Using Gamification to Enhance User Motivation in an Online-coaching Application for Flexible Workers

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Abstract: The number of people who are solo-self-employed or experience very flexible, individualized working conditions has grown over the last years. As a consequence, these persons need to design their own working conditions in the sense of 'job crafting'. We are developing an online coaching application for this target group to convey job design skills, increase well-being, and reduce stress. To enhance user motivation gamification elements are used in the online coach. In this paper we report on the evaluation of a prototype of the coaching application with different gamification elements by means of a user test with the target group. The results show that gamification has only a small effect in short-term use, but seems promising in the long term.

1 INTRODUCTION

The number of solo-self-employed and persons with flexible, individualized working conditions – like project work and home office – has grown over the last years (Lohmann and Luber, 2004; Hill et al., 1996). This also includes people who work while traveling (BenMoussa, 2003). While flexible working conditions offer many benefits, such as increased job control, individual working hours and possibly less work-family interference (Parslow et al., 2004; Prottas and Thompson, 2006), workers also face the challenge to design their own workplace in a healthy and sustainable way. This includes planning and setting working tasks, designing the workplace ergonomically as well as structuring their working times, breaks, and off-time. Furthermore, people with individualized working conditions (working at home or outwards) often experience less social support from colleagues and supervisors (Sturges, 2012; Paridon and Hupke, 2009). Thus, people in this target group need comprehensive skills for *job crafting* (Bakker, 2010; Wrzesniewski and Dutton, 2001) in order to work efficiently and stay healthy (Tims and Bakker, 2010).

As part of a larger research project on flexible working conditions we are currently developing an online coaching application, the so-called 'Job-Crafting Coach', for people with individualized working conditions to convey job design skills, increase well-being and reduce stress. A main challenge in designing this application is to keep user motivation high, since the target group typically experiences high workloads and long working hours.

Gamification elements are often used in a non-gaming context in order to improve user experience and motivation (Detering et al., 2011a). Therefore, in this paper we investigate whether and how gamification elements can be used in this context to enhance learning in a target group of mostly very busy, adult users.

The paper is structured as follows: In the next section we give an overview of related work and discuss gamification elements with respect to our special target group of highly skilled, flexible workers. Based on this, a gamified prototype of the coaching application was developed and tested with the target group (sections 3 and 4.1). Results are presented and discussed in sections 4.2 and 5.

2 RELATED WORK

Following a widely-used definition, gamification is "the use of game design elements in non-game contexts" with the goal of increasing motivation and user activity (Detering et al., 2011b, p. 2). During

the last years the use of gamification in a large variety of applications has increased (ibid.). Hamari et al., (2014) reviewed 24 empirical studies on gamification and examined its effects. The elements mostly used in these studies were *points*, *leaderboards*, and *badges*. Furthermore, *progress bars* (Hamari et al., 2014), *content unlocking* (Iosup and Epema, 2014) and *countdowns* (Corriero et al., 2014) are often utilized for gamification.

- *Points* are a basic game component (Nah et al., 2013). Users collect points as they make progress with their tasks.

- *Leaderboards* are ranking systems, in which all users are listed according to their scores (e.g., points collected). Therefore, leaderboards add a social component and invoke a sense of competition (Kapp, 2012).

- *Badges* are awards that users get for certain achievements, representing success. Users are motivated to collect further 'trophies' (Kumar, 2013).

- *Progress bars* show to what extent a task is carried out and represent positive development (Neeli, 2012).

- *Content unlocking* means that the player gains access to content or functionality according to certain rules, e.g. after prior tasks were fulfilled.

- *Countdowns* limit the time in which tasks must be completed, thus implementing time pressure as a game design factor (Hsu et al., 2013).

In the 24 studies reviewed by Hamari et al. (2014), psychological outcomes (e.g., motivation, enjoyment and attitude) as well as behavioral outcomes (e.g., effectiveness of learning) were investigated. The results show that gamification may have a positive effect on both psychological and behavioral variables, but this depends very much on the context and the characteristics of the users. Education/learning is the biggest application field for using gamification, followed by intra-organizational and work-related systems (Hamari et al., 2014).

