

# Chapter 5

## WorkAI: Raising Work–Related Self–Awareness With Gamified Approach

**Pauliina Tuomi**

 <https://orcid.org/0000-0001-9986-6426>

*Tampere University, Finland*

**Kati Fager**

*Crazy Town, Finland*

**Jari Multisilta**

 <https://orcid.org/0000-0002-5636-6365>

*Satakunta University of Applied Sciences, Finland*

### **ABSTRACT**

*The gamification of different work tasks remains an area where studies have focused mainly on conceptual considerations. This chapter focuses on the gamification process in facility services jobs – cleaning and maintenance. In general, gamification can improve productivity and workplace well-being. Better motivation is supposed to lead to better results and more enjoyable work. This chapter describes the process of gamifying facility services jobs, from the interviews of the staff to the implementation of the custom-made application, WorkAI. Eighteen employees participated in the pilot study, filled in a questionnaire, and attended semi-structured end-interview sessions. This chapter shows how personnel perceived the gamified solution and its possible effects on the employees and their work. Based on the results, the gamified solution must be easy to adapt and should not disturb work routines. This application’s main benefit lies in the employee’s self-reflection and self-evaluation.*

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## INTRODUCTION

Gamification is often described as the use of video-game elements to improve user engagement and experience with non-game initiatives (Deterding et al, 2011, 1). Benefits of gamification have been widely acknowledged in recent years and it has been studied from several viewpoints. Gamification has been previously implemented for example in education (Landers & Landers, 2014; Clark, Tannersmith & Killingsworth 2015), data-collection (Downes-le Guin, Baker, Mechling, & Ruyle, 2012), health (Bellotti et al. 2010; Jones, Madden, & Wengreen, 2014), marketing (Hamari, 2013, 2015) and environmental protection (Gustafsson, Katzeff, & Bang, 2009).

Gamification in work has also been in the interest of research for a while now. (e.g., Arai, Sakamoto & Washizaki, 2014; Fernandes et al., 2012). It has been seen supporting user engagement and enhancing positive patterns in service use, such as increasing user activity, social interaction, or quality and productivity of actions (Hamari et al. 2014; Hamari 2013). Based on e.g., Hamari et al. (2014) research, these desired use patterns are considered to emerge because of positive, intrinsically motivating (Ryan & Deci 2000) “gameful” experiences (Huotari & Hamari 2012) brought by game/motivational affordances implemented into a service. (Hamari, Koivisto & Sarsa 2014)

According to Sailer, et al. (2017), game design elements can deliberately be used to modify non-game contexts such as working environments to address motivational mechanisms, especially when well designed and built upon well-established implementation models. (Sailer, Hense, Mayr & Mandi 2017, 378) gamification primarily aims to increase users’ positive motivations towards given activities or use of technology (Hamari & Koivisto 2015; Huotari & Hamari 2016) It has been suggested that more and more of all organizations will have gamified parts in their processes in the future (Morschheuser, Werder, Hamari & Abe 2017)

Scholars in the field of workplace settings have argued that the use of game elements in the workplace setting might increase intrinsic motivation and thereby the meaning of work (Nicholson, 2012; Rosso, Dekas, & Wrzesniewski, 2010). Gamification is used to make work activities more enjoyable and interesting in schools, health care and business. Reward schemes can help achieve this through performance-dependent points, increasing levels of difficulties, leader boards, and achievement badges (Nicholson, 2015). However, there is still a need for empirically based knowledge on gamification and, it has not been studied elaborately in business organizations, i.e., real-life professional settings. (Obrescu et al. 2014; Hamari et al. 2014; Pogrebtsova et al. 2017; Lamberts et al. 2016; Hoffman et al. 2017).

In this study, the overall approach was to explore whether the gamified approach influences both the self-awareness and the knowledge acquisition of respondents during the pilot. The approach in this study is to use a gamified solution called WorkAI that aims to track the employee’s daily routines and feelings through relevant thematical areas. WorkAI can then be seen as a tool for self-evaluation. There are studies concerning the gamificational approaches that deal with the idea of work personnel self-awareness in the workplace (Lamberts et al. 2016; sutton et al. 2015), acquisition of knowledge in information security (thornton & Francia 2014; Antonaci et al. 2017), sociocultural studies (sitas 2017), emotional level in stress management (Hofmann et al. 2017) and overall, in workplace well-being (e.g. Pogrebtsova et al. 2017; Alatalo et al. 2018). Organizations have become increasingly aware of the positive implications of promoting well-being at work. Well-being at work is a concept that can be associated with various aspects of workplace health promotion (Anttonen & Vainio 2010). In this study, the substance of the application is gathered to raise self-awareness and through the application the employee is able to visualize his/her current position in respect to the themes. The approach of self-measurement and self-

## **WorkAI**

evaluation can be seen as phenomenon of “the quantified self”, term that was coined by Gary Woolf and Kevin Kerry in 2008. Nowadays it is possible to varying degrees to self-track and self-measure using smartphones, watches, and other wearable technologies. For example, physical activities are monitored and transformed into data, which can be used to generate statistics and can be shared on social networks (Maturo et al. 2016, 249.)

