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# A motivator game for forensic vigilance training

## Exploring the potential of the card game ROTBEESTEN?! as compared to treatment as usual\*

Rens Kortmann<sup>1</sup>[0000-0002-7088-4222], Rosalind van der Lem<sup>2</sup>[0000-0002-7689-3330], Doris Boschma<sup>1</sup>, Anouk Hakens<sup>2</sup>, Maartje Clercx<sup>3</sup>[0000-0001-9038-1035], and Erik Masthoff<sup>2</sup>[0000-0001-9721-1397]

<sup>1</sup>Delft University of Technology, Faculty of Technology, Policy, and Management, Department of Multi-Actor Systems, Delft, the Netherlands

<sup>2</sup>Fivoor, Poortugaal, the Netherlands

<sup>3</sup>Rooyse Wissel, Venray, the Netherlands

**Abstract** In the field of forensic mental healthcare, forensic vigilance is an important skill of healthcare professionals to deal with criminal behaviour of patients. The facilitated, collaborative card game ROTBEESTEN?! was developed to motivate professionals to enrol in forensic vigilance training. A controlled experiment was conducted with professionals from a Dutch forensic mental healthcare facility to explore the potential of the motivator game. The control condition involved ‘treatment as usual’: an oral presentation followed by a group discussion. Questionnaires, interviews and observations were used to measure certain participant characteristics, the quality of the game, and the user experience in both conditions. Respondents expressed significantly higher preferences for active, experiential learning styles than for learning from theoretical sources. In addition, respondents evaluated the quality of the game positively. Finally, respondents reported significantly higher scores on four out of five dimensions of (game) experience in the experimental condition than in the control condition. Limitations of the study include a low response rate to the post-questionnaires. As a result, the effects of both the game and presentation could not be established reliably. From the results, we may conclude that the game ROTBEESTEN?! was evaluated more positively and has more potential to motivate participants for follow-up training activities than ‘treatment as usual’ (an oral presentation). These findings are in line with the preferred learning styles reported. Games seem promising tools to motivate (healthcare) professionals to enrol in training activities. Future research will establish if indeed the game’s motivating effects exceed those of an oral presentation.

**Keywords:** motivator game, controlled experiment, forensic vigilance, learning styles, game experience.

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\* Corresponding author: Rens Kortmann, TU Delft, Delft, the Netherlands, L.J.Kortmann@tudelft.nl

## 1 Introduction

In the field of forensic mental healthcare, healthcare professionals provide care to patients with generally complex psychiatric problems and criminal backgrounds. The primary goal is to contribute to public safety by reducing and managing risks of patients committing crimes. In addition, at patient level efforts are made to build up protective factors and increase quality of life.

Organisations for forensic mental healthcare employ various types of healthcare professionals, such as psychiatrists, psychologists, psychotherapists, nurses and social workers. They have different educational backgrounds and are all required to attend periodical training on topics such as risk assessment, suicide prevention, and *forensic vigilance*. The latter is an umbrella term of all competences necessary for forensic mental healthcare professionals to deal with (the risk of) aggressive/delinquent behaviour (Clercx et al., 2021).

Fivoor, an organisation for forensic mental healthcare care in the Netherlands, offers an elaborate training programme for their healthcare staff. Although the programme has high quality standards, participants have voiced dissatisfaction with the teaching methods employed. Traditional methods, such as oral presentations, are perceived as being monotonously focused on cognitive skills and leading to passivity among trainees. The management recognises that consuming information passively may reduce the motivation to learn or continue learning. If training does not meet the needs of their staff (in terms of content or form), they mentioned it may prove ineffective and therefore not lead to the intended improvement of knowledge, skills and attitude. The latter is particularly an issue with regard to forensic care, which, according to the management, requires healthcare professionals putting theoretical knowledge into practice in interaction with patients and other stakeholders. The management believes that “doing and experiencing, and above all practicing, can prove to be more effective than a traditional teaching approach”.

Therefore, Fivoor and Delft University of Technology joined forces to develop and evaluate the card game ROTBEESTEN?!<sup>1</sup> to explore how game-based approaches may motivate healthcare professionals to make better use of the existing training portfolio. For this paper we established how healthcare professionals evaluated the quality of the game and how they experienced playing the game. We compared the game to an oral presentation followed by a group discussion, a method commonly used by healthcare organisations for motivating healthcare professionals (treatment as usual).

