



Complex Security Environments, Strategic Foresight and Transnational Security Cooperation Games

Deon V. Canyon, Jonathan Cham, Jim Potenza

Abstract

Disruption characterizes the 21st Century, which is replete with complexities of climate change, food security, scarcity conflicts, displaced populations, unbridled economic growth, erosion of traditional value systems and transnational security dilemmas. In an environment where governments need innovative tools to conceptualize and form a future that leverages emerging opportunities and minimizes risks, foresight is increasingly considered a critical capacity in those responsible for strategic decision-making and coherence in policy development. Transnational security cooperation games feature a hybrid design with elements of seminar games and live-action role-play games. They provide an ideal executive education method for engaging mid to senior-level security practitioners in strategic foresight thinking. This paper describes the transnational security cooperation game “Radicals” and reviews outcomes of relevance to professional security practitioners and strategists. Players appreciated the opportunity to practice the skills of negotiation, collaboration, and strategy development in a complex environment. Based on data collected from player reflections, feedback and anonymous surveys, the game provided insights into the complexity of crisis management including the importance of strategic preparation, relationship building and institutional resilience.

Keywords: Serious games, wargames, decision-making, crisis management

Introduction

Societal policy-related problems are inherently different from those that are confronted and resolved by scientists and engineers. They are hard to define, have few obvious solutions and manifest the characteristics of complex adaptive systems. They receive repeated attention because they have a life of their own and constantly evolve in response to corrective action taken. Such ‘wicked’ problems, initially described by planners (Rittel and Webber 1973), are an integral, well-known part of all societies.

To help manage complex adaptive systems, decision makers use foresight to navigate between uncertain futures and the need for intelligence to shape these futures. Strategic foresight is a concept that includes innovation, planning, policy formulation and solution design methods based on alternative futures. Foresight is “a systematic, participatory, future-intelligence-gathering and medium-to-long-term vision-building process aimed at enabling present-day decisions and mobilizing joint action” (Miles et al 2016). As such, foresight empowers decision makers to consider strategies that are compatible with plausible futures.

Transnational Security Cooperation Games

Futurists systematically explore numerous possible alternative scenarios to identify pathways to risks and opportunities. Among the best ways to do futures research is through the experience and analysis of serious games (Dator 2017). Repetition of a serious game with diverse participants can be very effective in revealing alternative futures. While this technique does not provide a prediction of the future, it permits a glimpse of what may occur, which aids decision makers in identifying the potential effects of policies in advance.

Transnational security cooperation games (TSCG) at the Daniel K. Inouye Asia-Pacific Center for Security Studies (DKI-APCSS) are 'serious' geopolitical games that integrate game mechanics into non-game activities and processes, such as multilateral negotiations on international security issues. They feature a hybrid design with elements of seminar games and live-action role-play games that originate from U.S. Naval War College wargames used by government officials to explore geopolitical options.

In the past two iterations of the TSCG Radicals, 26 to 28 participants completed the game as part of DKI-APCSS's Transnational Security Cooperation (TSC) course for senior level security practitioners. About half of the participants were military flag officers (1 to 3 star Generals), about half came from government (directors, diplomats, ambassadors, ministers and secretaries), and a few were directors of international non-governmental organizations.

These games were considered 'serious' because participants were directly or indirectly informed, trained or educated in the process (Luo et al 2017). Players gained insight into issue complexity through the lens of security, diplomacy, and geopolitics.

Learning objectives included:

- Experience a series of transnational security crises in real-time that possess the characteristics of complex adaptive systems – unpredictability, self-organization, constant change, and emergence
- Explore transnational security factors that shape effective crisis management
- Test strategies and approaches in adversarial conditions
- Deepen awareness of the variety of positive, negative and neutral roles played by stakeholders in government, industry and civil society
- Gain insight into capacity in critical thinking, strategy, planning, leadership, communication, creativity and negotiation in an environment where every decision has a rapid impact and the unexpected decisions of others create a complex environment

In TSCG Radicals, players are dropped into an asymmetric negotiation environment with competing interests and differing levels of power to pursue those interests. While some coercive means are available to players to push their agenda, most actions require the buy-in of other players to complete. Players use the resources they have available to negotiate and form coalitions of common interest to advance their strategy and gain influence within the game. As they act in a fast-paced and rapidly evolving situation, players observe how security situations might develop and how agencies, force structures, enemies and community factions might respond to their actions.

