Proceedings of the 2024 Winter Simulation Conference
H. Lam, E. Azar, D. Batur, S. Gao, W. Xie, S. R. Hunter, and M. D. Rossetti, eds.

BLIND MODELING THE PEACE GAME: REVERSE ENGINEERING A SYSTEM STRUCTURE FOR A ONE-OFF COMPLEX NATIONAL SECURITY WARGAME

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ABSTRACT

System structure models of existing national security wargames could enable systemic analysis and facilitate computer simulation. However, few if any wargames have a system structure model of the game. And many wargames are run infrequently, maybe even once, with strict limits on observer participation. Our experiment was to determine if, using a modified systems thinking method, a "blind observer" could reverse engineer the "Peace Game" to identify core system structure from observed behavior modes. Each Peace Game runs as a two-day exercise with participants playing a country team challenged to develop a response to a variety of host nation complications. Participants must consider all U.S. government assets available to mitigate the crises. The exercise also includes participation from senior retired officers on the control team, simulating Washington leadership responses as well as host-nation officials. Our experimental findings include observed behavior modes, proposed system structure, and writeup of results.

1 INTRODUCTION

National security wargaming lacks a rigorous analytical framework encompassing both system structure models and computer simulations representing the wargames. This gap challenges efforts to create systemic, repeatable, transparent, and unbiased wargames for purposes of national security. Complicating this is many national security wargames are only ever run once in extremely limited environments. In this experiment we test the ability for a 'blind observer' to attend a complex wargame, the Peace Game, to determine if they could distill a system structure of the wargame from a single observation.

The Peace Game brings together representatives from various U.S. departments and intelligence agencies that comprise a country team and challenges them to solve a complex crisis simulation. The simulation scenario centers around Ikhaya, a fictional country that has the national characteristics resembling various African nations. Each Peace Game runs as a two-day exercise in which 30 participants play the country team and are challenged to develop a response to a variety of complications. The participants' responses must consider all the U.S. government assets available to help mitigate the crises. The exercise also includes participation from senior retired officers who play on the control team, which simulates Washington leadership responses to the country team and dictates the pace at which new plot lines are released to the country team. The Peace Game leverages a computer system to approximate all manner of communications that might occur in the fictional setting, allowing some tracking of interactions. Adjudication of action outcomes is performed by expert consensus on the control team. Overall, the Peace Game allows government officials to confront these complications in a simulation before they are faced with similar challenges at post, ensuring they are better prepared to craft effective solutions.

Our methods of experiment were blind observation using a modified standard method of system dynamics. The standard method uses behavior modes to create a reference mode that is then used to guide development of a feedback-based qualitative system structure through causal loop diagram (CLD) methods. The CLD becomes the dynamic hypothesis of how the system interacts to produce the observed behavior modes and becomes the basis for later computer simulation development using system dynamics field accepted approaches. In this experiment four observers with no prior experience or training attended the event. Observers represented a range of diverse experiences and a viewpoints. A system scientist trained in the standard method, a geographer acting as an ethnographer, and two interns. All observers were 'blind' having neither been trained nor participated in the Peace Game before. Observations were structured so as to limit influence of participants on observers and vice versa.

During the exercise, observations included timestamped written notes, nine observed behavior modes with time stamps, a space diagram charting interactions, and three-time trials. The system scientist created nine observed behavior modes were Battlespace Awareness, Country Goals Furtherance, Country Team Agency, Country Team Use of Tools, Energy, Plot Furtherance, Stressors, System Perception, and Teamwork. After the exercises conclusion additional data was obtained from other observers, as well as the data generated by the control team and computer platform that facilitates the game.

An example of the combined time stamped behavior modes from observation is provided below in Figure 1 (all figures are included in supplementary document). The behavior modes of Teamwork, Energy, and Stressors are charted across a timeline of Day 1. The colored segments indicate major transitions in the exercise, such as the start or stop of Rounds. The stars indicate major plot points as noted by the observer. Another example is the perception of participants of the system they were operating in as simple, complicated, or complex as observed in the behavior mode of Figure 2.

In Figure 2 ranges of 0-1 indicate a perception of simple system, 1-2 as a complicated system, and 2-3 as a complex system. Note the interactions between the two chart. As teamwork, energy, and stressors rise early in the day so does the advancement of perceiving a system from simple, to complicated, to complex. However, near the end of the day, as exhaustion and mental fatigue sets in, teams struggle to maintain energy in Figure 1 and as a result of the cognitive strain the ability to retain perception of the system as complex also erodes in Figure 2.

As part of the standard method a full system structure CLD was built based on these behavior modes. As a select example of this output, Figure 3 depicts the feedback structure of the game generating perception of the system as simple, complicated, or complex.

Three central feedback loops represent the system state of players perceptions. Battlespace Awareness, informs players and shifts understanding from simple to complicated system. As they gain awareness of the battlespace, players begin to grasp how many moving parts are in play. However, Battlespace Understanding, arising from player experience in embassy operations and the purpose of Peace Game efforts shifts perception from complicated to complex. Players begin to understand the dynamic interactive connections between the different parts. A 'fatigue effect' at the top of the structure (pulling from the energy part of the CLD) acts as a filtering mechanism. When fatigue effect is high it damps both battlespace awareness and understanding leading to reduced cognitive ability to perceive higher levels of system. These findings were augmented by ethnographer observations of player interactions and comments throughout the first day.

The poster for WinterSims will include a full system structure CLD dynamic hypothesis capable of generating all nine of the observed behavior modes plus other findings of the experiment.

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