Regarding work contexts, participation and steering behavior on a question and answer website were influences positively by gamification (Anderson et al., 2013; Hamari et al., 2014). Furthermore, in a crowdsourcing project the quality of completed tasks, task completion speed and motivation to complete tasks were enhanced (Eickhoff et al., 2012; Hamari et al., 2014).

Regarding education and learning mostly students were surveyed (Denny, 2013; Cheong et al., 2013; Dominguez et al., 2013; Zachary et al., 2011;

Halan et al., 2010). A broad range of gamification elements was used in this context. Positive effects reported in these studies include increased motivation, commitment, and enjoyment of learning tasks (Hamari et al., 2014).

Denny (2013) investigated the use of badges in an online learning tool (including question and answer forums). He split-randomized a class (>1000 students) into two groups. The members of the first group were able to get badges for their activity and contributions in the online learning tool, whereas the members of the other group had no access to the badge system. After four weeks the first group (with badges) answered more questions, had used the tool more often and enjoyed being able to collect badges. The number of authored questions was not affected.

In another study two groups of medical students were supposed to train their interviewing and interpersonal skills by means of virtual patients in a web-based application. The first group used an application with gamification elements like leaderboards, narratives, und countdowns, while the second group used the same tool without these elements. In the first group, user participation increased (Halan et al., 2010).

3 PROTOTYPICAL IMPLEMENTATION

In this section we present a prototype of the Job-Crafting Coach, which incorporates several gamification elements in order to test their usefulness with the target group of highly skilled, adult users.

As described in the previous section, in former studies mostly students were the subjects to investigate the effects of gamification in learning contexts. Students are somewhat similar to our target group when it comes to self-organizing one's learning environment (e.g. doing project work, scheduling times for individual learning, breaks and off-time). Therefore, we assume that gamification elements that were successfully used in education/learning contexts may also be suitable for our target group. However, our coaching application is targeted at different age groups: Presumably, especially older persons might be less attracted to games. Therefore, the suitability of different gamification elements needs to be established.

The Job-Crafting Coach consists of three sections: In the first section job crafting facts and knowledge are presented mainly in the form of short animated videos. In the second section,

corresponding trainings and exercises are offered based on a self-assessment of one's working situation and current challenges, strengths and weaknesses. Sample exercises include hints on how to design a home office or mobile workplace ergonomically, a task planning exercise, trainings on how to do proper networking, relaxation exercises, and trainings focusing on a better work-life balance. In the third section users learn to set goals and integrate the exercises and strategies they learned into their everyday life.

The following gamification elements were considered:

- Assignment of *points* and *badges* to users who completed certain exercises or achieved goals they set for themselves, respectively. Furthermore, badges might show how often ('comeback badge') or how many days in a row ('day in a row badge') the user has logged in.
- Using the *content unlocking principle* by activating certain exercises only after the users performed other actions.
- *Progress bars* and *a leaderboard*, the latter to stimulate competition.

Furthermore, the following elements were used to enhance motivation:

- Playful *quizzes* designed as single or multi-player games to check the users' knowledge.

- A *rating system* (using stars) to evaluate the exercises.
- A '*tip of the day*' to stimulate interest and curiosity.

Countdowns were not used, as many exercises need time and patience and the users should not feel stressed.

For evaluation purposes we tested several ergonomics-related exercises of the Job-Crafting Coach (e.g. an eye relaxation exercise, see figure 1). It includes badges, points, a progress bar, rewards in the form of unlocking content (activation of exercises) and a leaderboard. Furthermore, the prototype provides a 'tip of the day' and a star rating system for the exercises.

4 EVALUATION

4.1 Methods

We conducted user tests of the Job-Crafting Coach with 16 test persons belonging to the target group (7 female, 9 male). Mean age was 35.9 years (range: 28-60 years).