This paper discusses the utility of serious games in executive education, describes TSCG Radicals, and analyzes its learning outcomes.

Serious games in executive education

Serious games require a challenging goal, entertaining features, performance assessment and content derived from the real world (Bergeron 2006). While education is the primary goal, entertainment is an essential motivating component. This allows androgogical content presentation in many different stimulating formats (Zyda 2005).

The popularity of converting real-world challenges into serious games through gamification gained popularity in 2011 (Deterding et al 2011). Google search results show that the concept has gained traction each year with a tenfold increase in 2017 hit results. Gamification is a proven, powerful strategy for influencing and motivating the behavior of people because it targets key human traits and desires to inspire action, participation, collaboration and engagement (Bunchball 2016). The method is useful for anyone wishing to have people engage to elicit and/or strengthen particular behaviors.

Participants in non-gamified exercises often struggle to maintain focus and may become wallflowers in group-work as they let more motivated and engaged people take the lead. Well-designed game mechanisms motivate people to remain engaged and keep working hard when a complex task becomes challenging or difficult to understand. Tasks that involve a social element are particularly effective at energizing players to collaborate and vie for peer recognition.

Some factors that contribute to the appeal of gaming include (Policy Horizons Canada 2016):

- Engagement where participants are provided with the opportunity to become involved in decision making in contrast to being a passive reader or observer
- Problem solving in complex role-playing games, embarking on missions, overcoming obstacles and solving puzzles can be very rewarding experiences
- Infectious enthusiasm and inspiration is generated by group play and socialization
- Achieving something notable with peers, such as vanquishing others or getting through a challenge is rewarding and intrinsically gratifying

Transnational security cooperation games (TSCG) at DKI-APCSS provide a cost-effective, safe-to-fail environment in which participants have the opportunity to test their strategies and make difficult decisions in an intellectually liberating setting that does not affect the state of the real world.

The game ran in a Transnational Security Cooperation course that aims to:

- Increase understanding of the Asia-Pacific security practices, politics, economies, national identities, and geopolitical considerations underpinning national behaviors and regional interactions

Transnational Security Cooperation Games

- Deepen comprehension of the complex and interdependent nature of regional security dynamics and the need for cooperation
- Expand interagency security practitioner networks and broaden opportunities for cross-institutional collaboration
- Increase interagency capacity through access to research and analysis, better equipping graduates to address regional challenges and concerns

TSCGs fulfill this mission by presenting players with a complex and memorable learning experience that provides maximum visibility on the management of security-related crises. Each iteration of a TSCG provides intellectually stimulating and liberating scenarios that motivate vigorous competition. An adversarial environment featuring real-time urgency, uncertainty, limited information and unexpected actions deepens the experience by introducing a multitude of feedback mechanisms that continually test strategy and agility to adapt in response to internal and external tensions and pressures.

Game description

Radicals is an executive, decision-making TSCG that explores crisis management in a framework of radical emergence and major power competition. The setting is a fictitious island nation, known as Paduana, in the southern part of the South China Sea, which has recently begun managing returning nationals, who fought for Islamic State (ISIS), and radicalized Rohingya migrants, who originated from refugee camps in Bangladesh following departure from Myanmar. Paduana is a predominantly Sunni Islam country that marginalizes Shia. Over a thousand members of its Sunni population travelled overseas to support the Caliphate, and they are now returning as the Islamic State suffers increasing defeat in Iraq and Syria. Local rebel factions are looking to bolster their ranks with new skilled fighters. However, the government is quick to respond to dissent and imprison all known returnees and agitators. Social media is rapidly gaining popularity, which some see as undermining traditional authority structures, forcing emergent change and weakening cultural value systems. All agencies find themselves struggling to manage an internal political environment that threatens to destabilize, while they balance attention and intervention from China and the United States, as well as an international megacorporation representing commercial interests.

