Wargaming in Information Warfare Training: A Study of Finnish Officials

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Abstract: In the digital age, information warfare has become a significant global concern, with malicious actors exploiting various media to manipulate public opinion, destabilising governments, and sowing discord. Automated and algorithmic tools are used to spread false and misleading information on social media platforms, and states have been unable to control the spread of it. In addressing new challenges, national governments globally reassess strategies, communications, and responses to adapt to evolving threat environments. To counter information influence activities, it is crucial to have informed, educated, and well-trained communicators. This case study focuses on the innovative use of wargaming in training government officials, providing them with abilities to respond to different tactics and methods of malign influence operations. This article is based on an information warfare exercise conducted in January 2024 involving 27 Finnish officials from various ministries and agencies critical to national security. The participants participated in an interactive simulation, where they explored and responded to challenges related to disinformation campaigns and other tactics designed to manipulate and influence information within a hybrid warfare context. The players were divided into two teams: red and blue, with the reds assuming the role of the offensive team while the blues took on the defensive role. The teams competed for control over the information space, employing various information warfare methods. After the exercise, each participant was asked to complete a post-exercise survey to evaluate the knowledge acquired and the exercise's overall usefulness, including scenario clarity and the effectiveness of role-playing. We also explored potential differences in perceptions and experiences between inexperienced and experienced players in the wargaming exercise. Key findings revealed the effectiveness of wargaming as an educational tool, particularly benefiting novices over experienced players. Role-playing proved valuable, emphasizing the importance of explicit scenarios for effective engagement. The study highlighted cross-departmental cooperation's significance, facilitating a dynamic learning environment.

Keywords: Wargaming, Information Warfare, Government Training, Gamification, Role-Playing, Inter-Agency Collaboration

1. Introduction

The rise of false and malign information poses a serious threat to governments, garnering significant interest. Algorithmic tools and AI have made creating and spreading false information easier than ever, complicating the task of preventing its dissemination (Fredheim & Pamment, 2024). Hostile actors actively aim to influence individuals' cognitive abilities to understand and interpret social realities (Bjola & Papadakis, 2020), adding to the complexity of the challenge. Governments have acknowledged the significance of this threat and its potential to endanger essential societal functions (Finnish Government, 2021). This multifaceted threat has compelled national governments to reassess their responses and strategies. Like several Western countries, Finland addresses information warfare through a collective and collaborative effort, emphasizing close cooperation between ministries and agencies. Finland does not designate a specific authority exclusively for managing information influence operations. Instead, each government agency assumes responsibility for its respective sector. The imperative for every national authority to be well-prepared is reinforced and coordinated by the Prime Minister's office (Mässeli, 2022).

In countering information influence activities, informed, educated, and well-prepared communicators are essential (Pamment et al., 2018). One such potential method for training government officials is wargaming. Wargaming serves as an innovative method for creating engaging exercises that facilitate effective learning. Rooted in the pedagogical theory of experiential learning (Kolb, 1984), wargaming offers a holistic and integrative perspective on learning, incorporating elements such as experience, perception, and behaviour.

This article is based on an information warfare exercise conducted in January 2024 involving Finnish officials from various ministries and agencies critical to national security. In this article, we investigate how wargaming can be used as an educational asset for training government officials. Specifically, we seek to examine their

reactions to critical themes embedded in the exercise, including learning dynamics, role-playing, and the distinctive scenario crafted for its execution.

Our article aims to answer the following questions:

1. How do government officials perceive wargaming, particularly in terms of learning, usefulness, role-playing, and scenario clarity?
2. Do perceptions and experiences differ between inexperienced and experienced players in the wargaming exercise?
3. Does wargaming serve as an effective educational tool for government officials?

To address the research questions, we employed a questionnaire encompassing inquiries about learning, role-playing, and scenario clarity. Additionally, open-ended questions were utilized to delve deeper into the insights and experiences of government officials during the exercise.