The study and the WorkAI application and its substance concentrates on the physical (workplace circumstances), psychological (self-evaluation and well-being & endurance at work) and social level (communication and cooperation). A view of this kind can be considered to refer to a holistic perspective on well-being at work (Alatalo et al. 2018, 226). However, in this project the aim is not to measure whether the actual well-being increases. The overall aim is to raise awareness how daily work processes influence the well-being, health and for example safety at the workplace.

Research questions:

- 1) How was the gamified application perceived by the respondents?
- 2) What affects, if any, WorkAI had in terms of self-awareness?

## **BACKGROUND**

### **Kisa-Project**

Kisa-project (2017-2018) was funded by the Finnish work environment fund (TSR). The aim of the project was to study how does gamification effect the facility services jobs – especially in real-estate maintenance and cleaning services. The overall process of this project included work engagement scale test, interviews with the staff, design process of the application based on the interview findings, implementation, and piloting and finally end-interviews. The cooperative organizations RTK-palvelu (cleaning services) and Porin Palveluliikelaitos (real-estate maintenance) were committed to take part in the project. (Fager, Tuomi & Multisilta 2018, 57)

### **Application**

The application development process is a combination of adapting existing platform and using external developers. Application bases on “one by one” platform by Headai that is an AI - based interactive questionnaire form. Headai company operates on artificial intelligence (AI), and they blend cognitive psychology, machine learning and semantic computing<sup>1</sup>. The used user interface resembles Whatsapp or Messenger, but instead of messaging a person, a software robot (bot) is messaging to the user, who has certain answering options to message it back. The background work and the design of the used application is better described in the paper “Gamifying facility service jobs - using personnel attitudes and perceptions for designing gamification” (Fager, Tuomi & Multisilta 2018), presented in the Gamifin 2018 conference. The conference paper focuses then on the design process of the application, while this chapter analyses the actual results of the study through interview and inquiry data. This book chapter manuscript then expands (by using totally different data & research focus) the previous work from a different perspective.

In the WorkAI application, the aim is to get the workers to self-evaluate different aspects of their work. The content of the application is on general level (not profession-specific), and it deals with work-related content widely, via themes described in Table 1. (Fager, Tuomi & Multisilta 2018, 60)

*Table 1. The main themes of the application*

Social	Physical	Psychological
Sense of community (1)	Safety in work (1)	Self-evaluation (2)
Information flow (2)	Work itself (1)	Feedback (3)
customer experience (2)	Working hours (2)	Learning (1)

All in all, WorkAI consists of fifteen different question patterns under nine themes. Fifteen was chosen because of three-week testing period (with five workdays a week) with dividing some themes into two or more categories. The categories are presented in table 1.

Using WorkAI goes as follows:

- At first you register in and create a software robot (bot). One can name the bot as one likes. Next step is to click “start” and the bot starts messaging to the user, explaining what the application is all about.
- One can then choose a theme to address. The bot introduces the theme and then gives one a claim, such as “I will say hello to five customers today” (communality) or “I will have a peaceful coffee break” (working hours) or “I got good feedback from my supervisor” (feedback). Some of the claims guide the worker to activity, some were just statements of how things are.
- The bot gives the answer scale (Likert): very often / often / seldom / not at all / does not concern me. One chooses the answer, and the bot gives feedback like “good!”, “well done!” And then moves on to the next question. (Fager, Tuomi & Multisilta 2018, 59)

