Evaluation of a Social Media Simulation for Decision-Making in the Training of Intelligence Analysts

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This report is submitted in partial fulfilment of the degree of Master of Psychology (Organisational and Human Factors)

School of Psychology

University of Adelaide

November 2022

Word Count: 8000

Author's Note: This manuscript has been prepared for the Computers in Human Behaviour journal which allows for APA 7 reference style, and has been prepared to meet the journal's guidelines. At present, the manuscript has been written according to the Master of Psychology thesis requirement of 6000-8000 words but will be edited prior to submission to meet the specified journal's word limit requirements.

Declaration

This dissertation contains no material which has been accepted for the award of any other degree or diploma in any University, and, to the best of my knowledge, contains no materials previously published except where due reference is made.

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November, 2022

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Acknowledgements

This research would have not been possible without the Defence Science and Technology Group (DSTG) Graduate Industry Placement Program. I am grateful to have been offered an opportunity to work with a group of such knowledgeable and talented individuals.

I would like to thank each of my supervisors for their endless support and guidance. I am sincerely grateful for all your time, effort, and expertise that you have shared with me.

I would also like to thank my friends, family, and partner for their endless support.

(Title page for journal submission to Computers in Human Behaviour. Please note that some details have been amended or excluded to preserve anonymity.)

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Author Names: [redacted]

Corresponding Author: [redacted]@student.adelaide.edu.au

Affiliations: The University of Adelaide

Declaration of Interest: None

Funding: This work was supported by Defence, Science, and Technology Group (Graduate Industry Placement Program)

Abstract

The rapid evolvement of technology has given rise to new threats such as the spread of misinformation and disinformation on social media. Therefore, it is vital intelligence analysts have high quality training that teaches them effective decision-making when faced with these potential threats. Wargames and interactive simulations have been found beneficial in training and education. However, there is little research specifically assessing social media simulations, and how they can be beneficial for the training of intelligence analysts. Using Naturalistic Decision-Making as a guiding theoretical framework, this study examined the decision-making processes of users during a wargame that utilised a social media simulation. Hence, providing insight into how the social media simulation tool can be used to train intelligence analysts to make effective decisions when faced with potential threat. The present study was exploratory and utilised qualitative data extracted from semi-structured focus groups from 21 participants who either worked or researched areas of interest to intelligence analysts. Results revealed that participants decision-making was largely influenced by the rapidity in which they could receive the information and their prior experience, thus demonstrating support for the intuitive style of decision-making. The practical implications of the present study are discussed and recommendations for future research within the area are outlined.

Keywords: Wargames, Social Media Simulations, Intelligence Analysts, Decision-Making

1.0 Introduction

1.1 Overview

The rapid growth of social media networking sites and media sharing technology has led to a dramatic shift in how information is distributed and shared (Mayfield, 2011).

Classified information can be leaked and exposed to millions of people within minutes, and damning images or information can be shared with devastating effects (Mayfield, 2011). While technology provides a method to connect or share with others, the rapidly growing cyberspace also means that individuals and organisations can become vulnerable and exposed to attacks from both state and non-state actors including activists, non-governmental organisations, protest groups, regular citizens, and governments (Agrafiotis et al., 2018; Shirky, 2011).

Intelligence analysts play a vital role in national security and defence by protecting military forces, governments, and the public from these threats (Gookins, 2008). Intelligence analysts are experts responsible for gathering and screening open-source intelligence (OSINT), which is information that is unclassified, freely, and publicly available, such as social media posts (Akhgar et al., 2017). Through social media, intelligence analysts can monitor certain communities, groups, or individuals who may pose a threat to national security. Further, they can analyse data that may suggest the occurrence or a growing risk of violent behaviours or events such as organised riots (Tropotei, 2019). When faced with a potential threat, intelligence analysts must quickly generate an appropriate course of action or decision, or immediately report their analysis to decision-makers (Chin et al., 2009; Elm et al., 2004).

Intelligence analysts operate in extremely demanding environments. In addition to dealing with complex and large volumes of information, which can often be false or irrelevant, intelligence analysts also face time constraints and high levels of pressure. Failure to correctly identify or assess a threat, can result in detrimental consequences such as destruction and the loss of civilian lives (Chin et al., 2009; Elm et al., 2004). For example, intelligence analysts have often been heavily criticised for not anticipating mass casualty events such as the September 11 attacks (Hedley, 2005).

Due to evolving technology, intelligence analysts are now faced with tackling new and complex types of threats such as hybrid warfare and tactics that fall in the 'grey zone', which are defined as strategies that do not cross the threshold of kinetic warfare (Dowse & Bachmann, 2019). For instance, an example of grey zone tactics includes the spread of misinformation and disinformation for influence on social media. Misinformation is information that is wrong or misleading regardless of the intent, whereas disinformation is information that is deliberately falsely created to cause disruption or manipulate public opinion (Azad & Haider, 2020; Stahl, 2006; Wither, 2016).

Given the rise in these types of threats, it is crucial that intelligence analysts have high-quality training in which they are taught how to make quick and effective decisions when faced with these threats. Wargames have been used for centuries within the military to teach better decision-making and can be defined as, "any type of warfare model or simulation, not involving actual military forces, in which the flow of events is affected by and, in turn, affects decisions made during the course of those events by "players" representing the opposing sides" (Perla, 1990, p. 274). Through wargaming, it is believed individuals gain greater understanding and insight into their own decision-making processes which in turn leads to better-informed decision-making in the future (Perla & McCrady, 2011).