The Sunni population concentrates in Paduana City, a large urbanized quadrant of the island, while Kanatopia Province, a smaller, sparsely populated area on agricultural land of poor quality, supports the Shia population (Fig. 1). Helekau Province provides a rich, well-resourced, rural base for Sunni radicals with oil and mineral reserves, while Manatau Province, the largest portion of the island, is undeveloped and supports communist rebels. The prison housing returnee fighters is located on a small island off Kanatopia.

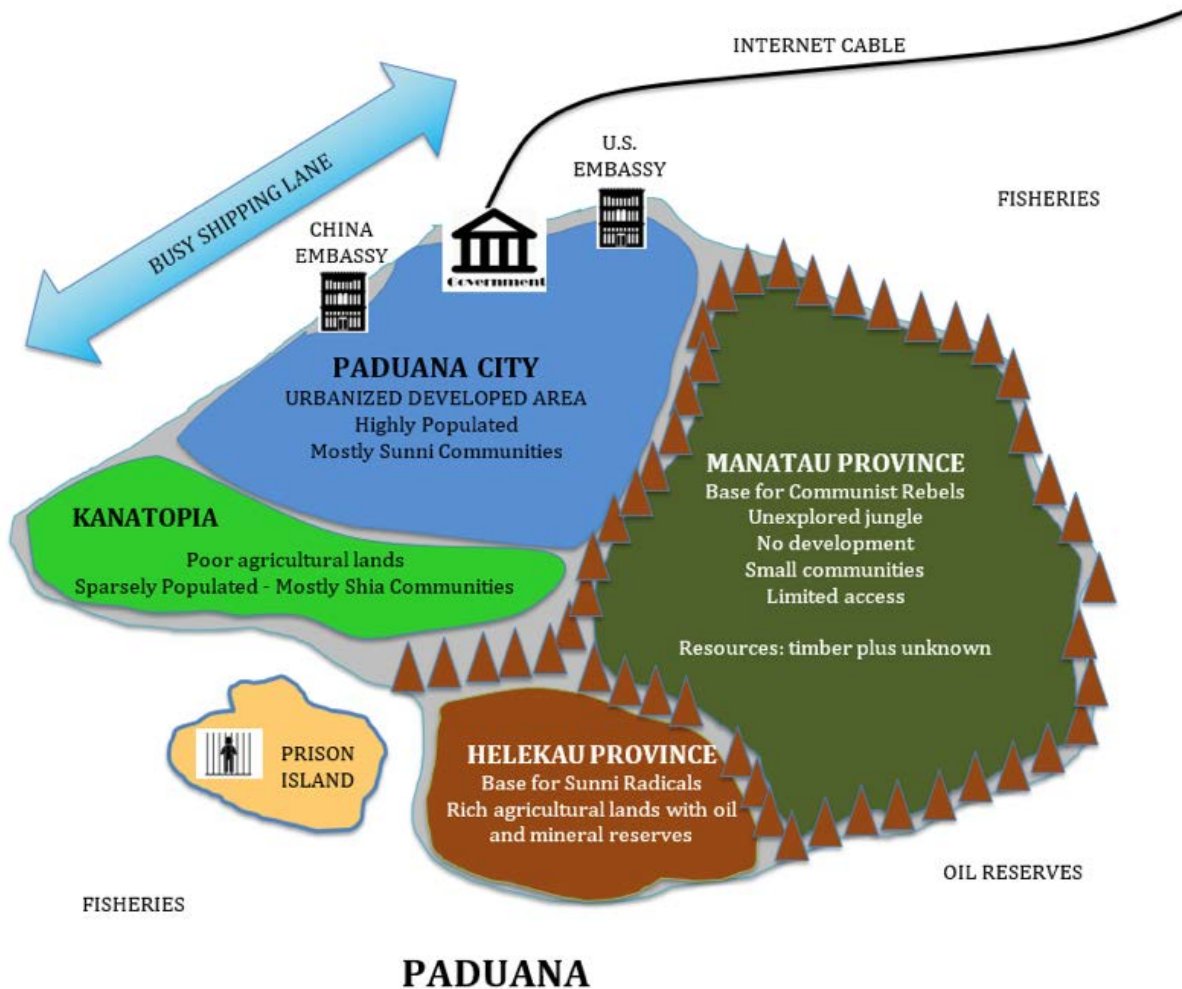


Figure 1. Map of Paduana.

Game staff

When Radicals is played with up to thirty-five players, the game runs best with a support team of a dozen people. The Pit Boss (game director) is supported by a Deputy, a Media Editor, a Photographer, an International Correspondent, a Team Performance Analyst, a Player Performance Analyst, and three Controls who regulate and manage activity by government, community and international groups of players. A few additional staff can provide useful supplementary support to media and analysis groups.

The three Controls act as the front line for in-stride adjudication and handle the bulk of in-game decisions. Based on the quality of player actions, adjudication results in outcomes that are close or far from what the player intended. When an action is proposed that affects players under other Controls, the Controls consult and jointly determine the best course of action on the spot. If they are in any doubt concerning their proposed outcome and how it will affect the overall game or sequencing of events, they consult the Pit Boss. Frequent huddles with all Controls, the Deputy and the Pit Boss are necessary to preserve game integrity and to track multiple developing storylines.

Most significant player actions require some game time to pass before they activate, so these adjudication delays due to huddling usually run parallel with player activity and reflect the time it takes for events to transpire.

Facility