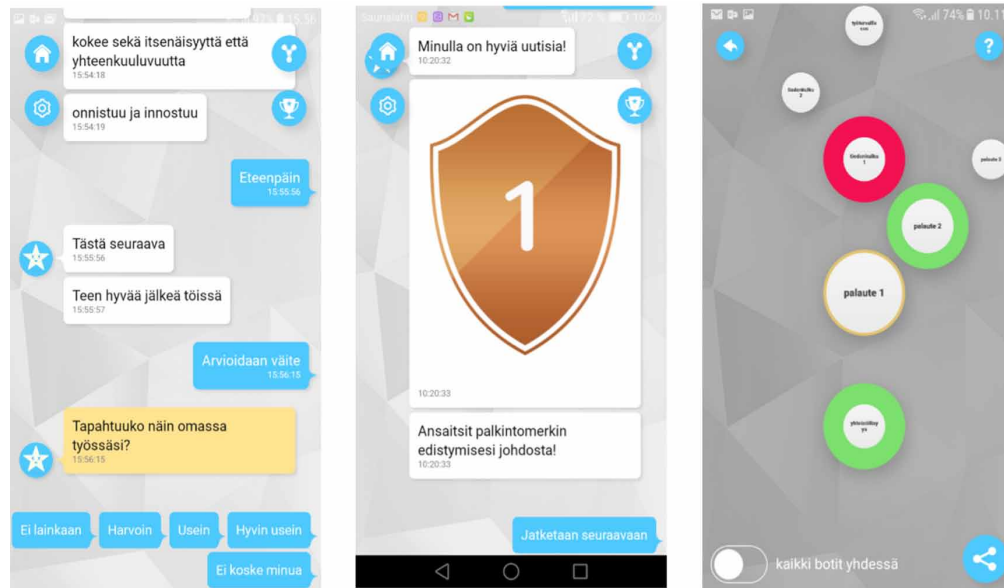
All the time one “plays”, one can also choose to check how one has progressed from the learning map, check out the trophies one has earned or go back to the starting page. The nine themes and the questions of WorkAI can be found from Appendix 1.

## RESEARCH METHODS AND DATA

The project operated within the action research (AR) framework. In KiSA-project the researcher and the organizational actors both participated interactively in the research. The approach was selected since it is particularly suitable when a study aims at improving a situation by making concrete changes to it (Toubolic & Walker 2016) and, at the same time, expanding scholarly knowledge providing deeper insights into the issues under consideration (e.g. Toubolic, & Walker 2016). Action research involves active participating in changing situation, often via an existing organization, whilst simultaneously conducting research. (Fager, Tuomi & Multisilta 2018, 56)

## WorkAI

Figure 1. Screenshots from WorkAI application. On the left, caption from the conversation with the bot (in Finnish). In the middle, first badge/trophy given for progressing in the application. On the right, the learning map where participants can follow their own progress and/or choose themes. (Fager, Tuomi & Multisilta 2018, 60)



The data consists of a) semi-structured interviews before the pilot, which were utilized in designing the gamified application, b) the data collected by the application during the pilot and the researcher's observation on the usage of the application, and c) the questionnaire and semi-structured end-interviews after the pilot. In this chapter, the focus is on the results of the questionnaire and end-interviews.

## Pre-interviews

The initial semi-structured theme interviews took place in both workplaces in spring 2017. Two researchers executed the interviews based on the thematic frame of questions that reflected with the previous research on work life research, work life well-being and gamificational aspects. Staff members were interviewed individually, and interviews were recorded. One interview took approx. 45 minutes. Interviews were transcribed afterwards and analyzed qualitatively using a thematic analysis. Overall, 18 staff members, 14 from RTK-palvelu and 4 from Porin Palveluliikelaitos, were interviewed. Two of the interviewees were managers. Three of them were male and fifteen were female. The interviewees were selected voluntarily, based on their interest to take part.

## Design Process

The data from the initial interviews were utilized in designing the gamified application. The main result was that the application needed to be simple, easy and fast to use. There was also clear need to move from specific work-related tasks to more general user needs, since the tasks and work environment of

the workers varied substantively (Fager, Tuomi & Multisilta 2018, 62). Themes from the interview data that operated on the physical, psychological, and social levels were detected. Themes were developed further into practical claims on the gamified application.

The gamified application was supposed to be developed by the research team but instead, already existing, potential platforms were benchmarked. Habitica2- communal, a rewarding application was tested, but it was rejected since it operated only in English language and had a complex user interface and also due to the unsureness of the data collection possibilities. After that an application of a local AI company was tested and it was decided to use their “One by One” platform and have it modified for project’s purposes, while the specific content was designed by the researcher team. (Fager, Tuomi & Multisilta 2018, 59) By selecting the platform, the gamified approaches were decided as well. The platform uses a software robot (bot) as an interactive character in the application. The bot gives the user a feel of a conversation and softens the questionnaire-like structure of the application. It can be regarded as a story/theme category of motivational affordances (Hamari et al. 2014). The other gamified elements were badges that one gains when advancing in the application and progress, which the user can follow from the learning map. The gamified elements were limited in these three in order to keep the application simple and fast to use.

