Gamifying Onboarding: How to Increase Both Engagement and Integration of New Employees

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Abstract. New employees are supposed to quickly understand their tasks, internal processes and familiarize with colleagues. This process is called "onboarding" and is still mainly realized by organizational methods from human resource management, such as introductory events or special employee sessions. Software tools and especially mobile applications are an innovative means to support provide onboarding processes in a modern, even remote, way. In this paper we analyze how the use of gamification can enhance onboarding processes. Firstly, we describe a mobile onboarding application specifically developed for the young, technically literate generations Y and Z, who are just about to start their career. Secondly, we report on a study with 98 students and young employees. We found that participants enjoyed the gamified application. They especially appreciated the feature "Team Bingo" which facilitates social integration and teambuilding. Based on the OCEAN personality model ("Big Five"), the personality traits agreeableness and openness revealed significant correlations with a preference for the gamified onboarding application.

Keywords: Onboarding · Gamification · Human resource management · Human factors · Human-systems integration

1 Introduction

Companies with engaged employees perform significantly better than those without [1]. However, only 15% of employees worldwide consider themselves as engaged in their jobs [2]. In order to retain a positive attitude and feel engaged at work, a focus has been placed on the intrinsic motivations of workers. Traditional incentives, such as reward systems work on the surface, but progressively change towards the desire of employees to do something "with a purpose" [2]. Values like freedom for creativity, social integration and professional and personal development are of increased importance [3].

Career starters representing the generation Y (born between 1980 and 1994 [4]) and Z (born after 1995 [5]) have differing expectations and wishes towards their working life compared to previous generations. Generation Y and Z are both characterized by

being highly technically literate [4]. Individuals of generation Y are in search for intellectual challenge, seek those who will further enhance their professional development and desire immediate feedback about their performance [4, 6]. Further, they desire to perform meaningful work with committed co-workers [4]. This value is also shared by individuals of generation Z. Both generations expect a high level of digitalization in their workplaces and appreciate innovative, new approaches.

Gamification is one possible innovative means to enhance user experience (UX) and engagement within the workplace [7]. Enriching non-gaming situations (e.g. work contexts), with game elements can make tedious tasks more fun and motivate employees, as well as alleviate stress in social situations and make learning more playful. When entering a new company, the first weeks strongly influence the level of commitment and the overall length of employment [8]. However, there is little research on the effects of gamification on onboarding processes. In this paper, we investigate the effect of a gamified onboarding application on onboarding processes, from an employee perspective. Further, we investigate the effect of specific personality traits on the users' preferences.

As a main research hypothesis, we expect users to significantly prefer gamified onboarding applications over non-gamified approaches. Secondly, we suggested correlations between personality traits and the preference for gamified onboarding.

In the next section, we provide a short overview of recent developments using gamification in working contexts, followed by a short description of the OCEAN personality model. The implementation of the onboarding application is presented in Sect. 3. Subsequently, the procedure of the study is described in Sect. 5 and the results are documented and discussed in Sect. 5. The last section concludes the paper and gives a short summary on the limitations of our approach.

2 State of the Art

2.1 Gamification in Work Contexts

The number of projects and research approaches using gamification in corporate contexts has highly increased in recent years [9]. In the service sector, for example in call centers, gamified approaches have been successfully used to promote employee motivation and optimize standard processes [10]. The attitude towards gamified work is especially affirmative among younger employees: 86% of young job applicants rated gamification elements as enjoyable and fun [11]. Thus, it is no surprise that gamification approaches are now also used beyond the service domain, even trying to enrich repetitive work in production environments. After the first ideas emerged in 2012 [12], systems combining assistance and gamification have been designed [13] and evaluated in several studies [14, 15].

2.2 Gamification in Human Resources (HR)

A study with over 32,000 employees, published in 2012 [16], showed the critical role of motivation and psychological backgrounds in working contexts. One of the key findings was that motivated employees lead to increased economic success.

The German Haufe Group performed a related study in 2017, with a total of 227 participants [17]. The results revealed that only 16% of the employees are satisfied with the current onboarding processes and that many companies see considerable potential for improving these processes. Depura et al. [18] suggest that employees of generations Y and Z desire technologically integrated workplaces with up-to-date software. Their study showed that social media, mobile applications and gamification can improve the engagement and learning success of new employees [8]. While conventional methods, such as introductory events or special employee sessions are common, more innovative approaches like mobile apps and platforms for onboarding are scarcer.