2. Previous Research: Wargaming and Learning

Previous research supports the effectiveness of experiential learning techniques like wargaming in aiding student learning (Rosen & Kerr, 2024). Simulations encompassing such experiential methods are considered highly effective for facilitating the learning of complex skills (Chernikova et al.,2020). Experiential learning techniques actively engage learners, promoting deep learning, fostering interactive skills, and linking theory to practical application (Hertell & Mills, 2002). Previous research on cyber warfare exercises suggests that knowledge acquired during cyber war exercises tends to persist (Maennel et al., 2017). Successful wargaming can be highly informative and instructive, contributing to individual learning. However, its success is not uniform, with some games more effective in preparing decision-makers for real-world environments than others. Factors influencing the success or failure of wargames include subject matter, participants, design, and factual accuracy (Perla & McGrady, 2011; Rosen & Kerr, 2024; Frank, 2012).

In an information environment where the boundaries between war and peace may be blurred (Hutchinson, 2021; Ehrhart, 2017; particularly the Russian perspective, Jonsson, 2019), wargaming offers a practical application of experiential learning ideas. This aids individuals in acquiring the necessary skills for navigating this complex landscape. According to Chan (2022), experiential learning imparts holistic competencies, gaining prominence in our increasingly technology-oriented society. This perspective should influence our approach to countering the dissemination of malign information. Indeed, training programs simulating realistic, practical disinformation campaigns in stressful situations help to assess individual strengths and vulnerabilities and train to identify, analyse, and counter disinformation techniques (Muñoz Plaza et al. 2023). Therefore, preparing officials and individuals to approach information critically within its context is essential. However, existing state bodies and institutions may encounter challenges when confronting malign information in complex media environments characterized by rapidly changing communication networks and social media.

This research article focuses on the Finnish context, where wargaming has been a typical feature of military education among officers, emphasizing its traditional role in military training (Ilomäki, 2023). In a broader international context, wargaming can be understood as a model or simulation that does not involve the direct activities of military forces (Perla, 1987). However, the tools provided by wargaming extend beyond the military domain, particularly in non-military contexts, especially when applied to information-related scenarios. For instance, in the field of cyber defence, wargaming exercises are employed to facilitate effective training and raise awareness of security flaws (Casano & Colombo, 2019). These exercises often incorporate red and blue teaming elements (Maennel et al., 2017), indicating a learning model in which role-playing can have significant importance.

Building upon the premise that participants in the exercise would have limited prior experience with wargaming, it is essential to contextualize their background knowledge. Although the participants generally lacked direct wargaming experience, it is noteworthy that a significant portion of them had participated in an information warfare course organized by the University of Jyväskylä before engaging in the exercise. This course provided them with a foundational understanding of information influence and information warfare as overarching phenomena. This pre-existing knowledge not only primed them for engaging with the central focus of our study but also enriched their perspective, given the insights gained from the course.

3. Materials and Method

3.1 Exercise Setting

The wargame exercise unfolded within a fictional scenario portraying the Russian Federation initiating hybrid warfare against Finland. The participants were divided into two teams: red and blue. The red team, representing Russia, was tasked with creating disinformation and inducing chaos, while the blue team, symbolizing various Finnish government agencies, focused on responding to these threats.

The blue team was further segmented into four teams, symbolizing different sectors of Finnish governance, such as national security, critical infrastructure, and cyber. A total of 27 individuals actively participated in the exercise, most of them being part of the blue team. Additionally, 12 individuals served in assisting roles within the red and white teams. Due to the official and confidential nature of the exercise, specific details about the participating organizations cannot be disclosed.

Platforms utilized during the exercise included a simulated social media platform, Mastodon, and a WordPress page featuring two legitimate media outlets and one alternative media source controlled by the red team. Facilitating the exercise, the organizers assumed the role of the white team. The white team not only controlled the exercise but also influenced events through specific inputs. Each team was directed by these inputs, ensuring that all teams maintained a consistent situational picture and communications strategy. In-game events orchestrated by the white team included cyber-attacks, GPS jamming, and power outages in the Åland Islands. The rules of the exercise adhered strictly to official peacetime protocols and laws, and no state of emergency or martial law was declared as part of it.