The development process reflects on the Morschheuser et al. (2017) method for designing gamification, which divides the process into seven phases. (Morschheuser, Werder, Hamari & Abe 2017, 1300-1301, 1303-1304) How the method was applied in this project is better described in the paper “Gamifying facility service jobs – using personnel attitudes and perceptions for designing gamification.” (Fager, Tuomi & Multisilta 2018)

## The Pilot Study

The pilot study (staff members using the gamified WorkAI application) was implemented in March-April 2018. Most of the participants were different than of the initial interviews. There were nine voluntary participants from RTK-palvelu (cleaning services) and nine from Porin Palveluliikelaitos (real-estate maintenance). The pilot study began with training sessions of both groups. The participants used the application during workdays for a period of 3 weeks (15 workdays). During the try-out phase, researcher was observing the use of application in the work environment.

## End Interviews

In order to get the overall experiences and opinions towards the pilot study and application, semi-structured interviews were conducted with the pilot study participants. All 18 participants took part in them. The end-interviews were done in groups, in both workplaces individually. In the beginning of the interview, the participants were asked to fill-in the questionnaire forms. After that, there was a semi-structured end-interview based on the thematical areas of WorkAI and the participants were able to speak freely how they had perceived the use of application and its content. Gamification elements were discussed as well. The semi-structured interview questions can be found from Appendix 2.

## RESULTS

### End-Questionnaire and Interview Results

Both the end-questionnaire and - interview data were analyzed. The final interview results are in line with the questionnaire results and in addition to questionnaire the interview sessions gave the participants a possibility to speak freely about the content of the questionnaire and the pilot study itself. Since only two organizations were involved and the number of participants is rather small, the end-interview results are not identified on the organizational level, they are left anonymous. The results are presented by highlighting the number of participants, out of the overall amount of 18, in parenthesis. The options agree/disagree and strongly agree/disagree are combined.

### Application

Based on the end-questionnaires, for the majority, the application and its usage were considered easy, well-adopted (18) and participants did not encounter major technical difficulties (17). The participants felt the use of application fun (15) and some felt it was beneficial (8). Majority (14) would like to use similar application with perhaps new thematical areas in the future. (See Table 2.)

*Table 2. Application*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	No opinion
It was easy to start to use the application	0	0	0	2	16	0
The technical execution of the application was good	0	1	0	2	15	0
The application was easy to use	0	0	0	2	16	0
The application was fun to use	0	2	1	10	5	0
The application was useful to me	2	1	6	7	1	1
I would like to use a similar application in the future	1	1	2	5	9	0

During the end-interviews, majority of participants highlighted the easiness of the AI work application – both when starting the usage as well as during the experiment. No one encountered major technical difficulties nor felt assistance needed.

- “Easy to start using, there were no technical difficulties during the try-out”
- “The interface was really good, would be really suitable for people born in the 21st century – it also worked very well and was easy to use.”

However, few remarks concerning the logic behind the application aroused during the end-interviews. This was mainly due to the AI logic and the preconditions of the applications. The problem was noted

during development before the actual piloting, but due to the budgetary and schedule-related reasons the application could not be modified. The bot in WorkAI offered same thematical areas several times even when participants had done them already during the day. This lead to confusion time to time.

- “There were some repetitions in the questions. Made it hard to answer all the questions”

In addition to this, it would have been more beneficial if the bot would have been showing the already covered areas clearer by preventing participants to go through the same theme. This feature is probably one of the reasons why all the participants did not go through all the areas.

- “You didn’t always know where you were, what areas had been completed.”
- “Where’s the logic? It didn’t operate on numerical order?”

### Substance

The application included nine different themes and based on the results, the participants executed the thematical areas as planned (one area per day) and considered themselves motivated to access the next stage/theme. The majority (13) did go through the whole 15 steps. The content of the thematical areas were seen both relevant (10) and irrelevant (4) to participants work. See Table 3.

Table 3. Substance of the application

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	No opinion
I used it one subject/theme at a time	3	3	0	8	4	0
I was looking forward to exploring the new theme	1	0	6	7	4	0
I went through all 15 topics	2	0	1	4	9	2
The content of the app seemed irrelevant and not related to my work	5	5	4	4	0	0

Despite this challenge, the perception of the application remained positive throughout the both interview sessions. 11 of the participants felt motivated to finalize one area and then accessing the next one. Based on the interviews, the intrinsic motivation was a key factor also behind the motivation to proceed – if the themes were felt important, they were perceived close to the participants work day, participants were motivated to go further and reach another area.

- “The themes arouse a lot of questions in my mind. I was easy to answer the questions since they related to my work”
- “All areas were relevant to my work and I considered them important”



## WorkAI

Overall, the themes of the bot were considered mainly relevant, but during the interviews it was stated that it might be more effective to actually concentrate on one theme instead of covering them all. One suggested theme in both of the interview sessions was work safety.

- “The whole application could have concentrated on work safety”
- “Work safety is a very important theme that all employees should be reminded of – also the fact that all issues should be reported”

This aspect also brought up some critical feedback as well as suggestions how to improve the application in relation to work safety. The more interactive interface was proposed.