A wargame that uses a social media simulation would allow the decision-making processes of intelligence analysts, and how they respond to threats on social media such as misinformation and disinformation, to be observed in a low-risk environment. Research suggests that social media simulations have been found effective in training and teaching new skills (DiFranzo et al., 2019; Gordillo et al., 2021; Reeves & Crowther, 2019), however, there is little research into how social media simulations can be used to train individuals to improve

their decision-making on a tactical, operational, and strategic level in the national security and defence systems.

Using Naturalistic Decision-Making Theory (Klein et al., 1993) as a guiding theoretical framework, the aim of the present study was to examine the decision-making processes of users during a wargame that uses a social media simulation as part of the experiment. The findings will inform how social media simulations can be used to train intelligence analysts to make effective decisions when faced with potential online threats such as misinformation and disinformation.

1.2 Hybrid Warfare & the Grey Zone

Rapid advancements in technology and globalisation have forever changed warfare within the 21st Century (Azad & Haider, 2020). In the last few decades warfare has evolved from traditional forms of combat to unconventional yet powerful methods that can cause devastating effects. Hybrid warfare is a term often used to capture the complexities of these modern-day warfare approaches that often do not involve open or physical hostilities, and do not always have obvious intentions (Dowse & Bachmann, 2019). Hybrid warfare is a combination of both conventional methods of warfare and grey zone tactics. Its purpose is to discredit or disrupt the opposing side without crossing the threshold of war (Dowse & Bachmann, 2019).

It is the ambiguity of the grey zone that makes warfare conducted within this realm so powerful. The intentions behind the actions are often blurry and therefore are very much open to interpretation. Producing an appropriate response to these forms of attacks is no easy feat for military forces and intelligence analysts (Banasik, 2016). Should they decide that the action is not intentional, unable to confirm who conducted the operation or believe it is not worth responding to, they run the risk of not tackling a threat that may end up having significant repercussions (Dowse & Bachmann, 2019). However, if they miscalculate the risk

of threat and exaggerate the threat, they may then face the consequence of "blowback" which refers to the unintended consequences of an operation that are felt by those responsible for the initial operations and sometimes the population of the government (Porche et al., 2017). Therefore, it is not just the military who are vulnerable to the repercussions of these newer types of warfare but also the country's civilian population. This is particularly relevant when considering the impact of grey zone warfare in a society that is heavily dependent on technology, and therefore vulnerable and exposed to online influence campaigns (Agrafiotis et al., 2018).

1.3 Misinformation and Disinformation

One form of grey zone warfare is the creation and spreading of misinformation or disinformation for influence (De Ridder, 2021; Lewandowsky et al., 2013). Misinformation and disinformation can have significant and detrimental real-life outcomes as evident in the case of Russia's interference in the 2016 U.S. Elections. During this period, Russia was accused of running influence campaigns by setting up troll farms and online bots to generate millions of fake Twitter and Facebook accounts and posts that comprised of politically biased information (Badawy et al., 2018; Ohlin, 2016). This caused significant real-life impacts such as the swaying of election results, and instability in the U.S social system through social polarisation (Levy & Razin, 2020). Ultimately, this was the result of many social media users failing to distinguish fake posts and circulating false information to their online audience who in turn were likely to do the same (Figueira & Oliveira, 2017). Therefore, making the spread of false information increasingly difficult to stop (Stahl, 2006).

Misinformation, even when shared with pure intents, can be just as harmful as disinformation. For example, some people such as conspiracy theorists do not believe they are operating under malicious pretence but are providing a community service by revealing and distributing information that has been covered up by governments or organisations (De

Riddler, 2021). However, while shared with the best intentions, false information can still result in violent outcomes such as in the case of PizzaGate.

PizzaGate is a conspiracy theory that was initially circulated during the 2016 U.S. Election period, which alleged that Hillary Clinton was running a child sex-trafficking ring in the basement of a local pizza bar called Comet Ping Pong Pizzeria located in Washington, D.C. (Bleakley, 2021). This conspiracy theory quickly went viral on social media and led 28-year-old, Edgar Maddison Welch, to drive from North Carolina to Washington to conduct his own investigation accompanied with weapons. Welch thoroughly searched the restaurant, threatened staff, and fired his weapon more than once. However, failed in finding any evidence of the supposed sex-trafficking (Guadagno & Guttieri, 2021).

This example highlights that misinformation and disinformation on social media, even when shared with good intentions can have violent consequences and poses significant risks. Thus, it is crucial that intelligence analysts can quickly and successfully identify misinformation and disinformation that may have the potential to cause detrimental real-life impacts.

1.4 Wargames for Decision-Making

Through wargaming, players are presented with an artificial representation of a scenario or conflict for the purpose of teaching a particular goal or skill through activity (Al-Elq, 2010). By undertaking a role as an active participant rather than a spectator, players navigate the scenario by following a set of rules and procedures and making a series of decisions that ultimately affect the outcomes (Perla, 1985). Much in the same way that Aviation Training Devices are used to train pilots to fly in adverse conditions (Bernardes et al., 2015**),** wargaming has been used for decades within the military for education, training, and research purposes (Perla & McGrady, 2011).