It was decided to design and deploy the game specifically within the context of outpatient treatment, where patients are treated who live at home (i.e., not being ad-

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<sup>1</sup> ‘Rotbeesten’ is a Dutch translation of ‘dirty beasts’ (the title of a poetry book for children by Roald Dahl). We chose this ambiguous title (and deliberately added ‘?!’) to refer to the fictitious patients featuring in the game (in the analogy of an animal world). The reason is that although forensic patients can behave truly badly and dangerously to others, they are also stigmatised as “unwanted members of society”. Forensic patients often struggle with their lives, due to severe problems dating back to childhood and few possibilities to improve their personal circumstances.

mitted to a closed ward of a forensic mental healthcare hospital). Section 2 provides theoretical background about forensic vigilance and its importance in outpatient treatment in particular. It also discusses game-based activities in relation to oral presentations. Section 3 outlines a controlled experiment, that was used to explore the potential of the motivator game as compared to treatment as usual. It also discusses the design of the game and game session (including debriefing). The experimental results are presented in Section 4 and discussed in Section 5 where the conclusions are drawn as well.

## 2 Background

Below, we explain the concept forensic vigilance in the context of outpatient treatment. Also, we hypothesise how the organisation may benefit from a game-based approach, instead of a traditional approach, to motivate staff for forensic vigilance training.

### 2.1 Forensic vigilance in outpatient treatment

Until recently, the construct *forensic vigilance* lacked a clear definition, despite its widespread use in the field of forensic mental health care in the Netherlands. A study by Clercx et al. (2021) provided a first definition:

*“Forensic vigilance is anticipating on possible escalation of a situation before it happens, by actively observing your surroundings and colleagues, and knowing when an observation requires action. Forensic vigilance requires awareness of the patient(s), their mental disorder, criminal history and awareness of the context of a forensic setting. It is being able to recognize even subtle signs of possible escalation, the capacity to communicate with colleagues about observations, doubt, uncertainty or gut feelings, and the willingness to act when necessary.”* (Clercx et al., 2021, p. 14).

In our research, we focused on forensic vigilance in the context of outpatient treatment. Forensic mental health care distinguishes *inpatient* treatment (in a forensic mental healthcare hospital) from *outpatient* treatment (where patients live at home and are visited by their therapists or come to de outpatient clinic for treatment). Due to the specific context, experts at Fivoor expressed that forensic vigilance in outpatients settings differs from inpatient settings in three main ways. First, while inpatients are incarcerated, outpatients live their life amid other citizens and, therefore, sometimes pose a direct threat to their environment. Weighing a possible threat to the community versus the wellbeing of the patient presents a prominent tension between interests in outpatient treatment that professionals have to consider. Compared to inpatient treatment, in outpatient treatment this tension is often exacerbated by limited resources and judicial measures, i.e. even when the forensic risk is high, therapists may have limited means to admit a patient involuntarily to a forensic psychiatric hos-

pital. Second, while in inpatient clinics the patients' behaviour can be observed by an entire team of care professionals, the therapists in outpatient facilities often need to rely on what their patients and their relatives tell them. Finally, while inpatient treatment is mostly limited to a short period, outpatient treatment is often long term. As part of their forensic vigilance, outpatient therapists have to take into account that coercion – which is sometimes necessary to reduce the forensic risks – might damage the often crucial long-term relationship with their patients.

Because of the three aforementioned complicating factors in outpatient treatment, enhancing forensic vigilance of therapists working in forensic outpatient facilities was considered to be of priority. Therefore, it was decided that the game ROTBEESTEN?! was designed and deployed within the context of forensic outpatients treatment.

