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A Board Game to Teach the Rudiments of Intelligence in an Airport Context

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Introduction

Aéroports de Montréal (ADM) is the airport authority for both Greater Montreal international airports. Unlike other Canadian international airports, at both Montreal airports, security is not the prerogative of an airport police. It is the duty of a security department within the airport authority: the *Airport Patrol* (AP) is in charge of protecting passengers, operations, and facilities against all threats to civil aviation. To adequately fulfill its mission, the Airport Patrol largely relies on intelligence.

In the context of their initial training program at the Airport Patrol, future security officers and constables receive a three-hour long introductory lesson about intelligence. Students – who are not cognizant of intelligence purpose – often initially question the pertinence of such a lecture. Thus the Airport Patrol developed in 2012 an educational boardgame to teach students the rudiments of intelligence in an airport context. The purpose of this game was threefold: 1) to get students interested in intelligence, despite their initial skepticism, 2) to help them understand key concepts to be discussed during the following lecture period, and 3) to facilitate the future work of Airport Patrol investigators to recruit on-the-job officers for their intelligence network.

Considering adult learning theories, the design process strives to root the game into the students' future work environment. This paper will focus on the reasons why a game-based learning approach has been selected, how the game has been designed, and what are the lessons from this experiment.

Why using a game to teach the rudiments of intelligence?

Presentation of the Airport Patrol

Aéroports de Montréal is a not-for-profit corporation without share capital and is responsible for the management, operation, and development of Montreal-Pierre-Elliott-Trudeau International Airport and Montreal-Mirabel International Airport. With close to 14 million passengers a year, Montreal-Trudeau is Canada's East Coast main entry and the third airport in importance in the country (after Toronto-Pearson and Vancouver). For cargo-processing, ADM is also third in Canada in terms of the load transiting through its facilities.

In 1998, ADM's Airport Patrol was created to replace the Royal Canadian Mounted Police's security officers at both airports. Between law enforcement agency and security company, its status is unique in the Canadian airports community. The Airport Patrol's mission is to protect passengers, operations and facilities against all threats to civil aviation. The patrol's

responsibilities include responding to emergencies, enforcing regulations, controlling traffic, detecting explosives, and patrolling public and restricted areas. The patrol has more than 250 members, divided into a number of specialized teams, including *Operations* (security officers, first responders, constables, and K-9 unit), *Investigations and Intelligence, Training, and Administration and Permits*.

Before being assigned, our security officers and constables attend respectively a 345 to 510 hour-long training program. From 2009 to 2012, this program took place in two college degrees delivered in a Montreal college and recognized by the Quebec Ministry of Education. The course has now been transferred to the Airport Patrol's training department.

Our proactive approach to airport security requires intelligence

Montreal's Airport Patrol is widely considered as a leading innovative organization in the Canadian airports community. The patrol especially considers intelligence as an essential tool in order to fulfill its mission. The patrol runs two committees, gathering representatives from the seven other law enforcement/intelligence agencies that are present at the airports. In fact, those best practices established by the Airport Patrol have been added in recent regulations as a federal requirement.¹ On those committees, tactical information is exchanged and debriefs are held about previous law enforcement operations at Montreal airports. Tactical and operational intelligence is also given by agencies to the Director of the Airport Patrol, on a need-to-know basis.

Nevertheless, despite federal regulations² and national security documents³ implicitly inviting Canadian airport authorities to perform an intelligence function, as a member of the private sector, ADM receives very little classified information, even though several Airport Patrol members hold a *Secret* clearance. Moreover, from a strategic point of view, the AP does not receive enough applicable aviation security-oriented intelligence products, neither from the law enforcement community nor from the intelligence agencies, to rely on as actionable threat assessments.

Actually, it happens that an airport police or an airport security department is more specialized in airport security than any of those general institutions. An Israeli airport security expert, Amotz Brandes explains:

“Can a security organization work well without the aid of external intelligence? The answer is a resounding yes...A security system which relies solely on this kind of intel is vulnerable. Likewise, a system which relies solely on intelligence it derives on its own

¹ *Canadian Aviation Security Regulations*, SOR/2011-318, s. 195 (2012), available at: <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2011-318/FullText.html>; See also *Regulations Amending Canadian Aviation Security Regulations, 2012 (Airport Security Programs)*, s. 196, *Canada Gazette – Part I, Notices and proposed Regulations*, vol. 147 (2013), No. 17, available at: <http://www.gazette.gc.ca/rp-pr/p1/2013/2013-04-27/html/reg8-eng.html>.