In 2013, DKI-APCSS built Maluhia Hall (Haven of Peace) for \$9.5 mil. It is a high tech conference facility designed to house a single large or two medium lecture halls with six breakout rooms, all featuring whiteboards and the latest in computer presentation equipment. This space comfortably accommodates various types of TSC games up to 110 participants plus the support team. During strategy-building sessions, larger, international and more secretive teams occupy space in the breakout rooms, while smaller ones sit at tables in the main hall.

Schedule

There are three Moves in a typical TSCG with the first functioning as a primer, the second as constructive and the third as expansionist in accordance with player acumen and experience. Each move is divided into four phases: an initial briefing, a strategy building team phase, an unstructured negotiation and action phase, and a review. The first Move begins with a description of abductive decision making, the game scenario and TSCG mechanics. Next, players convene team meetings with the express purpose of developing a multipronged strategy for the duration of the Move. An unstructured 60-80 min period of interaction follows, during which, players negotiate frantically to advance their strategic goals. A review is undertaken in four parts following the conclusion of each Move, with a grilling by the International Correspondent, presentation of performance results, polling on the current 'temperature' of the room and reflections on actions taken. A longer reflection occurs at the end of the game to draw out impacts, outcomes, lessons learnt and to delve into key decisions, their implications and possible alternatives.

Roles

Radicals runs with 25 to 35 senior participants allocated to the following team roles:

- Paduana Government (5)
- Paduana Security Forces (5)
- Communist Party (3)
- Society for Peace (Sunni) (3)
- Paduana City Community (Sunni) (3)
- Kanatopia Community (Shia) (3)
- U.S. (3)
- China (3)
- TransTrade (3)
- RusAnonymous (3)

Each team receives general guidance and develops its own priorities during the strategy development meeting. In addition, each player receives a list of personal priorities and guidance. These two sets of guidance may be somewhat aligned or may be grossly misaligned. The intent is to

create a natural tension between energy expended to further team goals as opposed to furthering personal goals. This serves to introduce unpredictability and uncertainty into relationships and collaborations, which makes trust building a vital endeavor.