The evaluation consisted of two parts. In the first part (20 minutes) the participants were asked to work through the knowledge units and complete

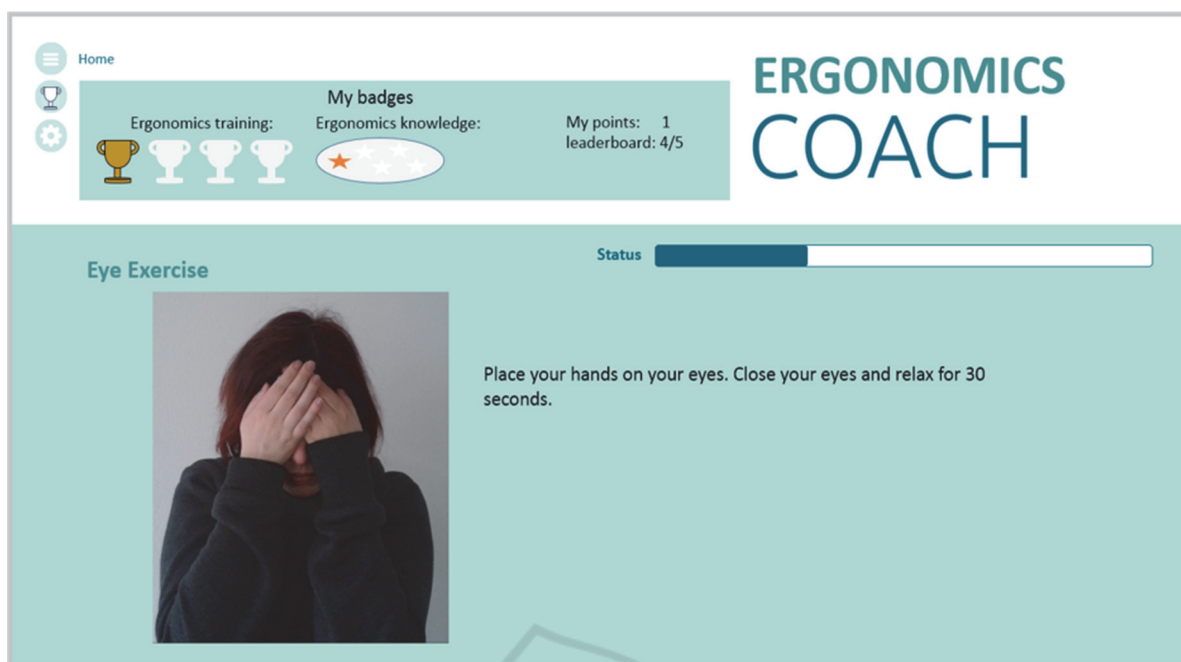Figure 1: Prototype showing badges, points and position in leaderboard.

Figure 2: Eye exercise with progress bar.

several exercises (eye exercise, see figure 2, and neck relaxation exercise). All participants started with no badges, no points and on the last place in the leaderboard and continually acquired points and badges for each completed task. According to the score the user raised in the leaderboard. For every completed exercise, a new exercise was unlocked. At the beginning of each test, two exercises were already available.

In the second part the participants were asked to fill out a questionnaire concerning their general gaming behaviour, their motivation during the test run and their evaluation of the gamification elements provided.

4.2 Results

General Gaming Behaviour. Two of the participants play mobile and/or PC games daily, two several times a week, six occasionally (less than several times a week) and six never. One person specifies

that he plays mobile and/or PC games with others together daily, two several times a week and 13 never. Board games are played by two of the participants several times a week, by four several times a month and by 10 occasionally (less than several times a month).

Motivation during User Tests. The testers were asked to evaluate how much they fell motivated by the following gamification elements during the test: badges, progress bar, points and leaderboard (table 1). The participants were able to choose between 'very motivated', 'somewhat motivated', 'hardly motivated', 'not motivated' and 'I haven't noticed'.

The participants who chose 'I haven't noticed' indicated that they focused too much on the task and therefore did not pay attention to the gamification elements. Some of the persons who felt 'somewhat motivated' stated that the test was actually too short to invoke motivation but that the elements might motivate them in the long run.

Table 1: User motivation during the tests.

How much were you motivated by …?	very motivated	somewhat motivated	hardly motivated	not motivated	I haven't noticed
badges	2	6	6	1	1
progress bar	6	5	1	2	2
points	0	7	3	1	5
leaderboard	1	4	6	4	1

Table 2: Long-term user motivation.