² *Canadian Aviation Security Regulations*, op. cit., ss. 89-91.

³ Transport Canada, *Canada's National Civil Aviation Security Program* (Ottawa, Ont.: Transport Canada, 2013), 12, available at: [http://www.tc.gc.ca/media/documents/security/NCASP_FINAL_ENGLISH_\(2\).pdf](http://www.tc.gc.ca/media/documents/security/NCASP_FINAL_ENGLISH_(2).pdf).

can be very effective. The real intelligence exists on the inside and comes from our own internal understanding of the operational environment in which we work and what it takes on the part of an adversary to beat it. Looked at another way, when someone else is providing you with the intel, it's hard to know what information you do not have...Externally derived intelligence is supportive and provides an important peripheral ring to a security system. But when we rely too heavily on it and it fails, so too does security fail. The Christmas Bomber is but one example of this.”⁴

This resonates with a statement by law enforcement intelligence expert, Pr. David L. Carter: “It is essential that...law enforcement discover the evidence that may be in its backyard.”⁵

Therefore, in order to get specific and useful actionable intelligence, the Airport Patrol has to produce it internally. To fulfill this function, the main information channels are: open-source intelligence information (OSINT),⁶ and human sources in the field at both airports.

For the purpose of collecting information from human sources, the *Investigation and Intelligence* unit has to maintain a network within about 30,000 people working at both airports. The task is nothing less than colossal. Because of their wide array of tasks, it is impossible for ADM investigators and prevention agents to build and maintain this network by themselves. So they have to rely on our security officers and constables. It is a *cliché* saying so but they actually are our *eyes and ears* in the air terminal building, on the aprons, along the perimeter fence, in the parking lots, on the curbside and the access roads. Hence the need for the Airport Patrol to sensitize officers and constables to intelligence, in order to better rely on them for intelligence collection.

Teaching intelligence the right way – A game-based learning approach

In 2008, the Airport Patrol's training department asked for an expanded presentation about intelligence. The original requirement was to raise students' understanding about intelligence, to focus on intelligence analysis, and to examine how intelligence is produced at the Airport Patrol. But after a few training sessions, the presentation had to be drastically redesigned.

First, our security officers have no background in intelligence. The course was supposed to instill on them an intelligence-oriented security mind – but inevitably failed. Second, when sitting in a classroom waiting to be taught about intelligence, a lot – if not all – of the officers were skeptical about the relevance of being trained in the rudiments of intelligence. According to them, constables are peace officers. And security guards see themselves as traffic regulators and gate keepers. What is the point of such a training class, considering the purpose of their job?

⁴ Amotz Brandes, “Good Security without Intel?”, Chameleon Associates (blog), July 26, 2011, <http://chameleonassociates.com/blog/2011/07/good-security-without-intel/>.

⁵ David L. Carter, *Law Enforcement Intelligence: A Guide for State, Local, and Tribal Law Enforcement Agencies* (Washington, D.C.: US Department of Justice, 2004), 95, available at: <http://www.cops.usdoj.gov/files/RIC/Publications/leintelguide.pdf>.

⁶ As the person in charge of strategic intelligence and threat assessments, I rely on OSINT in a proportion of 95% or more.

Moreover, some students have a law enforcement background (as former police officers). Some of them may be reluctant to learn about intelligence: to them, *intelligence* is just a hollow fancy word.⁷ Lastly, some students already have work experiences. Depending on whether they have been previously unionized workers or not, intelligence mainly refers to workers who are informants for the police or for a union.

Teaching intelligence to such an audience proved to be tricky. How to avoid the initial skepticism of students regarding intelligence? How to get them interested in the matter? How to prepare them to be eventually recruited as human sources into the Airport Patrol intelligence network? In other words, teaching them how paramount intelligence is, without overtly focusing on intelligence, is the challenge.

As mentioned previously, security officers and constables are valuable assets in the process of producing intelligence at both ADM airports. The point is they have to be aware of that, in order to willingly participate in the Airport Patrol's intelligence efforts in terms of collection. The intel class is not about teaching them *how* intelligence is produced at the Airport Patrol. It is all about showing them *why* intelligence is so crucial in the context of airport security. Moreover, the lecture should not be about teaching skills, processes, or other knowledge but about changing the audience's mindset.

