this study should be viewed as subject to Scandium's arrangements. The design elements might successfully be transformed for usage in other settings and inform novel design artifacts. However, the design implication presented in this study should be assessed thoroughly in a more contained and experimental research environment. Additional investigations should be conducted to identify more specific and precise design instructions (Crabtree et al., 2012). Since this is a limitation of the approach, it is imperative to provide a "thick" description so the readers can easily comprehend the

dynamics of a setting (Crabtree et al., 2012). Thick descriptions are a trademark of ethnographic methodology (O'Reilly, 2012) and a recognized approach for qualitative research to achieve a form of external validity (Clifford, 1973), while also ensuring the qualitative concept of trustworthiness (Lincoln & Guba, 1985; Shenton, 2004).

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Data Availability In observance of ethical guidelines pertaining to the protection of individual participant confidentiality and the anonymity of the involved enterprises, I am unable to make the raw data supporting the study's conclusions available to the public. However, comprehensive summaries of the data, which reflect the results of the research, can be provided within reasonable limits. For inquiries related to the data, interested parties should contact the corresponding author. Please note that while I am committed to supporting scientific transparency and collaborative learning, any data shared will continue to uphold and respect the confidentiality agreements set with our study participants.

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