The purposes and benefits of wargaming are multifaceted with one of those key advantages being its ability to provide a fascinating window into human decision-making processes and human interactions for the purpose of strategic advantage (Reddie et al., 2018). For instance, through wargaming, designers can observe how players interact with one another, how they rationalise, justify and execute decisions, the challenges and issues faced, and the information required for players to make effective decisions (Perla & Barrett, 1985). This research can then be used to provide insight into the complex dynamics of warfare and the processes of decision-making, and how military personnel can be trained to make better informed decisions (Perla & Barrett, 1985).

Furthermore, although wargames are synthetic, the high level of engagement and concentration required may feel very real for players as they are encouraged to make decisions while also justifying and explaining their decision-making to others (Perla & McCrady, 2011). By taking responsibility for those decisions and facing the consequences of their choices, whether it be positive or negative, players may gain greater understanding and enlightenment into their own decision-making processes. Ultimately, leading to better decision-making in the future (Perla & McCrady, 2011).

During wargaming, players can also learn from one another whilst exchanging ideas and information, and engage with unexpected and uncommon situations which they are forced to confront and learn from despite it being uncomfortable or foreign (Page 2016; Perla & McGrady, 2007). Hence, wargaming allows for military forces to practice and prepare for how to respond to potential future threats, and examine their own learning and decision-making processes for the purpose of improving these mechanisms (Page, 2016).

1.5 Simulations for Training and Social Media Simulations

One form of wargaming is interactive simulations in which users are presented with a representation or abstraction of a certain environment or activity which the user learns about

through their interaction with the simulation (Chung, 2016; Reddie et al., 2018). Simulations are commonly used within defence for training, to teach specialised skills, and to support better decision-making (Chung, 2016). For example, one such simulation used by defence is Operation Flashpoint, Virtual Battlefield Systems (VBS1), which is currently being used to train and support military forces operating in tropical wet seasons in Darwin (Carpenter & White, 2005).

There are many benefits to the use of simulations within defence. First, simulations are a cost-effective and efficient way for military forces to evaluate different operations, strategies, and tactics within a short period of time (Padilla, 2012). Further, simulations allow for repetition, meaning that military personnel can engage with the simulation many times to effectively train for missions and to acquire specialised skills (Padilla, 2012). Moreover, simulations allow military personnel to prepare for situations that may be too risky or difficult to undertake in a real-life setting, such as interacting with social media spaces (Iyengar et al, 1999).

The social media environment is a highly complex space to research and examine due to privacy, confidentiality, and ethical concerns (Hunter et al., 2018). Studies have shown that most users of social networking sites do not read the terms and conditions and have little understanding of their permissions and privacy (Kempa, 2015). This raises issues for researchers as to whether social media content is public information, and whether the users have consented for their data to be used in a different context than what they originally intended (Hunter et al., 2018). Moreover, when researching the social media environment, researchers run the risk of exposing users to harm (Hunter et al., 2018). For instance, if researchers wished to examine how users would authentically respond to misinformation and disinformation, they could post information that was false. However, they would then be exposing users to information that could be distressing and potentially dangerous, thus

violating ethical boundaries. Hence, a social media simulation is an effective alternative to examining online behaviour without the risk of violating these boundaries.

A social media simulation could mimic popular networking sites such as Facebook or Instagram and allow users to partake in typical online behaviours. For example, creating profiles, commenting on posts, sending or receiving messages, checking notifications, and viewing other profiles (Garaizar & Reips, 2013). Thus, providing researchers with the ability to examine how users respond when faced with misinformation and disinformation online, in a low-risk environment that poses no risk or real-life consequences to the user.

Social media simulations have been found to be effective in enhancing digital literacy, the ability to detect grooming behaviours online, and knowledge of responsible use of technology (DiFranzo et al., 2019; Gordillo et al., 2021; Reeves & Crowther, 2019). However, despite the growing risk of online attacks, such as misinformation and disinformation, there is little research specifically into how social media simulations can be used to train intelligence analysts to detect and combat these threats.

1.6 Naturalistic Decision-Making Theory

To fully capture the decision-making processes of intelligence analysts, it is not only important to observe the decisions they make, but also to understand the mechanisms that underlie their decision-making processes. Naturalistic Decision-Making Theory refers to an attempt to understand how people realistically make decisions in complex or time-sensitive real-world settings (Klein & Klinger, 2008). According to the Naturalistic Decision-Making framework, complex situations in real-life are often marked with different key features which can include factors such as uncertain or continually changing environments, ill-defined tasks, time pressure or personal consequences for error, competing goals, and organisational groups and norms (Gore et al., 2015; Klein & Klinger, 2008).

With so many factors to consider and navigate in complex environments, it is believed then experts rarely have the cognitive capacity or the time to be able to carefully consider all the available options, evaluate all their disadvantages and advantages, and then choose the most optimal time-efficient and workable option (Klein & Klinger, 2008). As such, the Naturalistic Decision-Making framework proposes that decision-makers in real settings heavily rely on intuition (Klein et al., 1993).