Information coherence

While in-stride adjudicators provide the primary source of player feedback, the game includes a media team to publicize both player actions and emergent events. Virtually all media releases contain an element of spin doctoring, so they are an additional component of in-stride adjudication.

Media content includes video and non-video injects, periodic news reports and speeches by key players who have attained significant status within the game. Speeches crafted by key players such as the Prime Minister of the Paduana Government build shared awareness of Government actions and reward the Prime Minister or other key players for attaining that elevated position. Video and non-video injects provide players with information on crises or political events. These injects serve to increase player immersion into the game narrative, as well as to introduce emergent crises that demand swift action by players to manage or exploit those crises.

A newsfeed is projected onto one of two central screens in the lecture hall, as well as mirrored on screens in each of the six breakout rooms. This newsfeed is published by the Media Editor and updated every ten to fifteen minutes. The newsfeed draws content from significant player actions and stories written by journalists on the media team. The Media Editor's job is to build shared awareness of player actions and to spin those actions to allocate communal credit and blame. Players want to achieve their strategic outcomes, but they also want to get credit for achieving those outcomes. In some cases, players may even settle for suboptimal outcomes as long as the credit they receive is sufficiently large (Bueno de Mesquita 2009). The newsfeed rewards players for significant actions with increased notoriety or prestige.

Team strategy and action processes

At the start of each Move, teams are required to create or revise their strategies. This forces them to diagnose what is going on in the game, creatively consider preparatory actions, reevaluate relationships, reach out to new stakeholders, allocate tasks and redistribute the budget. During this process, Controls guide the players, but do not adjudicate. Copies of a final written strategy along with accompanying goals go to the team leader and to the team performance analyst.

Prior to leaving the Team meeting, players are encouraged to refresh their memory on their current team role and personal guidance. Knowing who-is-who and who to target for a particular endeavor is essential, but it takes most of the first Move for this knowledge to build. The bulk of unstructured time is spent locating people, making introductions, sharing ideas and negotiating on collaborative action.

Getting anything done requires players to complete Action forms that are designed to ensure a minimal level of quality control. Players write down What is proposed, Why it is being proposed, Who is to undertake the action, How they are going to undertake it, and Where the action will take

place. The action originator must have signed the form in addition to all other necessary stakeholders who are required for the action to be successful.

Players are encouraged to think in diverse ways on how to achieve their desired results. Currency is the first and easiest choice for many to incentivize the actions of change. However, since it is distributed unevenly, some players must find alternative levers of change. Government players achieve results by creating new policy, legislation or other boundary-setting devices. Powerful players or those in possession of damaging knowledge may use direct influence to sway another player or entire team. Players with means may even resort to applying pressure through threat or direct criminal action. However, nothing beats good ideas brought to bear by creative energetic and charismatic players.

Once a player has filled out an Action form that clearly spells out their What, Why, Who, How and Where, they take it to a Control who determines if it is aligned with team and/or player guidance, and if it has the necessary alliances, support, skills and resources to make it work. Beyond a binary decision of success or failure, in-stride adjudication requires the Control to decide on the outcome of the Action, with consideration for possible second or third order effects. No Action ever works totally as planned. Larger Actions require consultation with other Controls or the Pit Boss to ensure that existing Actions in play are not conflicting or contrary. The Control considers possible broader effects and repercussions and lets all associated parties know the outcome.

The Controls are not moral gatekeepers and do not create interaction, but are in place to provide guidance and implement the rules and the outcomes. They feel the flow of the game and moderate adjudication from loose to tight depending on what is happening.

Performance evaluation

Upon receiving an Action, the Team analyst first ensures the Action is complete and that it promotes some element of the Team Strategy. Scoring is based on a simple three-point scale. The Action then flows to the Player Analyst who identifies the player, ensures the Action aligns with the player's personal priorities and allocates a score to the originator of the idea and the supporters of the Action.