## 2.2 Game-based activities vs oral presentations

The benefits of game-based activities have been studied extensively and include increased motivation, more pronounced learning effects, and longer retention rates (see, *e.g.*, Prensky, 2001; Sitzmann, 2011; Duchatelet, Jossberger, and Rausch, 2022). In the medical domain, a recent study showed that a certain computer game promoted flow, motivation, and learning achievements of third-year students due to the activating features of the game and its focus on problem solving (Zairi, et al., 2022). However, few examples exist of studies that compared game-based activities to oral presentations in a systematic way. Grimley et al. (2012) compared computer games to traditional lectures for the instruction of first-year students enrolled in a Computer Games and Education course. The experiment showed that participants who played the computer game felt more challenged and valued the activity more than the participants that attended regular lectures. Although the context of the aforementioned study differs substantially from our situation (different types of participants, different learning goals, and different type of game) we used its outcomes to formulate a hypothesis for our study: professionals in mental health care will feel more challenged in game-based activities and will value the activity more than oral presentations.

## 3 Experimental design

A controlled experiment was conducted with approval from the Human Research Ethics Committee of Delft University of Technology (application ID 2233). In the experimental condition, participants played the card game ROTBEESTEN?! and participated in the plenary debriefing afterwards. The control condition involved treatment as usual: participants attended an oral presentation followed by a group discussion moderated by a facilitator.

### 3.1 Participants

The participants were members from four teams of healthcare professionals at the Fivoor outpatient facility in The Hague. Participants were motivated by their manager

to attend both the game and the oral presentation (on different days). Participants were exempted from other work activities during the parts of the days when the experiment was conducted and participants were offered a free lunch. Participation to the research activities (questionnaires, interviews) was on a voluntary basis.

### 3.2 Materials

We adopted a mixed-methods approach with a sequential explanatory design (quantitative outcomes informed the use of qualitative methods). Anonymous questionnaires, semi-structured interviews, and observations were used to establish various background variables and to measure the quality of the game and the user experience in both the experimental and control conditions.

The pre-questionnaire (Pre) measured the following background variables: gender, age, profession, years of experience, frequency and enjoyment of playing games as a leisure activity, and participants' learning style (Learning Style Inventory; Kolb, 1985). The post-game questionnaire (PG, experimental condition) measured: quality of the game (eight items on a 5-point Likert scale, developed by the authors) and user experience in the game (in-game experience questionnaire (iGEQ); IJsselsteijn, de Kort, and Poels, 2013). The post-presentation questionnaire (PP, control condition) measured user experience during the video presentation and group discussion. For this, certain questions from the iGEQ were selected and adapted by the authors). More details on the psychometric constructs and measurement scales used can be found in Section 4.

All questionnaires were implemented on the Qualtrics XM platform. To match pre- and post-questionnaire responses anonymously, participants were asked to enter the last three digits of their mobile phone number in either questionnaire.

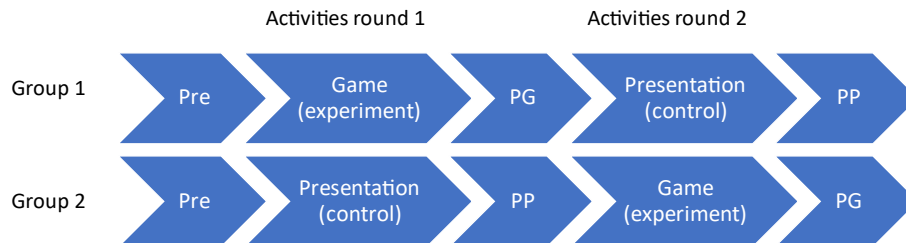
To explore explanations for the quantitative results, an independent interviewer conducted semi-structured interviews with volunteers who had entered their e-mail address in the post-questionnaire. Interviewees were asked how they evaluated the game as compared to the presentation and to explain the differences in their evaluations. Due to the exploratory nature of the study, no specific coding scheme was applied. Instead, we used quotes for possible explanations of the quantitative results.

Independent observers were present at the game sessions and presentations and took anonymous notes of the participants' behaviour in both the experimental and control group. Again, in line with the exploratory nature of the research, no structured observation protocol was used.

### 3.3 Procedure

The experiment consisted of two rounds of activities and three questionnaires (see Fig. 1). The first round of activities was scheduled on 13 September 2022. For the sake of continuity of patient care, the sample of participants was divided into two groups. Due to the limited availability of the facilitators, the first group played the game (experimental group) in the morning while the second group was the control group in the afternoon. In the second round of activities (three weeks later on 4 Octo-

ber), the experimental and control groups were reversed. Informed consent was obtained from the participants by means of the opening statements of the questionnaires.