The "Intuitive" style of decision making, is a proposed style of decision-making in which decisions made are rapid, automatic, and require little cognitive capacity or awareness into how these decisions are made (Kaufmann et al., 2014). These decisions are based on vast amounts of prior expertise, information, and knowledge that has been acquired primarily through associative learning and has been stored in the long-term memory (Salas et al., 2010). Ultimately, these types of decisions are associated with positive decision outcomes in challenging and complex environments in which the decision-maker may experience high stakes, constrained time limits, or limited available information (Kaufmann et al., 2014).

In complete contrast, the opposing style is known as the "Rational" system in which the decision-making process is slow, controlled, effortful, analytical, and requires high levels of cognitive ability (Hodgkinson et al., 2009). Decision-makers use rules, gather vast amounts of information, and follow a structured process by evaluating the strengths and weaknesses of each alternative, before making a decision that appears most optimal based on their careful and detailed analysis (Hodgkinson et al., 2009).

There is evidence to suggest that Naturalistic Decision-Making can be a useful theory to better understand how experts make decisions in natural environments or simulations that represent the environment. For example, an early study into Naturalistic Decision-Making examined a group of experts who worked in difficult environments such as firefighters and pilots (Klein et al., 1993). Results revealed that decisions made by these parties were based

on their evaluation of the situation and refreshing their situation awareness from experience, rather than generating multiple options and comparing them to one another (Klein et al., 1993). Thus, ultimately showing evidence in support of experts operating under the Naturalistic Decision-Making framework when in challenging environments (Klein et al., 1993).

Based on the literature, it would appear plausible to suggest that intelligence analysts would use their intuition to guide their decision-making. Indeed, there is some literature in favour of intelligence analysts operating under the Naturalistic Decision-Making framework, however, this research is limited (Gore et al., 2018). Therefore, one way of examining this relationship further is to investigate whether intelligence analysts are more likely to rely on their intuition to make decisions rather than using analytical means. For instance, when faced with a potential threat that they must respond to, are they able to quickly make a decision by drawing upon their past experience, as the Naturalistic Decision-Making framework would suggest.

1.7 Present Research

While simulations have been widely considered beneficial in training and education, there is little research conducted specifically into social media simulations despite the growing risk of online threats such as misinformation and disinformation. The present study aimed to build upon this growing area of research by conducting a wargame that used a social media simulation, which would allow for the creation, dissemination, and collection of information for analysis to inform decision-making during the wargame. Thus, examining how intelligence analysts respond to misinformation and disinformation, and how the social media simulation could be used in the context of training intelligence analysts to develop better decision-making skills when faced with similar threats in real life.

According to the literature, wargaming is often considered exploratory in nature as it is rarely ever used to disprove theories or prove concrete hypotheses but rather it is intended for the purpose of highlighting new issues and providing interesting insights and lessons into the processes observed (Perla, 1985). When considering this factor in conjunction with the limited amount of current research in the area, there was strong rationale for the present study to be exploratory in nature. Thus, qualitative data was used to provide a foundation for this developing area of research, and to allow the exploration of more complex and rich data.

As the present study was exploratory, a general set of aims were established rather than concrete hypotheses. The primary aim of the present study was to examine how a social media simulation could be used to train intelligence analysts by examining their decision-making processes when faced with disinformation or misinformation. To do so, the current study was particularly interested in the factors that influenced participants decision-making and how they made decisions. For instance, whether intelligence analysts were more likely to use an intuitive style of decision-making over a rational style of decision-making as the current literature would suggest. In addition, the present study also aimed to explore any insights and lessons derived by the participants as the literature has demonstrated that insights obtained during a wargame can result in better decision-making in the future. Lastly, the study aimed to examine whether participants found the social media simulation a useful and beneficial tool in training and felt it would help improve their decision-making processes if faced with a similar threat.

2.0 Method

2.1 Participants

The study utilised purposeful sampling to recruit participants. Participation was sought from Australian Department of Defence (ADF) employees and researchers from The University of Adelaide who either worked or researched areas of interest to intelligence

analysts. These individuals were contacted by email and invited to participate in the wargame. A total of 21 participants partook in the wargame, with a total of 21 usable responses received for the qualitative data. From the demographic data, it was ascertained that in total, 14 participants identified as Male, and 7 participants identified as Female.

There were 4 participants who opted not to state their age group or prior experience. Of the remaining 17 participants who did provide this demographic information, a total of 3 participants specified they were in the 18-29 age group, 5 participants were in the 30-39 age group, 3 participants were in the 40-49 age group, and 6 participants were in the 50-69 age group. Further, 2 participants specified they had used a social media simulator a few times, 4 participants indicated they had used it once, and 11 participants indicated they had never used a social media simulator before. Of the participants who had prior experience with social media simulations, 5 participants indicated that they had used a simulation prior as part of a wargame, and 1 participant indicated that they had used it as part of research.

2.2 Materials

2.2.1 Social Media Simulation

The wargame used a social media simulation tool that is available within ADF and can be used in 'real-time' for training and wargaming exercises. The tool mimicked the features of popular networking sites such as Twitter and contained an existing library of information. However, more content was generated by the bots that populate the simulation, and participants were responsible for generating new and specific content for their team, and for controlling when this information should become available to other users.

2.3 Measures

2.3.1 Demographic Information

Participants' demographic information was collected using a written survey prior to the wargame (*See Appendix A [full survey attached]*). Participants were asked their age,

gender, current job position, and their prior experience with social media simulations These details are outlined above in Section 2.1.