- “The application just revised the old knowledge I already had; it didn’t however make it interesting since nothing actually happened”
- “Could the use of pictures/videos and more in-depth questions make the application on work safety more affective?”
- “It would have been nice to be able to actually provide my own answers (in text) and at least to explain and elaborate the questions choices I made.”

Work safety was seen as a theme that a) would require daily attention and b) would be relevant to everyone. Of course, in this case, the content would have to be produced by an expert of a certain field e.g., work safety concerning cleaning maintenance’s use of corrosive liquids.

## Gamification

11 of the participants agreed that the trophies were seen as positive feature and 9 felt collecting them as motivating. Also, the map that highlighted the areas participants had gone through as well as their progress in general, was considered (15) a motivating feature. See Table 4.

Table 4. Gamification elements

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	No opinion
I perceived the trophies positive	0	0	5	5	6	0
Collecting trophies motivated to move forward in the application	1	1	7	4	5	0
I was following my own progress on the map	2	0	1	5	10	0
I chose themes through the progress map	5	3	0	5	5	0
I wanted to go through all areas of the progress map	0	0	3	5	10	0

Also, in the end-interviews, the use of gamified elements was perceived positively. There were three elements used: the software robot (bot) as a story/theme element, badges that you gained when advancing in the application and progress, which the user can follow up from the learning map (Gamified elements in line with motivational affordances by Hamari, Koivisto & Sarsa. (Hamari et al. 2014, 3027)

The respondents liked the playful and interactive bot and its pleasant mode of talking was a liked feature.

- “The bot and its way of talking was smooth and funny!”

The use of the map where one can follow up his own performance and success was used a lot and it functioned as a visualisation of one’s progress.

- “It was good that you were able to follow your progress through the map function”
- “I followed the progress map, but I liked the trophies better”.

The use of map was also, based on the interviews, a feature that brought up collective efforts and communication. Both within the pilot group, but also with people outside the pilot experiment e.g. during the coffee breaks of the whole company.

- “The application made me talk to my colleagues more.”
- “The questions enabled conversation (with colleagues) and the application worked as a good topic”
- “We browsed the application together with my colleague”
- “We used the application together and had conversations on the topic”

As a remark, it is evident that for the personnel that operate and work on their own on several locations, the sense of community is totally different than for the personnel that work together throughout the day. Also, the organizational cultures and ways to operate influence the sense of community, as well does the personality of the employee.

The collecting of the trophies was seen as a motivating feature. Participants felt that receiving a new trophy encouraged them to continue to pursue the next one. Participants said they felt proud when receiving a digital trophy on their phone.

- “The trophies were great!”
- “I waited my next trophy a lot”

Again, some ideas of improving the idea of trophies were presented during the end-interviews.

- “This is a great application for the youth. Would be great if the trophies could be earned through actual work tasks, not just for answering questions”
- “Would be great if you could post on Facebook every time you unlock a trophy”

However, it was also stated by the respondents that the application could have emphasized more gamificational elements and that the application was not perceived as a game as suspected.

## WorkAI

- “It didn’t really feel like a game, more like a questionnaire.”
- “Would be nice if you could personalize and customize your own bot, appearance, looks etc.”

The work-related requirements of having the application easy and fast to use affected the fact that the solution could not be more interactive and intense. The application had to appeal differently.

## Effects on Work Routines

Based on the end-questionnaire, the use of application did not disturb the majority’s work routines (14), and the use of application was fluent during the workday (13). Some (8) felt working more positive while using the application and a few (4) of the participants felt that the use of application helped them to improve their work. Some (8) felt as the application had taught something new. See Table 5.

Table 5. Effects on the workday and routines

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	No opinion
The use of application interrupted work routines	11	3	1	2	1	0
The use of application was smooth during the working day	1	1	2	3	10	1
Performing work assignments seemed more meaningful during the experiment	2	2	6	4	2	2
The arguments provided by the application helped to improve my work	2	4	7	3	1	1
I learned new ways to operate based on the claims applications offered	2	3	4	7	1	1

The participants highlighted also in the end-interviews that the application did not disturb their work routines and tasks. This was especially important for these particular work places – the main result of the pre-interviews was that the application needed to be simple, easy and fast to use and that using it shouldn’t disturb the work routines. Participants described the use of application during the workday fluent and some of them even stated that working felt more positive with the application.