3.2 Questionnaire

We developed a questionnaire to explore participants' perspectives on learning, role-playing, and scenarios within the wargaming context. Each theme was addressed through a series of multiple questions designed to capture various aspects of the respective theme. To ensure a nuanced understanding, questions were framed both positively and negatively. The learning theme had eight questions, the role-playing theme had six questions, and the scenario theme had eight. All questions were presented in Finnish using a 5-point Likert scale, with one indicating 'strongly disagree', three indicating 'neither agree nor disagree,' and five indicating 'strongly agree.' Additionally, respondents were asked whether they had previously engaged in similar wargaming situations, with response options 'yes' or 'no.' Furthermore, participants were prompted to evaluate their personal success and their team's success on a scale ranging from 1 to 10. Finally, respondents were also prompted with open-ended questions, seeking insights on what they learned during the exercise, the perceived usefulness, and any obstacles hindering learning. Data was collected through Microsoft Forms. Respondents were informed of the study's purpose, ensuring transparency about utilizing their responses for scientific publication. Importantly, no personal data was collected.

3.3 Data Preparation and Analysis

In total, we received 26 responses. Data was analysed using IBM SPSS Statistics 29.0.1.1. First, questions with a negative tone were recoded, with the highest value set to 1, and subsequent values adjusted accordingly. To assess the internal consistency and ensure the questions effectively captured the phenomena of learning, role-playing, and scenario, we computed Cronbach's Alphas (α) for each theme. If the SPSS dialogue indicated that removing a question would improve the alpha value, the content of the question was reviewed. If it did not align optimally with the theme, the question was removed, and the alpha was recalculated. An alpha value exceeding 0.70 is commonly interpreted as acceptable, indicating good internal consistency for the questions. Given the arbitrary nature of the acceptable alpha level, as Taber (2018) described, it is recommended to report the items included in a sum variable, making them available for scrutiny. The questions chosen to capture the phenomenon are presented in Table 1.

Table 1: Items included in the sum variables.

Theme	Questions	Cronbach's alpha
Learning	1) I was motivated to participate, 2) I felt that I learned new aspects during the exercise, 3) I perceived the exercise as beneficial, 4) I can apply what I learned during the exercise in	α = .879

Theme	Questions	Cronbach's alpha
	my work, 5) I feel better prepared to act if something similar happens in the real world, and 6) There were no new aspects to learn during the exercise (this was recoded)	
Role-playing	1) Role-playing provided added benefits to the exercise, 2) It was easy to immerse oneself in the role, 3) Role-playing facilitated the exercise, 4) Role-playing was fun, and 5) I would have preferred to participate without role-playing (this was recoded)	α = .926
Scenario clarity	1) The exercise's scenario was credible, 2) It was easy to comprehend what was happening, 3) I felt well-informed about the situation during the exercise, and 4) It was challenging to perceive what was happening during the exercise (this was recoded)	α = .789

Next, mean sum variables were computed for these themes. To investigate the potential influence of prior experience in similar exercises on opinions regarding learning, role-playing, and scenario clarity, a Mann-Whitney U test was employed, considering the non-Gaussian distributions of the sum variables. When conducting Mann-Whitney U tests and observing dissimilar shapes in group distributions, mean ranks are also reported. A significance level (alpha) of 0.05 was applied in all statistical tests.

4. Results

4.1 Questionnaire

Of the respondents, 11 (N = 26) had no prior experience with similar exercises, while 15 reported having participated in them before. Learning received relatively high evaluations: mean = 4.24, standard deviation = 0.63, and median = 4.33. The Mann-Whitney U test revealed a significant difference between the groups (U = 35.50, p = .014), indicating that those with no prior experience reported higher learning (mean rank = 17.77) compared to the group with prior experience (10.37). Similarly, role-playing received relatively high ratings: mean = 4.27, standard deviation = 0.77, and median = 4.50. The group that had not participated earlier in similar exercises before reported a slightly higher score for role-playing (mean rank 14.36) compared to those who had participated (12.87), but the difference was not significant (p = .646). Scenario clarity received slightly lower evaluations: mean = 3.86, standard deviation = 0.67, and median = 4.00. Again, no significant difference was observed between groups (p = .413); however, the mean rank of the group that had not participated earlier was lower (12.05) than of the group that had (14.57). Furthermore, respondents rated their own success during the exercise quite highly (M = 8.04, SD = 1.11, mdn = 8.00), with an evaluation of their group's success slightly higher (M = 8.65, SD = 0.69, mdn = 9.00).