2.3.2 Decision-Making Process, Lessons, and Insights

To gain insight into the decision-making processes of participants during the wargame, participants were asked to complete a series of semi-structured focus groups after each turn of gameplay, which were led by researchers from the Department of Defence, Defence Science and Technology Group (DSTG). The wargame consisted of a total of four turns, with each turn comprising of four actions that each team was able to make during the turn. During the semi-structured focus groups, participants were asked a series of open-ended questions to explore the influences on their decision-making. The questions asked by researchers included prompts such as, (A)Why did you make the actions that you did this round? (B)What shaped your decision? (C) What were you thinking when you made this decision? (D) What factors influenced your decision?

Following the wargame, semi-structured focus groups were conducted with participants to explore their experiences with the social media simulation. These open-ended questions attempted to explore whether participants had found the social media simulation a useful tool, and what lessons and insights they gained from their experience. The questions asked by researchers included prompts such as, (A) If or how did the social media simulation make you think about your own decision-making processes? (B) Did you feel the social media simulation would help you make better decisions in the future if faced with a similar threat? (C) What lessons or insights did you gain from the social media simulation? (D) Was the simulation useful in gathering relevant information? (E) How did you use the simulation to publicise your own teams' narrative/actions to influence other participants during the wargame.

2.4 Procedure

Following approval by the DSTG Low Risk Human Ethics Committee, participants were recruited for a study entitled, “Evaluation of a Social Media Simulator for Decision-Making in Information Operations and the Training of Intelligence Analysts”. After reading the Information Sheet, Consent Form, and the DSTG Guidelines for volunteers, and providing consent, participants were asked to complete a written survey comprising of demographic questions prior to the wargame. Participants then partook in the wargame in which they were asked to complete a series of semi-structured focus groups after each turn of gameplay regarding their decision-making. Following the wargame, semi-structured focus groups were conducted with participants to explore the insights and lessons gained by participants during the wargame. The focus groups were conducted within the teams that participants were allocated to during the wargame. There were five teams in total with an individual researcher assigned to each team.

3.0 Results

3.1 Analysis

Interviews from the semi-structured focus groups were transcribed verbatim by researchers. As the data was qualitative, it was then analysed using the method of thematic analysis which allows for the identification, analysis, and reporting of important themes (Braun & Clarke, 2006). Based on this approach, the data was analysed following six phases which included the following: ‘Familiarising yourself with your data’, ‘Generating initial codes’, ‘Searching for themes’, ‘Reviewing themes’, ‘Defining and naming themes’ and ‘Producing the report’ (Braun & Clarke, 2006). Microsoft Excel was used by researchers to input data and categorise the data into themes.

The thematic analysis resulted in three key themes being identified in relation to the influences on participants' decision-making, and three key themes regarding the lessons and insights gained by participants. The following section will discuss these results in detail. A total of 21 participants participated and provided comments during the semi-structured focus groups with a number code used to identify each participant.

3.2 Qualitative Results

3.2.1 Influences on Decision-Making

3.2.1.1 'The Delivery of Important Information Regarding the Wargame Scenario'

When considering the influences on participants' decision-making process, a prominent theme that emerged from the dataset was regarding how information about the wargame scenario was provided. Information about the wargame scenario and accompanying materials were shared with participants at the beginning of the wargame. Participants were not provided nor allocated extra time to read through this material. However, as shown by participants' comments below, participants felt that this information should have been provided sooner and that time should have been allocated to allow them to read through, and to fully grasp and process the information.

> *"They could possibly just set time aside at the beginning, like an hour or two, where we absorb all the information, and discuss before impacting the exercises."* (#11).
>
> *"There was probably a lot of stuff we missed, that could have been pre-reading some of that."* (#8).

As a result of not being able to process the information, many participants felt they lacked the necessary knowledge and understanding to make well-informed and effective decisions during the action rounds. For instance, as highlighted by a participant's comments below, some participants did not understand what the problem was that they were trying to resolve or their purpose, which impacted on their decision-making process when strategising.

> *"The information was there, but you need more comprehensive time to assimilate the circumstance because sometimes you need to actually work out what the problem is that we're trying to solve."* (#10).

Participants also commented that they spent a substantial amount of time reviewing information which meant they had less time to strategise and plan. Hence, hindering effective decision-making processes, as participants felt pressured by the time constraints or felt they did not have enough time to effectively strategise as shown by participants' comments below.

> *"We almost needed time to think of ideas and then actually post those ideas. We sort of having time to think of those ideas and then suddenly we got to run it to the table, but we haven't done anything."* (#2).

> *"From the brief to the decision, it was very short, and so there was a lot of reacting rather than planning or strategising."* (#10)

Evidently, the method in which the information about the wargame scenario was delivered had a substantial impact on participants. By not providing enough time for participants to read through and process the information, participants struggled with time constraints, and a lack of knowledge and understanding. Ultimately, hindering their decision-making processes or changing the course of them altogether if they had all the information.

3.2.1.2 'Prior Experience'

A prominent theme that emerged from the dataset was the relationship between prior experience and decision-making. When asked about what influenced their decision-making processes, participants frequently commented that they drew upon their prior experience and knowledge. As demonstrated by participants' comments below, this experience came from a wide variety of sources.