In order to meet the challenge, non-traditional ways of teaching should be explored. At that point, the approach was merely empirical and game-based learning was soon considered. But questions raised about how students and the college administration would receive such an approach. Resistance to game-based learning is a well-known phenomenon:

“When some people hear the phrase ‘learning game’ or ‘training game,’ they think ‘silly, foolish and time-wasting.’ Such associations lead to misconceptions about training games and, in turn, make some people reluctant to use games in their training for fear of being labeled ‘unprofessional.’⁸

Actually, the challenge the AP's training department encountered was common in the field of adult learning and professional training for enterprises. According to El-Shamy, “Adults don't want to be lectured at and inundated with data. They want to be actively involved in their own learning process... and training games can provide this.”⁹ This author provides quite an exhaustive overview of a dozen of well-documented learning theories¹⁰ that justify the use of games in training sessions.

⁷ To qualify intelligence officers, those patrollers generally use a more colourful made in Quebec expression: “les batteux de nuages.” It can be literally translated by cloudthreshers.

⁸ El-Shamy, Susan, *Training Games* (Sterling, VA: Stylus Publishing, 2001), 24.

⁹ *Ibid.*, 30.

¹⁰ Classic learning theory, adult learning theory, constructivism, modern learning theory, small group dynamics,

Training games are also considered as one of the four most innovative learning methods for professional training.¹¹ Moreover, according to game-based learning specialist Dr. Richard Van Eck, games are also a universal learning method:

“Play is a primary socialization and learning mechanism common to all human cultures and many animal species. Lions do not learn to hunt through direct instruction but through modeling and play. Games, clearly, make use of the principle of play as an instructional strategy.”¹²

In addition, training games are widely recognized for promoting motivation and commitment of participants,¹³ as much as arousing their interest in the learning activity.¹⁴ Game-based learning experts notice that “subject matter areas where very specific content can be targeted are more likely to show beneficial effects for gaming.”¹⁵

The proof of concept was made. Nevertheless, it seemed relevant to consolidate the game-based learning approach by highlighting similar theories or experiments in the field of intelligence education. Admittedly, numerous games have been developed for training civil servants and soldiers to operational duties. But using games to teach intelligence remains a rarity.¹⁶

A noteworthy exception is the works of Dr. Kristan J. Wheaton, an associate professor at the *Department of Intelligence Studies*, Mercyhurst University (Pennsylvania), and the owner of the blog *Sources and Methods* dedicated to teaching and/of intelligence. Wheaton explains why, how and for what results he introduced games in his classes. The results of his study indicate that

¹¹ Léonard, Évelyne, Frédéric Nils and David Vellut, “Les nouvelles pédagogies de la formation – Rapport de recherche RH-Entreprises”, vol. 3, Louvain School of Management Research Institute (Louvain, Belgium, 2011), available at: http://www.uclouvain.be/cps/ucl/doc/trav/documents/RHE3_Pedagogies_de_la_formation.pdf.

¹² Van Eck, Richard, “Digital Game-Based Learning: It’s Not Just the Digital Natives Who Are Restless,” *EduCause Review* 41, no. 2 (2006), 16–30, available at: <http://www.educause.edu/ero/article/digital-game-based-learning-its-not-just-digital-natives-who-are-restless>.

¹³ Jacobs, John W. & Dempsey John V., “Simulation and Gaming: Fidelity, Feedback and Motivation”, in Dempsey, J.V., and G.C. Sales, *Interactive Instruction and Feedback* (Englewood Cliffs, NJ: Educational Technology Education, 1993); Hogle, Jan G., *Considering Games as Cognitive Tools: In Search of Effective “Edutainment”* (Education Resources Information Center, 1996), <http://www.eric.ed.gov/ERICWebPortal/detail?accno=ED425737>; Pannese, Lucia, and Maria Carlesi. “Games and Learning Come Together to Maximise Effectiveness: The Challenge of Bridging the Gap,” *British Journal of Educational Technology* 38, no. 3 (2007), 438–454, doi:10.1111/j.1467-8535.2007.00708.x.