4.2 Open-Ended Questions

As open-ended questions, we included the following: 1) What did you learn during the exercise? 2) What did you perceive as useful during the exercise? and 3) What might have hindered your learning experience? We conducted content analysis, specifically employing conventional content analysis, where coding categories are derived directly from the data (Hsieh & Shannon, 2005).

4.2.1 Learning During the Exercise: Collaboration, Competence, and Situation Awareness

For the first question, we received 18 responses, with collaboration mentioned six times. This theme underscores respondents' reflections on how they learned the importance, even essentiality, of collaborating with different authorities. For example, one comment emphasized that 'collaboration is vital for the administrative section'. It was noted five times that the experience taught participants about the competencies of other officials or administrative sections. One specific comment highlighted the 'value of observing other officials at work and engaging in conversations with them'. The theme of situation awareness was also mentioned twice. This theme emphasizes the importance of developing situation awareness in somewhat disorderly circumstances. One respondent noted, 'The exercise served as a good reminder of how chaotic real situations can be and how many different actors are involved in them'.

4.2.2 Usefulness: Collaboration Across Administrations and Practicing Real-Life Situations

For the second question, we received 18 responses, and 11 of them noted the importance of collaboration across administrations. Pondering together with people from different administrations was perceived as useful. The responses indicated that including officials from various administrative sectors in the exercise was considered

beneficial. A participant expressed, 'I had the opportunity to meet new people and collaborate with individuals beyond my usual administrative sphere'. Additionally, seven comments emphasized the value of practicing and contemplating real-life situations. This allowed participants to consider how they would act in authentic scenarios. As one respondent mentioned, 'It was beneficial that the exercise prompted problem-solving, a skill valuable in acute situations as well'.

4.2.3 Aspects Hindering Learning Experience: Exercise Environment's Technical Aspects

In response to this question, we received 11 responses. The factors hindering the learning experience ranged from tiredness to unfamiliarity with others, with one predominant theme emerging from three responses. This theme centred around challenges related to the technical aspects of the exercise environment. Participants found it challenging to navigate new social media and newspaper platforms, and the scarcity of computers also posed difficulties. One respondent noted, 'It was challenging because the information systems differed from the ones I usually work with at my job'.

5. Discussion

In this article, we focused on investigating how government officials perceived wargaming, particularly in learning, usefulness, role-playing, and scenario clarity. We explored whether there were differences in perceptions and experiences between inexperienced and experienced players in the wargaming exercise and considered the effectiveness of wargaming as an educational tool for government officials.

Our analysis found that participants generally had a positive experience, with high scores for learning and role-playing. Notably, in terms of learning, individuals with no prior experience reported significantly higher levels compared to those with previous exposure to similar wargames. While much of the previously mentioned research discusses the positive learning outcomes of wargaming (Rosen & Kerr, 2024; Chernikova et al.,2020; Hertell & Mills, 2002; Maennel et al., 2017), existing studies fall short in assessing its effectiveness for both inexperienced and more experienced players. However, Hamari et al. (2014) have suggested that experiential learning and gamification may not yield long-term learning results, attributing the heightened effect to a possible novelty effect. The noted novelty effect may contribute to the significant difference in learning outcomes between inexperienced and more experienced participants. This occurrence, coupled with plain curiosity, could lead to an enhanced motivational boost. According to Filgona et al. (2020), motivation itself facilitates learners, promoting effective thinking, concentration, and learning. It significantly contributes to academic learning and achievement from childhood through adolescence, enhancing cognitive processing. This could suggest that participants with no prior experience may find the learning experience more impactful or engaging. This heightened engagement can have a positive influence on the learning process. While role-playing received high ratings overall, there was no significant difference between the groups. This implies that the role-playing experience was perceived similarly, regardless of prior participation in similar exercises.