**Fig. 1.** Activities in the experiment. ‘Pre’ refers to the pre-questionnaire; ‘PG’ and ‘PP’ refer to the post-game questionnaire and post-presentation questionnaire, respectively.

### 3.3.1 Design of the experimental condition (game)

The game ROTBEESTEN?! was designed as a facilitated, collaborative card game that is played by multidisciplinary teams of 8 – 15 healthcare professionals from outpatient forensic mental healthcare facilities (see **Fig. 2**). The game is situated in a fictitious world inhabited by various animal species with typical human traits. Some animals in the game world suffer from mental health problems and have a tendency toward criminal behaviour. These animals are treated by the healthcare professionals playing the game. The game world was deliberately modelled as an animal world, as interviews with potential players revealed that the use of real, human patient data (even if anonymous) would infringe a feeling of safety and security during game play.



**Fig. 2.** Participants playing the game ROTBEESTEN?!

The game is played in four rounds of 10 – 15 minutes each. In every round, the players choose a team leader who is in charge of treating an animal patient. The facilitator (not a player) gives the team leader a card containing a case description and three options for treatment: continue the treatment as is, intensify the treatment (scale up) or lighten the treatment (scale down). The team leader then explains the case and treatment options to the other players. All players now receive three game cards representing three categories of information about the patient based on knowledge, intuition, or experience. The front of each card features a question about the patient, while the back presents the answer to the question (see example in **Fig. 3**). Players cannot read the answers until they selected one card and discarded the other two cards. Only then they may turn around the selected card and read the answer. The team leader now starts a discussion about which of the three treatment options to choose. Team leaders may ask the other team members for information about the patient (stated on the game cards) but they ultimately choose a treatment option themselves.



**Fig. 3.** Examples of game art for game character Edward Elephant. The middle and right-hand figure are the front (question) and back (answer) of the same game card pertaining to a patient.

At the end of each round the team leader rolls a die to determine how the patient behaved in response to the team's treatment: the patient may have either committed a crime or improved their behaviour, depending on the die roll. The chances of either behaviour also depend on the treatment option chosen: intensifying the treatment costs resource points, but may reduce the risk of criminal behaviour, *vice versa*. The aim of the game is to minimise both the criminal behaviour of patients and the use of resources: less criminal behaviour and less resource use result in a higher game score.

In round three or four, the facilitator interrupts the game: one of the patients that was discussed in a previous round goes through a crisis and requires immediate help from the team. The players have two minutes to decide how to respond.

The game was led by experienced facilitators from the Delft University of Technology's Gamelab. In future, a game session will feature two facilitators from the Fivoor organisation itself: one therapist and one support staff member who focus on the contents (*e.g.*, debriefing) and logistic aspects of the facilitation process, respec-



tively. Combining both facilitation aspects in one person appeared to be unfeasible. A facilitation manual and a facilitator workshop were developed to instruct future facilitators from the organisation.

An introductory story was developed for the content facilitator to brief the participants and ease the transfer of a player's mindset into the fictitious game world. After the briefing, the technical facilitator takes over while the content facilitator observes the session and makes notes for the debriefing after the game.

The debriefing consisted of four activities and/or group discussions. First, the content facilitator selected and read a game epilogue – six different epilogues were developed for different ranges of the team's final score. Second, participants were given the chance to blow off some steam. For this, the facilitator asked plenary questions like "How did it go for you?" or "To what extent were you absorbed in the game?" Third, the participants were encouraged to collectively investigate the game and its meaning. For this, the facilitator asked plenary questions like "What do you think is the game about?" or "How does the game relate to your daily work?". Fourth, the participants were asked to discuss the concept forensic vigilance. For this, the facilitator asked plenary questions like "What does 'forensic vigilance' mean to you?" or "How would you like to further improve your forensic vigilance knowledge and skills?" The game and debriefing together lasted for about two hours.

In the future, players will receive a card with a take-home message and pointers to Fivoor training activities that they could enrol in as a follow-up to the game session. These cards were not yet available during the experiment.