- “WorkAI didn’t interrupt my working. On the contrary, it was fun to have the bot chatting and asking questions.”
- “I liked the fact that WorkAI intercepted the workday a bit and I had something different to do for a while.”
- “It (WorkAI) was pleasant, not ‘stalkative’. (in the meaning of harassment)”

## The Main Outcome: Self-Awareness

The main outcome of the gathered data was, all aspects mentioned combined, the factor that the application and substance got respondents to think about their own behaviour. The process of becoming more self-aware is shown in the transcript answers below. There were three areas that participants most frequently became aware of in relation to their own experiences and feelings. First theme was well-being and how to manage the workload. This is an important factor since the balance between workload and one's endurance affects the well-being at work. (Anttonen & Vainio 2010; Schaufeli et al. 2002).

Well-being & endurance (e.g., hurry, fatigue):

- “The work effectivity clearly declines in the afternoon; you just notice that you get tired. It is not stress-related, it is just that you slow down.”
- “It would help me to endure working if I could have an impact, a possibility to suggest the order of the work tasks allocated for the day.”
- “My endurance and effectiveness are day and week-based, but it was good to actually woke up to think about this.”
- “I noticed while answering that how much does the badly slept night affect the following work day or how important it is to eat right.”

The second theme was workplace environment and general feedback system at work. Also, these aspects are crucial for the employees feeling of control and succeeding in one's work tasks. Feedback can increase the feeling of occupational identity and empowerment when given constructively. (Anttonen & Vainio 2010) By getting feedback, the professional identity and self-confidence can be boosted, which affects the efficiency of the employee beneficially. (Askheim 2003, 230).

Workplace circumstances (e.g., safety, feedback system):

- “I just suddenly noticed that I actually get feedback every now and then”
- “(I awoke to) the fact work safety issues are not reported because there is sort of a mentality towards it. All the serious ones are reported of course, but the close-cases are rarely.”
- Feedback-theme arouse most thoughts. I get negative feedback time to time, but it is a good thing since only through that we can make things better. Sometimes I feel that the negative feedback is also sometimes seen or perceived as a bigger thing that it actually is.”

The third theme was social communication within the workplace. A positive atmosphere enables employees to share their feelings and knowledge which again may increase the feeling of empowerment. (Alatalo et al. 2018; Anttonen & Vainio 2010; Zimmerman 1995, 592)

Social communication (e.g., work colleagues, customers, superiors/employees).

- “Noticed that I don't necessarily talk a lot to others, could talk more, but always depends on the work situation, especially location.”
- “The questions made me think that even if someone sometimes annoys or disturbs you, you should not react.”
- “Made me think of how I work among the others, do I get nervous and do I let it show to others etc.”

## **WorkAI**

To conclude, the main preconditions from the pre-interviews – application needed to be easy and fast to adapt and use without disturbing work routines - were successfully implemented into the application used in the pilots. This was confirmed both through the questionnaire results and group end-interviews. Also, the reception towards gamified elements (bot, map and trophies) was promising. One of the most positive outcomes in respect to the whole study, from the design of the application to actual pilot experiments, is the fact that the clear majority would be willing to use a similar application in the future as well. The main benefit of this sort of application would lie in the self-reflection and self-evaluation. In order to feel empowerment, the employee must have a feeling of control of his/herself and work. (Askheim 2003, 230; Zimmerman 1995, 592).

- “Self-reflection was most beneficial in this experience!”
- “I thought every question precisely, I never answered lightly.”
- “This could be arranged once a year in order to remind employees about these issues, motivation and well-being.”

## **DISCUSSION**

Overall, the pilot study was executed as planned. There are however few remarks concerning the process.

In a review of the literature, Hamari et al. state that most published gamification studies reported some positive effects, but they identified a number of methodological limitations that may have contributed to varying results. These limitations included small sample sizes, lack of control groups and very short experiment timeframes. A fourth limitation was that multiple game elements were often investigated in combination, but not individually, making it impossible to establish whether individual elements had measurable effects (Hamari et al. 2014).

When reflecting to these valid points gathered by Hamari et al 2014, it can be said that the amount of the respondents in this study is rather small so the findings cannot be generalized. However, within this project the approach was qualitative which aims to in-depth understanding of a certain, specified research theme, not on representativeness. The results cannot be generalized also due to the fact that there are lots of variety in the participants’ background - ICT skills, technology used at work, attitudes towards games etc. The expectations towards games as well as the prior knowledge of the players can lead to different game experiences and learning outcomes within the same game. (e.g., Plass et al.2015). The working conditions vary since there are a lot of difference between the two organizations and within them. Unfortunately, also the idea of control groups was not applicable at this stage of the project.