2.3 "Big Five" Personality Traits

The OCEAN model, also known as the "Big Five", is a model defined in the mid-1980s to describe the human personality. The model features the personality traits openness, consciousness, extraversion, agreeableness and neuroticism (OCEAN). Paul Costa and Robert McCrae demonstrated that these factors are robust and stable dimensions of the human personality, independent of the empirical instruments, statistical methods, sample type and the cultural area [19]. The "Big Five" personality test used in this study is derived from the model of Satow [20].

3 Implementation

In order to determine the effects of gamified onboarding applications on the integration process of new employees from the generations Y or Z, two versions of such an application were developed: one featuring gamification elements, and one without such elements. We drew inspirations from commercially available applications (see Table 1) to design this app. Five major gamified features were implemented in the gamified onboarding app: QR-Hunting, Company-Quiz, Team Bingo, Company-Whisper, and the Onboarding Tree (summary in Table 2). Additionally, the following features were supported in both versions of our application: (1) a newsfeed, where information about upcoming events and (2) the possibility to contact someone from HR or a personal "Buddy" (i.e. a dedicated person who is responsible for the training of one specific new employee and works closely with him or her).

Table 1. Sources of inspiration and elements used for designing the onboarding application:

Application	Description	Extracted Elements for the Onboarding-App
QuizClash [21]	Players can challenge each other with questions on different topics. The one who scores more correct answers, wins	- time pressure - compete against others - collect points
Plant Nanny – Water Reminder [22]	Players keep a personal plant alive and growing. Thus, users are reminded to drink water themselves. The visual feedback motivates users to drink water in a playful way	- playful visual feedback
Pokémon GO [23]	Players capture virtual monsters in the real world using augmented reality. Collected monsters can be used in virtual fights	- smartphone serves as a means of exploring the real world
Jodel [24]	Social media platform that allows users to publish content (short texts or images) anonymously	- publish content anonymously

Team Bingo: This feature aims to help new employees to playfully get to know other colleagues. When tapping on a blue field, the person with whom the appointment should be arranged, is randomly selected from a predefined pool. The new employee can then make an appointment for a coffee or a casual after work meeting via the app (Fig. 1). In addition, new employees can contact their "buddy". Team Bingo is inspired by the popular American gambling game "Bingo" [25]. It aims to enhance social interaction between new colleagues and other employees.
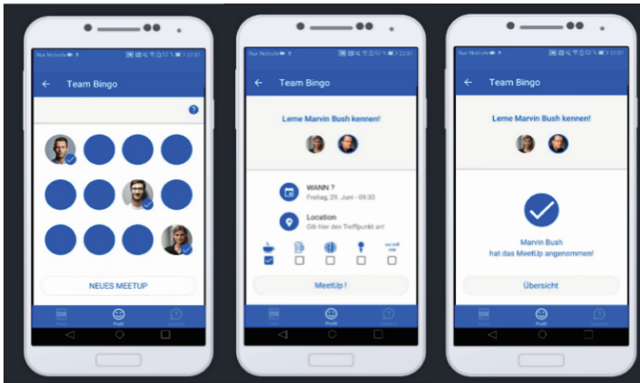

Fig. 1. Screenshots of Team Bingo. From left to right: Which persons have been met and how many meetings are still missing? Arrangement of appointments. Accepted appointment.

QR-Hunting: The QR-Hunting feature is about finding a specific destination in a dedicated time. QR codes are distributed at various locations in the company and offer detailed knowledge about the related topics once scanned. When a new challenge is started, the onboarding app provides the new employee with information about the location of a specific QR-code and starts a timer. The new employee needs to find and scan the QR-code within the given time period. In search for QR-codes, young employees can explore the company in a playful way. The game *Pokémon GO*, designed for mobile devices, served as a major inspiration for this gamification approach: digital tasks can only be completed while exploring the real world.

Company-Quiz: This feature of the onboarding application was designed to motivate new employees to learn important facts about the company. The quiz can be played alone or against other users of the application. This playful way of gathering information about the company was inspired by the widespread game *QuizClash*.