### 3.3.2 Design of the control condition

The control condition was designed as a 1-hour, on-site workshop consisting of a word of welcome/introduction (10 minutes), a video presentation (30 minutes), and a facilitated group discussion about the video (20 minutes).

An introduction emphasising the importance of forensic vigilance in daily practice was given by the manager of the outpatient clinic (also a therapist). The manager and 18 – 28 participants were all present in person in one of the organisation's conference rooms. The video presentation was a pre-recorded lecture by leading Dutch expert in forensic vigilance Maartje Clercx (see **Fig. 4**). We decided upon using a video presentation, instead of a live presentation, for logistic reasons: a video presentation made the planning of the experiment less dependent on the availability of the expert.

Using slides, the expert addressed the significance of forensic vigilance and explained the process of establishing its definition. She clarified the definition itself and elaborated on characteristics of professionals (such as personality traits and years of working experience in forensic psychiatry) associated with forensic vigilance. After the video presentation, the participants discussed as a group the concept of forensic vigilance and the importance and meaning thereof in their daily work. The discussion was moderated by the manager.

The contents of the presentation differed from those of the game. However, given the purpose of both instruments – motivating participants to enrol in training activities, not the training itself – these differences were not considered problematic.

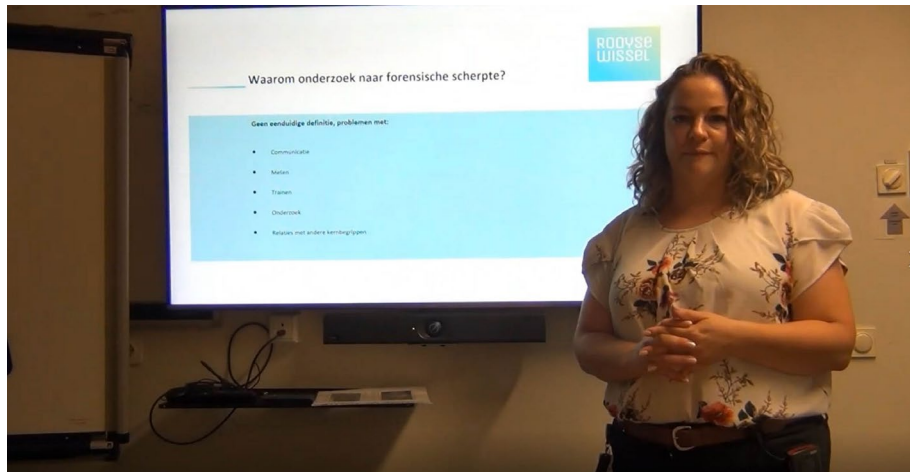


Fig. 4. Still from video presentation by forensic vigilance expert Maartje Clercx

## 4 Results

A total of 63 respondents completed the pre-questionnaire. The characteristics of the sample are shown in **Table 1**.

**Table 1.** participant characteristics

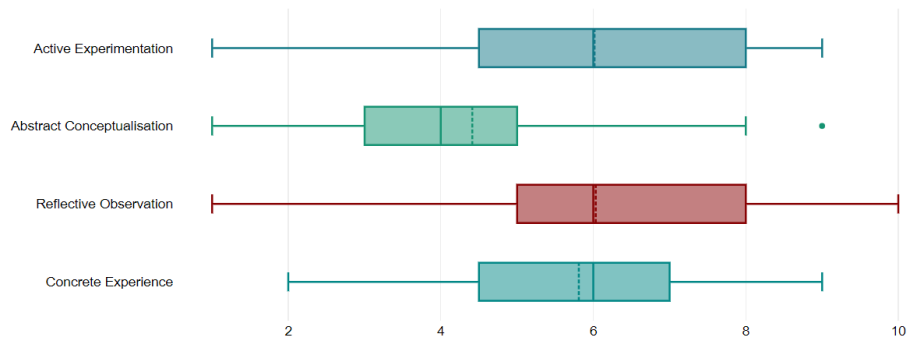
Age	Range 21 – 54 years (M=36, SD=7)
Gender	female (71%), male (29%)
Professions	social worker (32%), nurse (34%), psychologist (25%), other (9%)
Work experience	Range 0 – 22 years (M=5.8, SD=4.8)
Frequency of playing games	Seldomly (24%), a few times a year (21%), monthly (33%), weekly (22%)
Enjoyment of playing games	very much (49%), a little (35%), very little (16%)

### 4.1 Quantitative results

The responses to the pre-questionnaires were merged and so were the responses to the post-game (PG) questionnaires and the responses to the post-presentation (PP) questionnaires.