How much would you be motivated by …?	very motivated	somewhat motivated	hardly motivated	not motivated
badges	3	10	3	0
progress bar	7	8	0	1
points	4	9	2	1
leaderboard	2	8	3	3
tip of the day	1	5	7	3
comeback badge	1	7	7	1
days in a row badge	1	8	3	4
activation of exercises	8	5	2	1

Table 3: Long-term user motivation of female and male participants (percentages rounded).

How much would you feel motivated by …?	very motivated		somewhat motivated		hardly motivated		not motivated	
	female	male	female	male	female	male	female	male
badges	14%	22%	43%	78%	43%	0%	0%	0%
progress bar	29%	56%	71%	33%	0%	0%	0%	11%
points	14%	33%	57%	56%	29%	0%	0%	11%
leaderboard	0%	22%	57%	44%	14%	22%	29%	11%
tip of the day	14%	0%	29%	33%	43%	44%	14%	22%
comeback badge	0%	11%	14%	67%	86%	11%	0%	11%
days in a row badge	0%	11%	14%	78%	43%	0%	43%	11%
activation of exercises	57%	44%	29%	33%	0%	22%	14%	0%

Long-term Motivation. The participants were also asked to estimate to what extent the gamification elements would enhance their long-term motivation (table 2).

They were also asked to assess further elements not present in the prototype. Regarding *quizzes*, three of the participants said that a quiz that retrieves knowledge playfully would make lots of fun, 10 some fun, two little fun and one no fun. Furthermore, four participants said that a quiz would motivate them very much to work through further knowledge units, nine a little, two barely and one not at all.

14 of the 16 participants would like to use a *star rating system* to evaluate the exercises. Eight persons said that such a rating system, showing reviews from others, would be very helpful, five a little helpful and three hardly helpful. Seven of the participants would find it very interesting to see such reviews, another seven a little interesting and two hardly interesting. However, in the user tests the rating of the exercises had little influence on the participants' choices: 11 participants said the ratings had no influence, three said some influence and two a little influence. Instead, the topics of the exercises

were the decisive factor. However, as the full version of the Job-Crafting Coach will comprise a lot more content, a rating system will presumably gain importance.

The distribution of responses of female and male participants is shown in table 3.

5 CONCLUSIONS

In this study we investigated how solo-self-employed and people with individualized working conditions could be motivated to use an online coaching application by means of gamification.

We examined gamification elements and other additions ('tip of the day', quizzes and a star rating system) as motivational drivers. To this end, we developed a prototype and tested it with the target group.

The results indicate that progress bars, activation of exercises, badges and points would generate the most positive motivational effects in the long term. A leaderboard would achieve a less positive effect. Furthermore, the participants would also feel

motivated by quizzes and a star rating system for the exercises.

The 'tip of the day', 'days in a row badge' and 'comeback badge' were rated the least positive. This shows that the type of badges is very important and that different badges might not have the same motivational effects (see table 2). This should be investigated further in future studies.

The results also show that gamification elements have different effects on female and male participants: Male users would feel more motivated by points and badges (particularly 'days in a row badge' and 'comeback badge') than female participants.

Our study also shows that gamification has only a small effect in short-term use compared to long-term use. Only progress bars seem to motivate similarly regarding temporary and long-term use. This is promising as our application is specifically geared at long-term usage, and gamification elements are supposed to support continual use and keep up participants' motivation in spite of a stressful working life. However, general research on gamification should consider that short-term and long-term effects might be quite different. Thus, gamification might be less suitable in applications that are typically only used for shorter periods of time. Further studies on gamification need to take this into account.

Interestingly, the testers' general gaming behaviour had no influence on the results. However, it is known from previous studies that user characteristics influence the effectiveness of gamification (cf. Hamari et al., 2014). Therefore, in our future research we will take a closer look at different personal variables such as age and also personality traits.

Our target group differs from the students usually investigated within educational and learning contexts in previous work (Hamari et al., 2014). However, we argued that both groups share significant similarities. Our study confirms that the positive effects of gamification carry over to our target group of professionals with flexible working conditions.

Of course an important limitation of this study is its small sample size, as it was meant as a first test whether gamification makes sense in this context at all. Based on these first results, a fully functional prototype will be developed incorporating the elements that proved successful in this test (progress bars, activation of exercises, badges, points, leaderboard, quizzes and star rating) to test their long-term effects with a large set of users.

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