Onboarding Tree: Drawing inspiration from the application *Plant-Nanny*, this feature visualizes a user's progress during the onboarding process by a tree, which grows as he or she progresses through the onboarding process [20, 23] (Fig. 2). The more an employee is integrated into the new company, the taller the tree grows. This visual representation of progress addresses the common wish of career starters of generation Y and Z for regular feedback on their own performance.
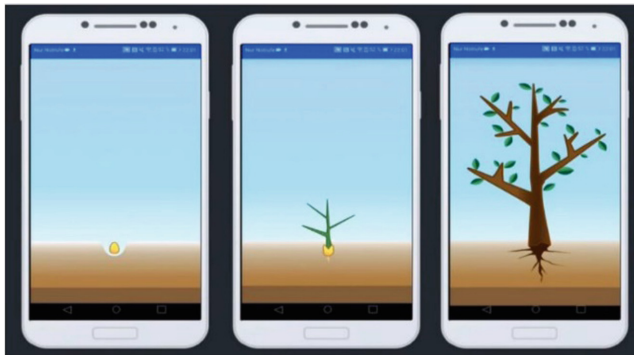

Fig. 2. Onboarding-Tree: visualization of the own progress.

Company-Whisper: Based on *Jodel*, a social media application mainly used among students, Company-Whisper allows to publish posts anonymously. They are only visible for other users of the company's onboarding app.

Table 2. Summary of implemented game-design elements [10]:

Feature	Game mechanics	Game dynamics	Goal
QR-Hunting	Timer	Time pressure	Cognitive stimulation (many new stimuli)
	Points, rankings	Collecting, competition	Iterations, higher performance
Company-Quiz	Time display	Time pressure, comparison	Cognitive stimulation
	Points, rankings	Collecting, competition	Iterations, higher performance
	Show quiz opponent	Competition	Social recognition
Team Bingo	Activity documentation	Exploration	Curiosity: who else can I meet?
Onboarding-Tree	Documentation of advancement	Visual feedback	Feel connected to process of onboarding

4   Study

98 participants (54 female, 44 male, average age = 27) took part in the study. All were from generations Y and Z. They were either students (62%, n = 61) or young career-starters (38%, n = 37). The study consisted of an online questionnaire with two parts. In the first part, participants watched a video introducing the onboarding app and rated 11 statements about the app (see Table 3), using a 5-point Likert scale (from 1 = "I totally disagree" to 5 = "I totally agree"). Participants had the opportunity to add additional comments in two open questions: "Which features do you like best?" and "Is there a feature missing?" In the second part, the participants completed the "Big Five" personality test [20].

Table 3. Statements on the onboarding app (OA) in the first part of the questionnaire:

S1	The video has made me curious and stimulated me to download the OA
S2	I would use the onboarding OA even before my first day of work
S3	I can imagine that the OA will make it easier for me to get started in the new company
S4	Offering such an OA would welcome me as a new employee
S5	I can imagine that the OA helps me to get to know future colleagues more easily
S6	I can imagine the OA helping me get to know the company faster
S7	I do not see any added value in the OA and therefore would not download it
S8	The OA shown in the video appeals to me
S9	The OA design appeals to me
S10	The way the OA is built will be intuitive to use
S11	Frequency of the usage of the OA. *(Never, monthly, weekly, daily, several times a day)*

The participants were divided into two groups: while the experimental group (62 participants) watched a video presenting the gamified onboarding app, the control group (36 participants) watched a video of the same app without gamification elements (i.e. QR-Hunting, Company-Quiz, Team Bingo, Company-Whisper and Onboarding Tree). The rating statements and the personality test questions were identical in both groups.

5 Results

In the analysis of the first part of the questionnaire, t-tests were used to evaluate the preferences for the gamified or non-gamified onboarding application. In the second part, we investigated correlations (r = correlation coefficient, Spearman's rho) between the rated statements on the gamified onboarding app and the "Big Five" personality traits (openness, consciousness, extraversion, agreeableness and neuroticism).

5.1   The Rating Statements

All in all, the gamified onboarding application was preferred over the non-gamified version for all 11 statements. In the following, we discuss the five statements revealing higher differences in participants' preferences (see Fig. 3).

Statement 10: *I perceive the onboarding app as intuitive*. The non-gamified app's mean rating was 3.64 (SD = 0.87) while the gamified app scored 4.16 (SD = 0.68). This highly significant difference (t(96) = 3.30, p < .002) strongly supports the hypothesis that a gamified onboarding application has advantages over non-gamified approaches. One reason why the gamified onboarding app was experienced as more intuitive might be due to familiar elements, which participants might already know from other applications (e.g. writing messages, or a visual representation of the own progress [26]).