> *"Well for me its previous experience with the previous wargame."* (#1).

"An experience for me is previous work with different actors including governments, and also my own personal background and experience that I bring to the decision-making process." (#11).

"I come from a politics background so previous knowledge I guess for me." (#3).

Participants commented that they felt this prior experience was advantageous to their decision-making process. For instance, as demonstrated by participants' comments below, prior experience allowed participants to strategise more effectively as they had greater insight into the probable outcomes of the action.

"It was really previous experience about how influence campaigns work, and you know, you either distract from the problem or you gather some force for the personal issue or event, and you make it a non-issue and non-significant event." (#3).

"What also helps, in my experience was trying to drill from uh previous experiences, you know so we can look at one thing, or we can look at the same thing and have different interpretations of it, so trying to look at it from there, things from that perspective, and anticipating the next and then strategising and consulting that line." (#11).

Comments coded into this theme demonstrated that prior experience had a significant influence on participants' decision-making and that participants viewed this as an advantage on their decision-making processes.

3.2.1.3 'The Quantity and Speed of Information'

An emerging theme from the data revealed that the abundance of mass and complex information had an impact on participants' decision-making. Participants noted that the influx of information on the social media simulator made it extremely challenging to manage and find relevant information. As a result, participants felt their decision-making was hindered as they often wasted substantial time trying to find relevant information. In addition, as shown

by participants' comments below, participants frequently felt overwhelmed and confused at times by the massive amount of information they were receiving from various sources.

> *"Staying on top of what was happening as best as we could, responding to things, and just letting you know that they needed to be responded to, and how and from where, was a ridiculous task."* (#2).
>
> *"That was part of the difficulty I had with the feed, because I couldn't tell what order this stuff is coming in, why am I getting, a hundred tweets from CosmicGnome101, and only a couple from other things."* (#10).

The abundance of information meant that participants often did not have the time to properly distinguish between false or real information or verify the information. Rather, participants had to strategise and make decisions based on the information they could get the fastest as demonstrated by a participants comment below.

> *"I would say, whatever is quickest, if you are trying to do everything, but everything is within a day, so whatever is going to get you the most information as fastest as possible. You are probably not going to double check and verify, you are probably just going to go, right, what's happening, and grab that and move on with that … it's more like having a quick skim, anything popping out, no, okay move onto the next news article. So, there is more popping out, then you make the decision. So, it's kind of like, what can I get fast to influence my decision."* (#2).

Evidently, participants were heavily influenced by the abundance of information and the time that was spent trying to manage and find relevant information. Consequently, this meant that participants heavily relied on and based their decision-making on information they could get the fastest regardless of whether this information could be verified.

3.2.2 Insights and Lessons Learnt

3.2.2.1 'Greater Awareness into Misinformation'

The first theme identified regarding the insights and lessons learnt by participants referred to misinformation. Participants commented that after partaking in the simulation, they felt they had greater awareness into the ease and carelessness in which misinformation could spread. Participants shared insight into how easily misinformation can be circulated and spread by actors who are not concerned with the credibility of information as demonstrated by participants' comments below.

> *"Misinformation is cheap, its cheap to lie, its much less cheap to be accurate, especially when the access to what is accurate in this situation is quite difficult."* (#9).

> *"Journalists are lazy, you know pretty much now, journalists sit there, look for a tweet, and then that becomes new info, and its one person's opinion."* (#10).

Participants also noted that misinformation often caused influxes of information which made it extremely difficult to distinguish between false and true information. As demonstrated by a participant's comment below, this provided insight into how difficult it can be to determine the credibility of information or the actor.

> *"That really looks like a fake account, but I can't be sure because of the stupidity that people post online daily and those are real accounts. It doesn't conclude stupid things on here not being real as well."* (#15).

Comments within this theme also referred to participants indicating that false information often made it difficult to find and monitor the relevant information. As a result, they gained greater understanding into the many different factors decision-makers must consider when monitoring information as shown by a participant's comment below.

"Cyber scandals or such trending news can sometimes derail some of the priorities that decision-makers are already paying attention to. So, there are all these moving parts that need to be taken into account at the same time." (#11).

Comments coded into this theme demonstrated that participants appeared to gain greater awareness of the influence and power of misinformation. Particularly, participants demonstrated insight into how rapidly misinformation can be spread and the difficulty that misinformation poses in that relevant and accurate information becomes increasingly difficult to find and monitor.

3.2.2.2 'Greater Awareness into the Difficulty of Managing Multiple Profiles'

The second theme identified regarding the insights and lessons learnt by participants referred to the management of multiple online profiles. Participants commented that managing multiple profiles on the social media simulation was extremely challenging from a practicability perspective as demonstrated by a participant's comments below.

"We have at least nine accounts, plus the official ones that we got to hold to, it's a dozen accounts but it's such a pain in the backside to switch between, and you just up just kind of sitting at one account for a while and that sort of shapes your thinking as you come up with a great idea and then go oh no, I will have to log out of this account and log into another one." (#5).

In addition, to the practical aspect of managing multiple profiles, participants also shared they felt they gained insight into how difficult it is to manage multiple personas when attempting to influence others and when trying to control the strategic narrative as shown by a participant's comments below.