In the review phase of each Move, Team and Player analysts update players on their cumulative performances. Based on analyst feedback, players intuit the game's underlying scoring system and respond by taking increasingly collaborative actions that better conform to their team strategy or individual goals.

Logistically, an important consideration is the amount of exposure the analysts have to the players during their deliberation. Placing the analysts in a separate room insulates them from the chaos of the negotiations in the main hall and allows for a more regulated flow of player interaction via an inbox at the doorway. Analysts can use whiteboards to display related threads of actions as they unfold along a timeline. This is useful for the Media, Controls and Pit Boss who need to rapidly refresh and update knowledge on what is happening. Location in the main hall immerses analysts in the fray of activity, which they quickly grow to find extremely distracting.

Injects

Injects vary in every game depending on player actions and game direction. Emergent issues commonly arise and new injects and even new roles are created on the fly to maintain control, adjust direction and pace the game. Some of the more interesting types of injects are as follows:

- Radical explosive attack on government buildings followed by rioting. This 'cause-unknown' event kick-starts the game by providing an example of possible action and directing initial investigations and responses by authorities. The source of this explosion emerges through deeper investigation, but its effects often persist until Move 2.
- A prison break releases returnee fighters, but they require assistance to leave the island and join with their rescuers. The government security forces usually handle this inject with some competence, but occasionally lack preparedness with disastrous consequences.
- Elections for Prime Minister take place in Moves 2 and 3 with term limited to one Move. The first election may be rigged by a cyber inject in real time. Players may learn of opportunities to influence the election. Support staff may also act to further manipulate the outcome. The purpose is twofold: to place a pre-identified highly competent person in this position and to give the government a vote rigging issue to investigate and resolve.
- Paduana is adjacent to an international sea-lane that sees around ten percent of the annual traffic of the Singapore Strait. Explosions from unknown sources, but blamed on pirates, occur on ships flying U.S. and China flags, which block the sea-lane. This inject sets up a dynamic competition between Paduana and major powers for control of the Paduana Strait.
- To force more extensive negotiation, an attack cuts all power, communications and internet access. Staff herd players into pre-determined rooms along with other players who are not always their usual collaborators to create opportunities for new deals with strange bedfellows done in a less hectic environment. The blackout is resolved by the government paying a large sum for repairs, which requires multilateral fund raising.
- Radical action is surprisingly difficult to encourage among people who are new to the game and who have not given much thought to strategic options for 'winning'. Even when groups are given clear guidance to engage in radical behavior, the outcomes are unpredictable with some completely avoiding adversarial action. Even direct communications combined with funding and resources (secondary injects) from powerful terrorist organizations often fail to spur players into adversarial action. In such cases, a third Move inject appears in the form of an emergent extremist group fronted by a recently ousted Prime Minister or other capable player. In a fit of 'last move madness,' this can result in rapidly changing allegiances, instability and a flurry of Actions that Controls need to manage very carefully, but promptly.

Game outcomes

TSCG “Radicals” has nine built-in opportunities for player reflection and feedback. Chronologically, these are a short debrief, polling and survey after Move 1; a short debrief, polling and survey after Move 2; and a long reflection period, polling and survey after Move 3. Players are encouraged to express their views freely during both debrief and reflection periods under a strict non-attribution policy. The surveys are submitted anonymously via tablet computers in two breakout rooms with no game facilitators present.

Analyzing player feedback from each capture point reveals growing levels of game comprehension and strategic sophistication with each Move. In the last iteration, for example, 91% of players reported that they had identified all important stakeholders and/or built many useful relationships by the second Move, while only 5% still struggled to find the right people (Table 1).

Comparing polling results from the senior-level TSC course to the mid-level Comprehensive Crisis Management course offers additional insights into player comprehension and sophistication. Only 13% of senior-level players needed help compared to 44% of mid-level participants in a similar game involving 110 players. Likewise, the number of those unable to find the right people was 15% compared to 31% in the mid-level game. This is a feature of both the seniority of the participants and the number of participants, since it is easier to find people when numbers of participants are lower. As such, the comprehension speed of senior-level players may differ significantly from the median comprehension speed of less senior players.