#### 4.1.1 Participants' preferred learning styles

Boxplots of the respondents' scores (N=63) on four learning styles from Kolb's Learning Style Inventory (LSI; Kolb, 1985) are shown in Fig. 5.



**Fig. 5.** Boxplots of the respondents' scores for four learning styles (Kolb's LSI, N=63) (1985). Each learning style was scored on a 10-point scale.

Paired-samples t-tests with the LSI scores revealed that there are no significant differences between participants' mean scores for Active Experimentation (AE;  $M=6.0$ ,  $SD=2.1$ ), Reflective Observation (RO;  $M=6.0$ ,  $SD=2.1$ ), and Concrete Experience (CE;  $M=5.8$ ,  $SD=1.8$ ) at the 0.05 level. However, the mean score for Abstract Conceptualisation (AC;  $M=4.4$ ,  $SD=1.8$ ) is significantly smaller than AE ( $t(62)=-4.607$ ,  $p<.001$ ), RO ( $t(62)=5.913$ ,  $p<.001$ ), and CE ( $t(62)=3.615$ ,  $p=.001$ ).

Therefore, the results show that the respondents, on average, prefer to learn from personal involvement with people in everyday situations (CE), observing situations from different points of view (RO), and trying out methods and strategies (AE), more than from the use of theories and logic to understand problems or situations (AC).

#### 4.1.2 Quality of the game and game session

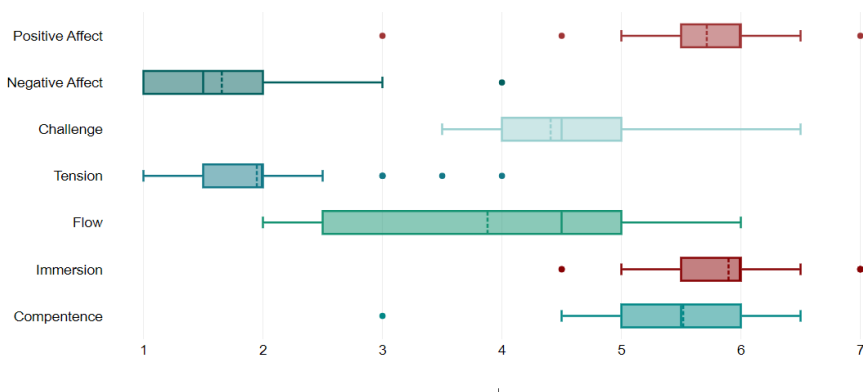
A total of 29 participants responded to the items in our post-game questionnaire about the quality of the game and the game session. This number is considerably smaller than the response to the pre-questionnaire, due to the fact that many participants needed to leave immediately after the debriefing. Multiple reminders were sent to complete the post-questionnaire, but the response rate remained low. The responses were visualised as boxplots in Fig. 6. In the Figure, the dotted lines that represent the mean scores are centred around the value 4. Therefore, the results indicate that on average the participants agree with the propositions about the quality of the game and the game session.



**Fig. 6.** Boxplots of the quality of the game and game session. Items were scored from 1 (completely disagree) to 5 (completely agree).

#### 4.1.3 Game experience

A total of 29 participants responded to the items in our post-game questionnaire about in-game experience (iGEQ). The responses were visualised as boxplots in **Fig. 7**. The iGEQ measures seven dimensions of game experience. The results show that, on average, the respondents scored high on the dimensions Competence, Immersion, and Positive Affect (mean scores in between the values 5 and 6). Moreover, the respondents had intermediate scores on the dimensions Flow and Challenge (mean scores near value 4). Finally, the respondents scored low on the dimensions Tension and Negative Affect (mean scores between 1 and 2). This means the respondents experienced little tension and few negative emotions while playing the game.



**Fig. 7.** Boxplots of responses to the in-game experience questionnaire (iGEQ). Items were scored from 1 (completely disagree) to 7 (completely agree).