"I think it pointed out how much effort it can be to manage several identities at once ... so if you are doing it manually, what goes into it, and I knew of that already but once you have done it for real its little bit more eye-opening, so you know trying to

keep the personas straight and then one started veering to the other but trying to make that look sensible at the same time was interesting." (#15).

Comments coded into this theme demonstrated that participants gained greater awareness and insight into the complexities and challenging nature of managing multiple identities at once when trying to influence and control the strategic narrative.

3.2.2.3 'Useful Tool for Training'

Another insight shared by participants that was evident from the qualitative data, was that participants felt the social media simulation would be a useful tool for training. As evidenced by a participant's comment below, participants indicated that the social media simulation had potential to become an effective training tool for high level decision-makers.

"I think there is an opportunity now to create a tool that could be very effective in training, particularly senior military and whole governments." (#3).

Participants also referenced specific situations in how they felt the tool could be useful. For example, participants indicated that the social media simulation could be used to train intelligence analysts to develop better awareness and understanding into early warning signs of real-life risk. As demonstrated below, one participant referenced the January 6th Capitol Riots and how a social media simulation tool could have assisted in preventing this occurrence.

"I think it's a situational understanding of those early warning indicators, you know, a change in population sentiment or disenfranchising. … when you look at the January 6th [riots], had they been tracking social media they would have known that hundreds and thousands of people, who were against the election were coming to the capitol, so what are the actions that needed to be taken." (#6).

Furthermore, participants also noted how the social media simulation could be used by intelligence analysts to practice repetitively. As demonstrated by a participant's comment

below, participants felt this would be extremely beneficial as this would allow the individual to receive feedback on their performance.

> *"If we sat down and went through all the tweets like a football team goes through their players right, like this is good, this is bad, for whatever reason. You would be able to teach a team how to think on their feet within boundaries...,if I was going to be an information warfare guy, I would want this for weeks and weeks to work out what is expected of me and what is it that they want."* (#11).

Comments coded into this theme demonstrated that participants felt the tool had the potential to be useful and beneficial in the training of intelligence analysts. Participants commented that the tool could be used to train intelligence analysts by teaching them to identify early warning signs, and for practice and feedback. Thus, ultimately contributing and leading to better decision-making.

4.0 Discussion

The present study explored the decision-making process of individuals while using a social media simulation available within the ADF. While simulations more broadly have been shown to be effective and useful in training, education, and knowledge, there is very little research into the benefits of social media simulations specifically. However, given the growing risk of online threats such as misinformation and disinformation, there is a clear need for intelligence analysts to have high quality and effective training. Hence, the present study aimed to contribute to the current literature field by conducting one of the first few studies into how a wargame using a social media simulation can be used to assist and train intelligence analysts to make better informed decisions when faced with potential threat. The following section below will discuss both the theoretical and applied contributions of this study, and highlight suggestions and directions for future research.

4.1 Theoretical Contribution

This study aimed to contribute to the current literature by gaining insight into the decision-making processes of individuals and how social media simulations can be used to train intelligence analysts to make better decisions when faced with similar threats in real-life. To do so, the present study sought to examine what factors influenced participants' decision-making. Results revealed that participants' decisions were influenced by three key factors which included, 'the delivery of important information regarding the wargame scenario', the quantity and speed of information' and 'prior experience'. These key influences that impacted participants' decision-making processes demonstrate support for participants making decisions using Naturalistic Decision-Making.

According to the Naturalistic Decision-Making framework, decision-makers in real-life settings often rely on their intuition (also known as past experience and knowledge) to make decisions in complex and challenging environments in which they are constrained by external factors such as time pressure, and either a lack of or an abundance of information (Klein et al., 1993). As demonstrated by the present research, participants were often hindered by time pressures or the lack of accessible information. As such, participants often quickly made decisions based on the information they had and what information they could get the fastest, rather than utilising a slow and carefully considered process in which they had all the information and considered all options. Additionally, in further support of participants operating under Naturalistic Decision-Making, participants commented that they frequently drew upon their past experiences which allowed them to make quicker and more effective decisions as they had more confidence and certainty in the outcomes. When considering these factors, it is evident that this style of decision-making is most reflective of the initiative style of decision-making rather than the rational style of decision-making. Thus, based on these

findings, there appears to be evidence to plausibly suggest that participants utilised Naturalistic Decision-Making when making decisions during the social media simulation.

This finding contributes to the current literature by expanding on previous research which has demonstrated support for intelligence analysts operating under the Naturalistic Decision-Making framework (Gore et al., 2018). As this type of decision-making is associated with better decision outcomes in difficult and time-sensitive environments (Kaufmann et al., 2014), this is a positive finding as it demonstrates that intelligence analysts are likely to utilise an advantageous style of decision-making. Evidently, when working within demanding situations, there is little capacity for individuals to carefully consider all their options and follow a structured process. Therefore, prior experience and knowledge are extremely valuable for individuals when working and making decisions within these challenging environments.

Further, an interesting but unintended finding was that participants felt frustrated with the method in which they received information. For instance, participants frequently commented that they felt their decision-making processes were hindered due to not being given enough time to process the information provided before being forced to make decisions. However, despite their frustrations, the time constraints and pressures that were placed on participants were purposeful to make the experience more reflective of the challenging real-life environments that intelligence analysts often operate in. Ultimately, this finding highlights that participants may have not made the association between the social media simulation and its applicability to real-life. Therefore, future studies may choose to explore how to make the real-life applicability of the social media simulation more apparent to users.