Statement 8: *I perceive the onboarding app to be fun and appealing*. Participants in the non-gamified condition ranked this question with a mean of 3.39 (SD = 1.23), while the gamified app's mean was M = 3.90 (SD = 1.00). The difference is significant with t(62) = 2.14, p < .040. One might suspect the gamified onboarding app to be perceived as more fun and appealing due to the various playful elements. The stressful task to familiarize with the new company and new colleagues is enriched by gamification elements offering playful, social interactions. New employees might appreciate the engaging, fun way their nervousness is reduced – as one participant framed it: "information before the first day, reduces uncertainties" [P13].

Statement 5: *I perceive the onboarding app as supportive in getting to know future colleagues*. The mean of the gamified onboarding application was significantly higher for S5 (M = 3.97, SD = 0.91), than that of the non-gamified approach (M = 3.50, SD = 1.08), with t(63) = 2.19, p < .040. The feature Team Bingo, for example, provides an anonymous and fast way to contact new colleagues. By

providing the opportunity to get in touch virtually, the hurdle to address them in person is by-passed.

Statement *2: I would rather use the onboarding app before my first day of work* scored the mean rating M = 3.94 (SD = 1.35) for the non-gamified app, compared to the mean of M = 4.44 (SD = 0.84) of the gamified app. This marginally significant difference shows that the gamified onboarding application addresses the important need for social interaction and integration of new colleagues [27] better than the non-gamified version, with t(51) = 1.97, p < .060.
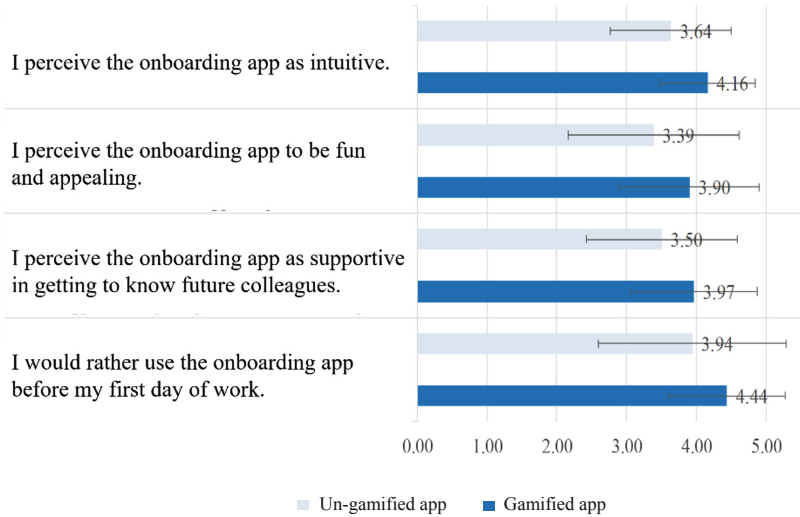

Fig. 3. Mean values of the four significant statements regarding the onboarding app.

5.2 The "Big Five" Personality Test

The analysis of the "Big Five" revealed significant correlations between the two personality traits agreeableness and openness and four of the statements from the first part of the questionnaire (see Table 4). In the following, we will give a short explanation on the personality traits which have been found to be connected to the preference of our gamified approach:

- *Agreeableness:* This trait describes the tendency to be compassionate, cooperative warm-hearted, helpful, tolerant and forgiving towards others [28].
- *Openness:* Openness, sometimes also called "Intellect" [28], is commonly associated with being curious, broad-minded, intelligent and imaginative.

The gamified application has an appealing design (r = 0.362) and strongly arouses the curiosity of persons with the trait agreeableness (r = 0.255). Further, agreeable individuals assume that the app would help them to get in contact with future colleagues more easily (r = 0.250). Individuals with the trait openness believe that the

gamified onboarding app would facilitate getting started in the new company (r = 0.303). In the following paragraphs we discuss the significant correlations in more detail.

Table 4. Significance level of correlations between statements of the gamified onboarding app and personality traits. Bold underlined values: significance levels below α = 0.05.

	Extraversion	Neuroticism	Conciousness	Agreeableness	Openness
The video has made me curious and stimulated me to download the onboarding app	0.681	0.078	0.953	**<u>0.045</u>**	0.130
I can imagine that the onboarding app will make it easier for me to get started in the new company	0.934	0.541	0.580	0.242	**<u>0.017</u>**
I can imagine that the onboarding app helps me to get to know future colleagues more easily	0.147	0.255	0.476	**<u>0.050</u>**	0.547
The app design appeals to me	0.436	0.365	0.115	**<u>0.004</u>**	0.294

Agreeableness

The Gamified Onboarding App Arouses Curiosity. According to the analysis, watching the video of the gamified onboarding app arouses the curiosity of agreeable persons. In contrast to the non-gamified version, the gamified one has playful elements, such as Team Bingo. As agreeableness is the main dimension by which interaction partners are first judged [29], the gamified app allows open-minded persons to get to know interaction partners more easily.