Table 1. TSC Radicals polling results from Moves 1 & 2.

Item	Move 1	Move 2
I still need help	13%	--
I haven't found the right people yet	15%	5%
I've made many useful relationships	54%	37%
I've identified all important stakeholders	31%	58%
I'm focused on team strategy	54%	42%
I'm focused on official duties	23%	42%
I'm focused on personal goals	15%	16%
I'm focused on someone else's goals	4%	0%
My team is my biggest obstacle	36%	--
Other players are my biggest obstacle	56%	--
I am my biggest obstacle	8%	--

Within the debriefs, reflections and anonymous surveys, players felt generally positive about their experience with “Radicals.” Negative survey comments came predominantly from Move 1 when 15-20% of participants were still trying to figure out how to make progress. Others came from a small minority of players who found difficulty in role-playing and wondered, “Why are we doing this?” In aggregate, however, player comments paid tribute to the exciting, challenging and interactive

Transnational Security Cooperation Games

nature of the game that enabled them to practice many aspects of transnational security. The following list displays items that the game provided an opportunity to practice and the percentage of players who practiced them:

- Understanding complexity and developing strategy 28%
- Coordination and leadership 28%
- Developing relationships and cooperation 16%
- Negotiation 15%
- Event framing and dealing with the media 8%
- Threat management 4%

According to the poll results, players spent the majority of their time on executive level skills such as strategy development, coordination and leadership. Players also devoted substantial time to developing relationships and negotiating over actions. By contrast, relatively little time was devoted to tactical aspects, such as framing and resolving threats. While the delicate skill of framing it is critical to many real-world negotiations, the fast pace of the game and presence of many powerful drivers leaned players away from subtlety and towards overt subterfuge.

Comments made during debrief and reflection periods suggest that the game evoked a variety of insights from players related to TSC learning outcomes. These included the following categories of comments:

- Strategic preparation
 - Team function is closely tied to clear strategic objectives
 - Critical thinking and strategy planning beyond immediate concerns is vital
 - Action outcomes are difficult to predict, but must be anticipated
 - It is hard to stick to a strategy when trying to cooperate in complex situation
 - Flexibility and ability to adjust is essential
 - Be ready to assume control and take rapid action if your strategy is successful
- Relationship building
 - Natural cultural, ethnic and religious backgrounds add a lot to complexity
 - Effective negotiation is very important, but it depends on understanding the motivations behind counterpart actions
 - It is difficult to deal with multiple stakeholders who have unstated personal agendas
 - Alliance building effort and networking results in success
 - For cooperation and relationships to solidify it is essential to have trust
- Institutional resiliency
 - Building trust requires social peace and stability and functional alliances
 - Building strong democracies in a complex environment is demanding
 - Strong, well-coordinated national mechanisms are needed to respond effectively to security situations

In addition to broad learning outcomes, the specific narrative of the TSCG “Radicals” allowed players unique insight into the behavior of radicals, leaders and the media during crisis situations.

These included:

- Effects of radicals on society
 - Issues must be identified early through vigilant surveillance
 - Issues must be rapidly acted upon by gaining control, restoring stability and preventing escalation
 - Failure to promptly address issues leads to more emergent radical action and the situation getting out of control
- Ways of thinking, decision-making and cooperation
 - Personal biases and experiences greatly affect our ways of thinking
 - Effective leaders are able to quickly switch between different types of thinking
 - The challenge to decision-making is how to bridge the middle ground
 - Trust is essential for effective decision follow-through and cooperation
 - Peace and stability are not possible without basic security
- Media relations
 - Media directed to target audiences is more powerful than print or TV media
 - The use of media by radicals and its effect on society must be managed
 - Never believe that a real trusting relationship is possible between media and leaders

Finally, by playing the TSCG with other senior-level security practitioners from their own region, players gained unique insight into senior-level decision making processes and negotiation styles. As they challenge each other in a fun, safe-to-fail environment, players become more comfortable engaging with their peers. Moreover, the strategic moves and personality of each player add elements of unpredictability and realism that can only be found in a senior-level game.