¹⁴ Randel, Josephine M., Barbara A. Morris, C. Douglas Wetzel, and Betty V. Whitehill, “The Effectiveness of Games for Educational Purposes: A Review of Recent Research,” *Simulation & Gaming* 23, no. 3 (9–1, 1992), 261–276, doi:10.1177/1046878192233001.

¹⁵ Ibid.

¹⁶ See Daniel Q. Burch, “Game-based learning in Intelligence: Teaching Intelligence Analysts Geography Using Games” (master’s thesis, Mercyhurst University, 2012), 17, available at: <http://fr.scribd.com/doc/100254200/BURCH-Game-Based-Learning-in-Intelligence>.

“[g]ames helped the students remember the concepts better. (...) Games-based learning appears to have increased intelligence students' capacity for sensemaking.”¹⁷

Designing the game

Get it practical – A game about airport security

The next choice was about using an existing game or designing an original one. Training game designers have been particularly productive for the last 40 years. For instance, on its website, *The Thiagi Group* – a leading expert in the field of training games – gives direct access to 326 free games.¹⁸ Moreover, through his *Strategic Intelligence* course, Dr. Wheaton uses a dozen of existing games.¹⁹ Do actionable games already exist to fulfill the Airport Patrol's needs? Is an exhaustive search necessary to find them?

The eventual decision was to design an original game. Various arguments supported this decision, from the very specific needs of the matter to the excitement about designing an original training game. This case study happened to fit into one of the most frequent reasons why a trainer decides to design a training game: “Maybe you will be designing a new training event and want to use a game to meet a key learning objective.”²⁰

Assumption was made that it would be easier to lean on the essential contribution of training games²¹ by *designing* the game – considering that the initial intention was to stay as close as possible to the students' future professional duties. It had been previously determined that the purpose of the game would be to change students' mindset related to what they see as a very marginal part of their professional duties. Airport Patrol's security officers and constables have access to information that is relevant to the intelligence process at the corporate level. The goal was to make them aware of the importance of relaying such relevant information to the intelligence unit.

Hence the necessity to make them understand what is at stake, and that the information is used to produce intelligence in order to inform decisionmakers on how to better secure the airport. Officers may be told regularly to report any information of interest. But if they don't know *why*, they just can't get truly involved in the process. Relaying pertinent information is a crucial part of their job. They just have to realize that and act accordingly.

Adult education specialists found:

¹⁷ Wheaton, Kristan J., “Teaching Strategic Intelligence Through Games,” *International Journal of Intelligence and CounterIntelligence* 24, no. 2 (2011), 367-382, doi:10.1080/08850607.2011.548217, available at: <http://fr.scribd.com/doc/33931295/Teaching-Strategic-Intelligence-Through-Games>.

¹⁸ The Thiagi Group, “Training Games”, January 7, 2013, <http://www.thiagi.com/games.html>.

¹⁹ Wheaton, “Teaching Strategic Intelligence Through Games.”

²⁰ El-Shamy, *Training Games*, 127.

²¹ That is, promoting motivation and engagement of the participants, and arousing their interest in the learning activity – as previously mentioned.

“Adults are ready to learn when they perceive a need to know or do something in order to perform more effectively in some aspect of their lives. Their readiness to learn may be stimulated by helping them to assess the gaps between where they are now and where they want and need to be. (...) Learning activities need to be clearly relevant to the needs of the adult.”²²

For El-Shamy:

“Adult learners are usually quite practical, goal-oriented, and relevancy-oriented...Participants in our classes want to know how playing a game will be useful to them, as well as how what they learn in a game is relevant to their work and their lives.”²³

The best way to make the lesson relevant to their work was to root the training game in an airport context. As mentioned previously, it was critical that students have no preconception or express no skepticism about intelligence. Therefore, the lecture had to be introduced without speaking about intelligence. But how to teach people about intelligence without using the *I Word*? The solution was to use a decoy: the term *threat assessment*. For intelligence professionals, it is commonplace to say that threat assessment falls under the realm of intelligence. But in the field of critical infrastructure security and risk management, people see threat assessment only as a phase of a wider risk management process and don't draw a direct connection to intelligence. Therefore, the word *Intelligence* was abandoned for the time of the game and it was only introduced during the debrief phase. The lesson was then renamed *Traditional Threat Assessment in An Airport Context*.²⁴