4.2 Applied contribution

The results demonstrated that participants gained greater insight and awareness into the ease and rapidness in which misinformation could be spread and the complexities involved when monitoring online information. For example, how difficult it is to manage several online profiles. This finding was positive as research has consistently demonstrated that gaining greater awareness of an issue can result in greater insight and more effective decision-making when faced with a similar threat (Perla & McCrady, 2011).

The findings demonstrated that participants found the social media simulation an effective and beneficial tool for training. Participants commented that they felt that the social media simulation could be used to train intelligence analysts to monitor and detect early warning indicators of real-life threat such as organised riots like the January 6th Capitol Riots. In addition, participants felt the social media simulation was extremely beneficial as it allowed for repetition which then allowed for feedback on their performance. Thus, they could gain insight into what constituted a good/bad decision which ultimately would lead to better decision-making. While this study was exploratory in nature, these findings provide an early indication into usefulness and benefits of social media simulations in the training of intelligence analysts. This provides strong rationale for the investment and continuation of research regarding social media simulations in training.

4.3 Limitations and Future Directions

The current study has contributed to the literature field by providing insight into the decision-making processes of individuals who work with complex volumes of data such as in the case of intelligence analysts. Nonetheless, there are several limitations that must be considered.

First, it is important to note that the outcomes of wargames are never pre-determined but are dependent on the actions and decisions made throughout by participants. However,

human decision-making is complex, unpredictable, and sensitive. A single factor can have a significant impact on any of these processes. Therefore, due to the many variables that can influence decision-making, it is believed that no wargame will ever be the same (Perla, 1985). Consequently, the present study is limited in that it is unlikely that it will ever be able to be fully duplicated and produce the same conclusion. Nonetheless, while the wargame is unable to be duplicated there may still be benefit in the replication of the present study. While the final outcomes might differ, the same key patterns and themes that were found in the current study are still likely to emerge. Thus, helping to increase the generalisability and reliability of the present finding. Hence, future research may benefit from replicating the present study with an equal or larger sample.

It is also worth noting that participants in the present study were recruited using a purposive sampling technique. The researchers were aware prior to the study that all participants either researched or worked within areas related to intelligence analysts. However, for future research it would be beneficial for a question to be included about how long the individual has worked in the role. This information would be valuable as it would allow researchers to observe how participants' specific experiences influence their decision-making and any relationships between years of experience and decision-making.

Further, it is important to note that the present study utilised qualitative data extracted from focus groups. As this study was exploratory this method was considered appropriate, however this does result in a limitation. An individual researcher was assigned to each team to conduct a series of focus groups after every round. However, given the nature of semi-structured focus groups, the researcher may not ask all questions or may ask additional questions that were not planned in advance to explore an interesting or unexpected point that has been raised. Further, the focus groups are primarily guided by the participants, meaning that at times some participants may choose to answer more than others, or others may choose

not to answer the question at all. Consequently, while the data was analysed by identifying the most prominent themes that emerged from the dataset, these findings may not be applicable or reflective of all participants. Therefore, future research would benefit from the additional use of written surveys or structured individual face-to-face interviews to thoroughly capture all participants' experiences with the social media simulation.

4.4 Conclusions

The rise and evolution of technology has led to an increase in online threats such as in the case of misinformation and disinformation which can result in dire consequences and real-life risk. It is vital that intelligence analysts have quality and effective training to identify, monitor, and accurately assess these potential threats. The present study has provided valuable insight into the decision-making processes of intelligence analysts and how social media simulations can be utilised in their training to assist decision-making. The results suggest that social media simulations appear useful for the training of intelligence analysts and that there is strong rationale for research within this area to expand. Future research that replicates the present study and uses other methods such as structured individual interviews would increase the reliability and generalisability of the present findings.

The current study continues paving the way for future research within this area and has provided recommendations for the ongoing growth and development of social media simulations.

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Contribution Statement

[redacted]**:** Conceptualisation, Methodology, Formal Analysis, Investigation, Resources, Data Curation, Writing – Original Draft, Writing – Review and Editing, Visualisation, Resources, Project Administration. **D.I.:** Conceptualisation, Methodology, Software, Writing – Review and Editing, Supervision. **D.S.:** Writing – Review & Editing, Project Administration, Funding Acquisition: **G.B.:** Conceptualisation, Funding Acquisition: **A.G.:** Writing – Review & Editing, Supervision.

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Team: **Role:**

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◯ 18-29
◯ 30-39
◯ 40-49
◯ 50-69
◯ 70+

Sex

◯ Male
◯ Female
◯ Non-binary
◯ I use a different term
◯ Prefer not to say

What is your current position/role?

How many times have you used social media simulations?

◯ Never
◯ Once
◯ Twice
◯ A few times
◯ Several times

When have you used social media simulations?

How much time (minutes or hours) have you spent using social media simulations?

Please describe how you have used social media simulations e.g. training exercise

Do you have an understanding of the work/analysis undertaken by intelligence analysts?

◯ Yes
◯ Some
◯ None