#### 4.1.4 Effect of background variables on reported quality and experience

A total of 20 participant (13 female, 7 male) responded to both the pre-game and post-game questionnaire. Mann-Whitney U-tests were applied to analyse a gender difference in average scores for quality and experience of the game. The resulting significant differences are shown in **Table 2**.

**Table 2.** Gender difference in average scores for quality and experience of the game.

	Mean Rank		U	p
	Women	Men		
The game was overall well designed	12.81	6.21	15.50	.01
The debriefing encouraged me to think	12.92	6.00	14.00	.01
The game cards were clear	12.85	6.14	76.00	.01
Positive affect	12.85	6.14	15.00	.01

The Table above shows that on average women scored significantly higher on three items measuring the quality of the game and game session, and on one dimensions of game experience (positive affect). The differences on the other items and dimensions were not significant at the 0.05 level and were therefore not reported. Consequently, the variable Gender seems modify the reported quality and experience of the game to a certain extent, but this could be due to the relatively low sample size.

No significant differences were found when the sample was divided along other background variables (age, profession number of years of experience, learning style, and the frequency and enjoyment of playing games). Therefore, the results suggest that the reported quality and experience of the game did not depend on the age, profession, etc. of the respondents.

#### 4.1.5 Participants' experience of the game vs the presentation

Of all respondents, 17 respondents both played the game (experimental condition) and attended the presentation (control condition) as well. We applied 1-tailed related-samples Wilcoxon signed rank tests to determine the difference between the reported experience of the game versus the presentation. The alternate hypothesis read: "the experience of the game is more positive than of the presentation". **Table 3** provides the results.

**Table 3.** Participants' experience of game (experimental condition) and of the presentation (control condition). The five dimensions of experience were measured in the range 1 – 7.

Dimension	Game		Presentation		Wilcoxon (1-tailed)	
	M	SD	M	SD	Z	p
Immersion	5.76	0.73	4.41	1.14	-3.35	.001
Flow	3.44	1.38	2.59	1.12	-1.93	.03
Challenge	4.21	0.69	3.88	0.74	-1.39	.08
Negative affect	1.85	0.63	3.71	1.41	-3.38	.001
Positive affect	5.59	0.81	4.88	1.13	-2.23	.01

We found that participants experienced the game significantly more positively than the video presentation on four out of five dimensions (immersion, flow, negative affect, positive affect). On the remaining dimension (challenge), the game scored more positively than the presentation, but the difference was not significant at the 0.05 level.

## 4.2 Qualitative results

Semi-structured interviews were conducted with six participants of both the game and video presentation (3 female, 3 male; age:  $M=40$ ,  $SD=12$  yrs). The outcomes confirmed the quantitative results shown above: the game was evaluated more positively than the video presentation in terms of 'immersion', 'flow', 'negative affect', and 'positive affect'. For instance, a female participant (age 34) mentioned "the game stimulated me much more than the video presentation" (higher 'immersion'). A male participant (age 64) confirmed that the game helped to stay focused more than the video presentation did (more 'flow').

In addition, the interviewees explained that the interactive and social characteristics of the game were the main reasons for them to evaluate the game more positively than the video presentation. For instance, in the game they enjoyed working as a team in a way that resembled their daily practice, whereas they experienced the video presentation as an individual activity that was less related to their everyday work. All interviewees also viewed the game as a team-building activity.

Some interviewees remarked spontaneously that the presentation (control condition) being a pre-recorded video, instead of a live presentation, did matter to them: they would have evaluated a live presentation more positively than a video recording. Interestingly, other interviewees mentioned that the format of the presentation did not matter to them: they stated that recorded and live presentations are equally difficult for them to maintain focus on.

The observations made during the game sessions and video presentations are also in line with the results presented above. At the start of the video presentations, the participants seemed interested and keen to learn, but this faded when the presentation progressed: participants started talking with each other about other topics than the presentation and some used their phones for non-related activities. During the game,

none of these things occurred: participants stayed focused on the activities and actively engaged in the discussions.