There were three different gamificational elements within WorkAI, so it is not possible to say whether the appreciation of the application bases on the trophies, bot, progressive maps or even just on the functionality of the application and its themes. To point out, it would be difficult to come up with a gamificational solution with only one gamified feature. The three features in WorkAI were not adequate to some of the participants since they felt the solution not gamified enough. Nacke and Deterding (2017) state well while saying that at the heart of the gamification design process is the development of gameful systems, which are complex combinations and interactions between elements. To explain these systems, there is also a need for more complex explanations than the mere understanding of how each element functions individually (Nacke & Deterding 2017, 453). It is also problematic where to draw the line on what constitutes gamification in the given context (e.g., Warmelink et al.2018) and it should also be kept

in mind that gamifying something does not make it automatically engaging – there needs to be enough value in the concept to want people to participate and play along (e.g., Kim 2015).

Also, in respect to the WorkAI and end-interview results, one particular theme area could have been chosen instead of using all of them as a content of the application. It could have concentrated on e.g., safety at work or well-being in order to give more intense and detailed insights to the participants. Also, the AI features of the platform could have been executed more properly. If used more effectively, AI would enable searches for information on certain topics that could be filtered to the application in wanted way. In the future studies concentrating on one theme and seeking the ways of using AI in gamification could produce more beneficial outcomes to the employees.

Also, at this stage only the data from the interviews was utilized as a background for the application. However, facility service jobs already produce lots of sensor-based data, often in the form big data. These could be for example the energy consumption of the buildings, satisfaction of the users of the buildings, cleanliness, and the fuel consumption of the work appliances. In the future, this sort of a data could be utilized in gamifying different work tasks. Then it would be possible to integrate gamified elements to already existing technical systems.

## **CONCLUSION**

This chapter described the design process of a solution to gamify facility service work tasks. The used application bases on the pre-interview data and the design process were reported in line with Morschheuser's et al. (2017) theory on designing gamification (Morschheuser, Werder, Hamari J & Abe, 2017; (Fager, Tuomi & Multisilta 2018). The main findings of the pre-interviews were: a) the application for facility service work needed to be simple, easy and fast to use b) communal and rewarding elements were appreciated c) the participants' background and the working conditions varied a lot. This demanded the application to concentrated on the general user needs rather than specific work-related tasks. Nine work-related themes were detected from the interview data and the WorkAI application was built on them. The 3-week pilot study took place on spring 2018 and overall, 18 employees participated in the study. After the pilot study, participants filled in a questionnaire and attended semi-structured group interview sessions. In this chapter the focus was on the results of the questionnaire and end-interviews.

Based on these results, the answers to research questions are the following: 1) How was the gamified application perceived by the respondents? The attitudes after the pilot study were positive and the gamified features implemented in the application were positively perceived. Half of the respondents felt the use of application motivating, especially through the gamificational elements e.g., collecting of the trophies and progress map. Also, the use application did not interfere with respondents' work-routines during the pilot. As a promising result, due to the previous points, the majority would like to use similar solutions in the future. Based on the results, the gamified solution needs to be easy to adapt and it should not disturb work routines. Secondly, it should operate on relevant issues and offer new insights on e.g., well-being at the workplace. Thirdly, gamified elements play an important role when motivating respondents to use the solution daily. To conclude, the main preconditions – easy and fast to use and adapt without disturbing work - were successfully implemented into the application used in the pilots. This was confirmed both through the questionnaire results and group end-interviews. 2) What affects if any WorkAI had in terms of self-awareness? The main outcome of the research was clearly, all aspects mentioned combined, the factor that the application and substance got respondents thinking about their own behaviour. The end-

interview data highlighted the fact that the thematical areas, the substance of the application evoke lots of thoughts that increased employees' self-awareness on the topics. The participants started to reflect their own attitudes, behaviour and working habits. Though personal development might appear to be an intrinsic outcome, as an incentive it is an extrinsic goal that can be achieved through the participation in the gamified process. As such, it is not the participation in the gamified process that motivates the participant, but the expectation of improved personal skills (Lamberts et al. 2016). Therefore, the main benefit of this sort of application would lie in the self-reflection and self-evaluation.

In the future it will be fruitful to measure the actual impact of the used application in the study group when compared to a control group without the application. Is there a clear difference when work engagement is measured for example through work engagement scale (UWES) by Schaufeli & Bakker (2003). The timeframe of three-week pilot study is short, but since the aim was to validate the application designed within the project, the period was feasible. In the future the application could be implemented as a feature that would run longer periods, as a part of normal work routines. Also, the aspect of managerial implications is interesting. Gamification, if employed successfully could be a tool for innovation and strategy. However, challenges might rise, in terms of data management. As most of the applications acquired user data, there is a need for management of such data, including security and ethical issues. Thus, gamification of management requires a management of gamification itself. (Wanick & Bui 2019, 14) According to Wanick & Bui (2019), the opportunities of gamification applied to management in businesses could be explored, such as management for environmental-related applications, sustainability, general education and training, team effectiveness, issues related to governmental practices and new policies, enterprise innovation and data management and protection. (Wanick & Bui 2019, 14) In all, a fun, engaging, gamificational experiment can be utilized for managers, staff, and leaders in global contexts, even the stakeholders involved in the process in a more engaging way and promoting more innovative outcomes. (Wanick & Bui 2009) As in KiSA-project, where both researchers and the organizational actors participated interactively in the project. This can be addressed since the idea and numerous opportunities around personalisation in different gamified applications.