The Gamified Onboarding App Supports the Process of Getting to Know Future Colleagues more Easily. Agreeable individuals are often described as team players, warm-hearted, cooperative and helpful. Several features of the gamified onboarding app promote community and team cohesion, such as Team Bingo, Company-Whisper or Company-Quiz.

The App Design is Appealing. The results show a highly significant correlation between the agreeableness and the rating of the app design. As the design is characterized by a clear and intuitive structure and agreeable persons are particularly in search of harmony [30], one may assume that they like the straightforward, harmonious design.

Openness

The Gamified Onboarding App helps to Facilitate the Start in the new Company. The fact that open-minded individuals think that the gamified onboarding app can facilitate the start in a new company is not surprising. After all, open-minded persons are characterized by being curious, imaginative and having a positive attitude towards new experiences. An onboarding app which supports meeting new colleagues and conveys the values of a company easily is, therefore, appreciated by persons who are welcoming and broad-minded.

5.3   Qualitative Findings

In this sub-section we briefly note some of qualitative statements from the two open questions in the questionnaire ("Which features do you like best?", "Is there a feature missing?").

The most frequently mentioned positive feature was Team Bingo. Many participants stated that getting to know other colleagues is very important for new employees, e.g. "getting to know the team, organization of appointments even after work" [P6] or "contact to other employees through Team Bingo" [P19]. This supports our initial research hypothesis that a gamified onboarding app offers benefits over non-gamified approaches.

Further, it is notable that several participants especially appreciated the "Buddy" concept, for example by stating "I also like the Buddy idea" [P26]. Several participants expressed that they would like to regularly receive information on the new company even before the first day of work: "information before the first day, reduces uncertainties" [P13] or "tips on the many little things that you would only understand after days/weeks in the company" [P31].

These qualitative findings support our suggestion that innovative and modern approaches for onboarding like apps are in general appreciated by young employees of generation Y and Z.

6   Conclusion

In this work, we analyzed how gamification can affect onboarding processes. Firstly, we described a mobile onboarding application specifically developed to support onboarding processes for those in generations Y and Z. Secondly, we reported a study with 98 participants of these young generations (either students or young career starters). Our goal was to determine if a gamified version of the onboarding application is preferred over a version without playful elements.

According to our expectations, the gamified onboarding app was preferred to the non-gamified version. Four out of 11 rating statements revealed statistically significant differences: users perceived the gamified onboarding app as more intuitive, more fun and appealing, more supportive in meeting future colleagues, and they would rather use the gamified version before their first day of work.

Also, the expectations on correlations with personality traits were confirmed: the study showed that especially agreeableness and openness correlate with the preference

for the gamified onboarding app. Furthermore, qualitative findings indicate that features promoting social integration are particularly well received, especially the playful feature Team Bingo.

In conclusion, we believe that the integration of gamified features makes onboarding solutions more effective and more user-oriented, especially for employees of the generations Y and Z. Important information can be learned in a playful way and contact with advisors and future team members is facilitated.

Limitations and Future Work

To obtain more in-depth results, the survey should be repeated at a later stage in the development process of the gamified onboarding application. As a result, the user experiences could be tested with a fully implemented application, rather than a video demonstration of the app.