Scenarios lay the foundation for wargaming exercises, shaping and influencing player actions (Perla & McGrady, 2011). Scenario clarity, on the other hand, received slightly lower evaluations, with no significant difference between the groups. The lower mean rank for the group with no prior participation suggests that they may have found the scenario less clear, though this difference was not statistically significant. According to McCreight (2013), for a wargame to be successful, the scenario must be appropriately developed. An effective scenario is factual, accurate, and concise, seamlessly integrating realism while minimising ambiguity. The scenario must also be streamlined enough for organic development during the game. If the scenario is excessively intricate, it can confuse participants and complicate the mapping out of events.

In the responses, the importance of collaboration among administration authorities was deemed significant. While this might seem self-evident, it is not always the case. Previous research, particularly in the context of Finnish security, has underscored both the importance of cooperation among authorities and the necessity to enhance means for collaboration (e.g., Anttonen 2016; Branders 2016; Jalava et al. 2017). Our results align with this, highlighting the ongoing need for cooperation. This is also supported by the observations of some respondents, who mentioned that the exercise provided an opportunity to learn from the work of other government agencies and contribute to a shared situational understanding.

Overall, these results suggest that the lack of prior experience might positively influence perceived learning, but it may not have a significant impact on role-playing, scenario clarity, or success evaluations. The participants generally reported positive experiences in learning, role-playing, scenario clarity, and success. Acknowledging the influence of organizational culture, hierarchy, legal rights, and bureaucracy on each entity and its employees,

gamification through experiential learning provides a unique opportunity. It enables individuals to distance themselves from their daily routines and immerse themselves in the learning process within a safe space without transgressing their jurisdictions. While wargaming appears effective for government official training, there are practical considerations for future implementations. Ensuring clarity and coherence is crucial. It is also advisable to provide ample devices for the teams and adequately train participants in using technical platforms to prevent potential disruptions and to improve the usability of the gaming environment.

5.1 Limitations and Further Research

One limitation of this study lies in the relatively low number of respondents and participants engaged in the exercise. The research could have benefited from a more extensive respondent group. With only 26 survey responses, caution must be exercised in making broad claims. Additionally, the respondent group exhibited a slight imbalance between inexperienced and experienced players, highlighting the need for a more equitable distribution in future studies.

For subsequent future research, it would be interesting to replicate the same exercise with a more extensive and more diverse test group while improving the technical execution for a better participant experience. A key consideration for further exploration could involve examining each agency's officials' performance. This approach may unveil variations in organizational responses, potentially suggesting that such exercises might be more beneficial for certain groups over others. A more comprehensive investigation with a more extensive and well-balanced participant pool would contribute to a deeper understanding of the dynamics at play in wargaming for government officials.

6. Conclusions

In exploring wargaming as an educational tool for government employees, this article delved into the realms of learning, role-playing, and the clarity and comprehensibility of provided scenarios. We observed that novices experience a notable increase in learning when playing wargames compared to more experienced players. While role-playing was considered useful by both experienced and inexperienced players, it did not emerge as a significant factor. Notably, players rated our scenario clarity slightly lower; nonetheless, prior research emphasizes the pivotal role of a clear scenario in the success of the exercise.

An interesting finding from our study suggests that many respondents acknowledged the potential importance of cross-departmental cooperation and collaboration. The exercise facilitated a dynamic learning environment, enabling participants to engage with government actors from diverse sectors within a realistic worst-case scenario.

Our analysis underscores the predominantly positive effects of wargaming as an educative tool, particularly for newer players. Wargaming has proven effective for training government officials, but future implementations need careful attention to scenario clarity, as well as adequate technical training and resources, to ensure an enjoyable and effective learning experience. Continued investigation will contribute to a more comprehensive understanding of the broader implications and applications of wargaming in the realm of government training and education.

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