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## KEY TERMS AND DEFINITIONS

**AI:** Artificial intelligence.

**Bot:** Abbreviation of the term robot.

**Gamification:** Use of game design -based elements in non-game contexts.

**Gamified Elements:** Usually elements such as use of badges, score list, avatars that can be used in non-game contexts.

**Productivity:** A measure to determine the efficiency of a person completing a task.

**Self-Awareness:** Ability to reflect to one's feelings, thoughts, and actions.

**Self-Evaluation:** Ability to examine oneself to find out how much progress one has made.

**Well-Being:** The state of being comfortable, healthy, or happy, efficient.

## **ENDNOTES**

- <sup>1</sup> Create Artificial Labour” <https://www.headai.com/>
- <sup>2</sup> Habitica- Gamify your Life: <https://habitica.com/>

## **APPENDIX 1**

### **The content of WorkAI application**

Does this happen in your own work?

Is this true for you?

Does this happen in your work?

very often / often / seldom / not at all / does not concern me.

### **Sense of Community**

- I talk nicely to my co-worker
- I go to a workplace health promotion event with my co-workers
- I help my co-worker in his/her assignment
- My co-worker helps me in my assignment

### **Feedback 1**

- I tell my superior how my workday has passed
- I thank my co-worker
- I thank myself for a job well done

### **Feedback 2**

- I get feedback from a co-worker
- I get feedback from a customer
- I get feedback from a superior

### **Feedback 3**

- I give feedback to a co-worker
- I give feedback to a customer
- I give feedback to a superior

### **Information Flow 1**

- We brainstorm together to solve a problem
- I figure out a development idea and bring it forward
- I learn a new thing at work

### **Information Flow 2**

- We learn a new thing together with co-workers
- I teach something to my co-worker
- My co-worker teaches me something

### **Safety at Work**

- I notice a security lack in workplace and report it
- I follow safety in work guidelines fully
- I take the initiative to improve safety in work

**Work Itself**

- I perform quality work
- I am prompt at my tasks
- I use stairs instead of elevator

**Learning**

- I learn a new feature from a technical system
- I use new equipment/tool/cleaning agent
- I succeed in a hard assignment

**Working Hours 1**

- I don't lose my nerves even when I get bothered
- I manage despite of hurry
- I don't let hurry affect my mood
- I spend coffee break in peace

**Working Hours 2**

- I spend lunch break as planned and in peace
- I remember to use the monitoring of working hours correctly
- I stay on schedule
- I forget things and it slows down my working

**Customer Experience 1**

- I say hello to around five customers in a day
- I talk nicely to customers
- I respond to customer feedback in a factual matter

**Customer Experience 2**

- I say hello to around ten customers in a day
- I respond to customer feedback in a factual matter
- I help the customer (open the door etc.)

**Self-Evaluation 1**

- I stay on a good mood the whole day
- Some assignments remain undone
- A seemed-like-an-easy-job doesn't work out

**Self-Evaluation 2**

- I postpone a tedious assignment
- I have to cut corners to get the job done
- Work-related thing bother me even outside work

## **APPENDIX 2**

### **End-interview questions**

1. **All the nine themes were individually discussed:**
  - How did you feel on answering questions from this theme?
  - Did this theme awake any thoughts?
  - Any notions concerning your own work?
  - Did the theme change your behavior?
  - Did the theme make you think differently?
  - Do you feel you learned something from this theme?
2. **The overall experiences of the pilot study and the possible effects were discussed:**
  - Did WorkAI influence your work, how? (Motivation, endurance, enjoyment, etc.)
  - Did WorkAI influence the sense of community, how?
  - Did WorkAI influence your self-awareness, how?
  - Did you feel that WorkAI was useful for you, how?
  - Did you feel that participating on this pilot study was useful, how?
3. **The gamificational elements of the experiment were discussed:**
  - How did you perceive the gamificational elements (the bot, trophies & progressive map) of WorkAI?
  - Did the gamificational elements influence your usage of WorkAI, how?
  - Did WorkAI succeed as a gamificational solution and what did you appreciate and what would you change?
4. **General and free discussion concerning the pilot study, WorkAI and overall feelings of the participants.**