## 5 Discussion and conclusions

The Fivoor management aims to develop innovative instruments for professional development of their staff. The results above state that a sample of 63 of their healthcare professionals prefers instruments that, in the terminology of Kolb's Learning Styles Inventory (1985), provide Concrete Experiences and allow for Reflective Observation, and Active Experimentation with real-world cases, rather than Abstract Conceptualisation based on theoretical knowledge.

The game ROTBEESTEN?! was developed as such an innovative instrument to motivate professionals to enrol in forensic vigilance training. In a controlled experiment, healthcare professionals who participated in this game and debriefing evaluated it more positively than a treatment as usual consisting of a video presentation and group discussion (control condition).

How participants perceived the quality of the game did not depend on the background variables age, profession, work experience or the frequency and enjoyment of playing games. Therefore, the game seems suitable for a wide range of participants. However, some gender differences were found, where female participants evaluated the game significantly more positively than male participants, but this could be due to the relatively small number of 20 respondents who completed both the pre-game questionnaire and the post-game questionnaire.

When compared to the control condition, the user experience in the game scored significantly better on four out of five dimensions: Immersion, Flow, Negative Affect, and Positive Affect. The game scored higher on the dimension Challenge than the control condition did, but the difference was not significant at the 0.05 level. Interestingly, other authors reported an increased experience of challenge among game players when compared to lecture attendants (Grimley et al., 2012). This may be due to different interpretations of the dimension 'challenge'. Some of our interviewees stated that staying focused on the presentation was a big challenge for them, which is different from the regular meaning of 'challenge'.

Qualitative results of the experiment were used to explore explanations of why the game was evaluated more positively than the oral presentation. Most interviewees indicated that they had trouble staying focused on the presentation, while this was not a problem in the game. Also, they experienced a lot more pleasure from the game. These results were confirmed by the authors' observations in both conditions of the experiment. The main reasons, as reported by the interviewees, for these differences are the fact that the game fitted their preferred learning style much more closely than the presentation. The interactive game experience in which players actively collaborated with colleagues on concrete, real-world cases in a fictitious world helped them to stay concentrated on the activities much more than the presentation which appealed to more abstract conceptualisation capabilities of participants. Our analyses showed

that abstract conceptualisation was a significantly less preferred learning style among our respondents.

### **5.1 Limitations and recommendations for future work**

In the design of the experiment, certain choices were made that limit the generalisability of the results. For instance, in the control condition it was decided to use a video presentation instead of a live presentation, due to the limited availability of the presenter. Some interviewees indicated that their evaluation of a live presentation could have been better than of the video, although others reported that it would not have made a difference. To study this potential effect, we recommend to compare the game to a live presentation as well.

Also, the response to the post-questionnaires was lower than expected (50% fewer respondents than to the pre-questionnaire). This, and the fact that participants volunteered for being interviewed afterwards, may have caused a bias in the response: participants who did not enjoy the game may have refrained from completing the post-questionnaire or from volunteering for being interviewed. However, observations during the sessions do not point in that direction – the players all seemed equally appreciative of the game session, while they almost unanimously seemed to dislike the control condition. To confirm these observations, we are currently preparing more experiments to increase the response. This will allow for more powerful statistical analyses of the results and enable us to systematically and reliably determine the effectiveness of the game.

Finally, in this exploratory study, no attention was paid to the costs involved in developing the game with respect to developing traditional motivational instruments such as presentations. Follow-up research into the cost-effectiveness of ROTBEESTEN?! would be helpful to understand the feasibility of such games.

### **5.2 Conclusions**

The card game ROTBEESTEN?! was developed to motivate professionals at mental healthcare provider Fivoor to enrol in existing training in forensic vigilance. Players of the game evaluated it more positively than treatment as usual (a presentation). They reported difficulties to stay concentrated on the presentation, where this was not the case for the game. The persuasive elements of the motivator game seemed to match the learning style preferences of our sample of participants better than traditional instruments that focus on the transfer of theoretical knowledge. Also the facts that the game is played in teams and contains many interactions helped to stay focussed on playing the game. From the experimental results we may conclude that games are promising tools to motivate (healthcare) professionals to enrol in training activities – perhaps more promising than oral presentations with the same purpose. We are currently in the process to extend the experiment and improve the response to our surveys to follow-up on this exploratory study and systematically establish the effectiveness of the ROTBEESTEN?! game.



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