References

1. The Best Employee Engagement Statistics You Should Know. https://dynamicsignal.com/2018/01/08/the-best-employee-engagement-statistics-you-should-know/
2. Autry, A.: 2018 Employee Engagement & Loyalty Statistics. https://blog.accessperks.com/2018-employee-engagement-loyalty-statistics
3. Deterding, S.: GamifyConference 2017 - Dr. Sebastian Deterding - Gamification - Missverständnisse und Lösungen. https://www.youtube.com/watch?v=1v8mxnNOaHM
4. Eisner, S.P.: Managing Generation Y. SAM Adv. Manage. J. **70**(4), 4–12 (2005)
5. Tulgan, B.: Meet Generation Z: the second generation within the giant "Millennial" cohort (2013)
6. Francis-Smith, J.: Surviving and thriving in the multigenerational workplace. J. RECORD (2004). Online Research Library: Questia. https://www.questia.com/newspaper/1P2-2120458/surviving-and-thriving-in-the-multigenerational-workplace
7. Deterding, S., Sicart, M., Nacke, L., O'Hara, K., Dixon, D.: Gamification: using game design elements in non-gaming contexts (2011)
8. Depura, K., Garg, M.: Application of online gamification to new hire onboarding. In: 2012 Third International Conference on Services in Emerging Markets, pp. 153–156 (2012)
9. Dale, S.: Gamification: making work fun, or making fun of work? Bus. Inf. Rev. **31**, 82–90 (2014)
10. Korn, O., Schmidt, A.: Gamification of business processes: re-designing work in production and service industry. Procedia Manuf. **3**, 3424–3431 (2015)
11. Kupka, K.: Online-assessments im recrutainment-Format: Wie gefällt das eigentlich den Bewerbern in der echten Auswahlsituation? In: Diercks, J., Kupka, K. (eds.) Recrutainment: Spielerische Ansätze in Personalmarketing und -auswahl, pp. 53–66. Springer Fachmedien Wiesbaden, Wiesbaden (2013)
12. Korn, O.: Industrial playgrounds: how gamification helps to enrich work for elderly or impaired persons in production. In: Proceedings of the 4th ACM SIGCHI Symposium on Engineering Interactive Computing Systems, pp. 313–316. ACM, New York (2012)

13. Korn, O., Funk, M., Schmidt, A.: Design approaches for the gamification of production environments: a study focusing on acceptance. In: Proceedings of the 8th ACM International Conference on PErvasive Technologies Related to Assistive Environments, pp. 6:1–6:7. ACM, New York (2015)

14. Korn, O., Muschick, P., Schmidt, A.: Gamification of production? A study on the acceptance of gamified work processes in the automotive industry. In: Chung, W., Shin, C.S. (eds.) Advances in Affective and Pleasurable Design. Proceedings of the AHFE 2016 International Conference, pp. 433–445. Springer, Heidelberg (2016)

15. Korn, O., Lang, J., Korge, A., Causegic, H., Schmidt, A.: Gamification of a workday: a study on the effects in sheltered employment. In: CHI 2016 Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems, pp. 3114–3121. ACM, New York (2016)

16. Towers Watson ed: Global Workforce Study. Geld, Karriere, Sicherheit? Was Mitarbeiter motiviert und in ihrem Unternehmen hält. Ergebnisse für Deutschland 2012/2013. Presented at the July 2012

17. Haufe-Lexware GmbH & Co KG: Noch viel Verbesserungspotenzial beim Onboarding. https://www.haufe.de/personal/hr-management/umfrage-zum-onboarding-in-unternehmen_80_396926.html

18. Gen Z & Millennials Collide At Work. https://workplacetrends.com/gen-z-millennials-collide-at-work/

19. Simon, W.: Persönlichkeitsmodelle und Persönlichkeitstests: 15 Persönlichkeitsmodelle für Personalauswahl, Persönlichkeitsentwicklung, Training und Coaching. Presented at the (2006)

20. Satow, D.L.: Big-Five-Persönlichkeitstest (B5T): Testmanual und Normen (2012)

21. QuizClash – Quiz against your friends!. http://www.quizclash-game.com/

22. Fourdesire: Plant Nanny - Water Reminder with Cute Plants. http://plantnannyapp.com/assets/plantnanny/features-grow-up.png

23. Niantic, Inc.: Produkte. https://nianticlabs.com/de/products/

24. Jodel – Impressum. https://jodel.com/de/imprint/

25. Instructions on How to Play BINGO. http://www.dltk-cards.com/bingo/instructions.htm

26. Gouveia, R., Pereira, F., Karapanos, E., Munson, S.A., Hassenzahl, M.: Exploring the design space of glanceable feedback for physical activity trackers. In: Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing, pp. 144–155. ACM, New York (2016)

27. Blohm, I., Leimeister, J.M.: Gamification. WIRTSCHAFTSINFORMATIK **55**, 275–278 (2013)

28. Barrick, M.R., Mount, M.K.: The big five personality dimensions and job performance: a meta-analysis. Pers. Psychol. **44**, 1–26 (1991)

29. Paulus, J.: Das Fünf mal Eins der Psychologie | Wissen | SWR2. https://www.swr.de/swr2/programm/sendungen/wissen/das-fuenf-mal-eins-der-psychologie/-/id=660374/did=5488364/nid=660374/1iydduq/index.html

30. Philipps, G., Lebek, S.: Erfolgreich durchs assessment-center. In: Strategien - Aufgaben - Testverfahren: Experten zeigen, worauf es wirklich ankommt, p. 92. Linde Verlag GmbH (2012)