Conclusion

TSCG Radicals is an instrument for experiencing the politics of dealing with radicals in a complex environment and is a powerful foresight tool that provides insight into plausible alternative futures. Its unstructured format allows individuals and teams to generate a wide variety of responses that give other participants a broader understanding of what might occur in possible futures. For instance, in one iteration of TSCG Radicals, participants in government roles neglected to respond effectively to crises and as a result, experienced multiple coups with radical extremists eventually overthrowing the government to establish a new Caliphate-based governance system.

The benefits of foresight gaming systems, such as DKI-APCSS transnational security cooperation games, extend far beyond engaging course and workshop participants or delivering custom learning outcomes. They are a proven method for amplifying “plurality, diversity and multiple perspectives, which are essential for understanding and steering through postnormal conditions” (Sardar 2015). Futurists have long used games and simulations because they “embody some of the core tenets and long-standing practices of futures: systemic, yet playful, inquiry; engaged and collaborative curiosity; and anticipatory action learning through experiential approaches” (Sweeney 2017). Through the participatory and transdisciplinary engagement found in foresight

games, players develop vision and scenarios that reveal possible futures and open pathways to the future they prefer (Inayatullah 2008).

TSCG Radicals provides an excellent means of engaging people and motivating them to reflect on the potential effects of radicals in society, the ways that leaders think and frame decisions, and the influence of the media. TSCG participants struggle to coordinate and lead in an unpredictable environment full of shifting relationships and allegiances. They push through actions that demand an understanding of complexity and they continually must revise strategy to remain relevant. As a foresight tool, the TSCG teaches the need for adequate preparedness, establishing and maintaining enduring relationships, and securing the prerequisites for functional governance.

The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Daniel K. Inouye Asia Pacific Center for Security Studies, the Department of Defense, or the U.S. Government.

References

- Bellotti F, Kapralos B, Lee K, Moreno-Ger P, Berta R. Assessment in and of serious games: an overview. *Advances in Human-Computer Interaction*. 2013; Feb: DOI: 10.1155/2013/136864.
- Bergeron B. *Developing serious games*. Boston: Charles River Media, 2006.
- Bueno De Mesquita B. *The Predictioneer's Game: Using the Logic of Brazen Self-Interest to See and Shape the Future*. New York: Random House Publishing Group, 2009.
- Dator J. Why gaming, why alternative futures? *Journal of Future Studies* 2017;22(2):75-80.
- Deterding S, Dixon D, Khaled R, Nacke L. From game design elements to gamefulness: defining gamification. *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments*. ACM, 2011:9-15.
- Inayatullah S. Six pillars: futures thinking for transforming. *Foresight* 2008;10(1):4-21.
- Luo C, Gilbert L, Liu A. Designing serious games for complex systems: a framework. https://www.researchgate.net/publication/314220021_Designing_Serious_Games_for_Complex_Systems_a_Framework, 2017.
- Miles I, Saritas O, Solokov A. *Foresight for science, technology and innovation*. Springer Switzerland, 2016.
- Policy Horizons Canada. *Serious games: driving results for public sector organizations*. Government of Canada. 2016;PH4-156/2016E-PDF, 978-0-660-04204-6.
- Rittel H, Webber M. Dilemmas in a general theory of planning. *Policy Sciences*. 1973 Jun 1;4(2):155-69.
- Sardar Z. (2015). Postnormal times revisited. *Futures*. 2015;67. 10.1016/j.futures.2015.02.003.

Transnational Security Cooperation Games

Sweeney JA. Game on: foresight at play with the United Nations. *Journal of Futures Studies*, December 2017;22(2):27-40

Zyda M. From visual simulation to virtual reality to games. *Computer* 2005;38(9):25-32.