Integrating various materials to maximize learning

An abundant literature establishes that individuals perceive and process information in very different ways. Several learning theories converge on that point: multiple intelligences²⁵, right-brain/left-brain and brain-based learning²⁶. Moreover, learning styles theorists generally classify individuals as concrete perceivers, abstract perceivers, active processors, and reflective processors.²⁷ Therefore the designed game should stimulate various senses and learning processes in order to widen the potential receptivity of a higher number of participants. As Wheaton noticed during his own classes, “[t]he old-school boardgame with its dice, hex maps and counters seemed to encourage a thoughtful, collaborative (at least within the two teams

²² Knowles, Malcolm S., Elwood F. Holton III, and Richard A. Swanson, *The Adult Learner*, 6th ed. (Burlington, MA: Elsevier, 2005), 294.

²³ El-Shamy, *Training Games*, 29-30.

²⁴ A similar decoy has been previously formulated in the course about security profiling. At first sight, people (particularly students from visible minorities) tend to comprehend the concept as racial profiling. Security profiling has nothing to do with racial profiling – in the course of the lecture, it is clearly explained why racial profiling doesn't work. But it is crucial that students approach the course with no preconception. So the lecture has been entitled *Behavioral Threat Assessment in An Airport Context*.

²⁵ Gardner, Howard, *Multiple Intelligences: New Horizons*, 2nd ed. (New York: Basic Books, 2006).

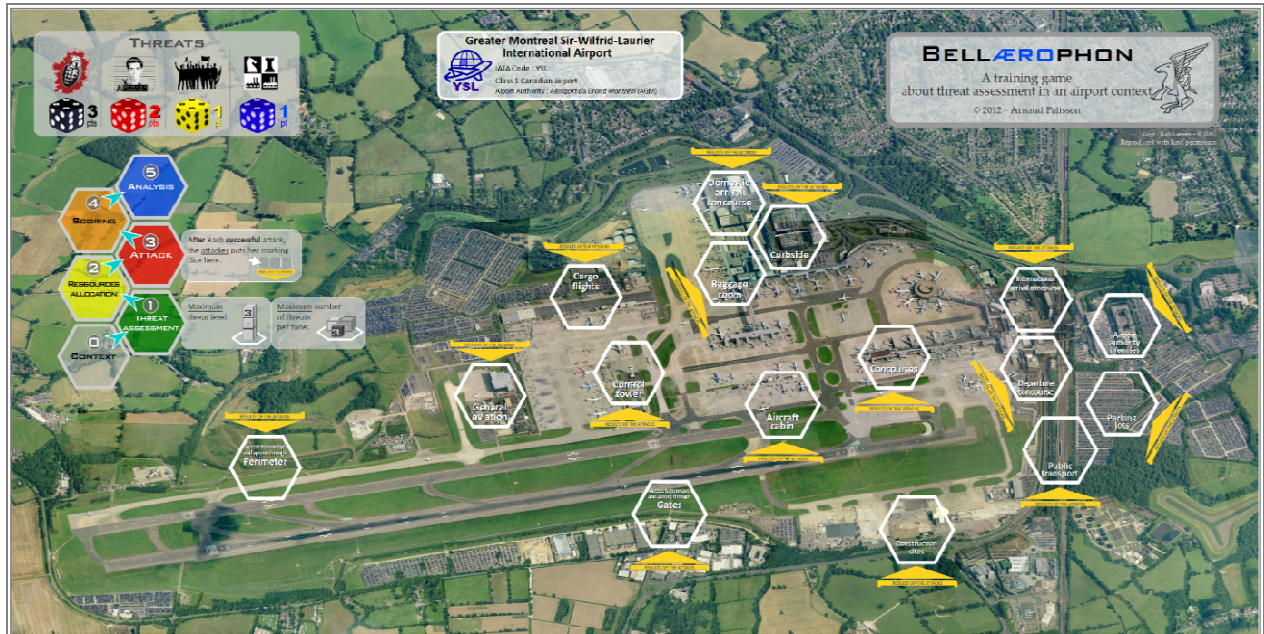
²⁶ Connell, J. Diane, *Brain-Based Strategies to Reach Every Learner* (New York: Scholastic, 2005).

²⁷ El-Shamy, *Training Games*, 34.

playing) learning experience.”²⁸ Eventually, the design process focused on providing various game materials, with diverse functions, and creating interaction between them. The game contained the following materials.

The board:

- shows a large aerial photograph of an international airport – strong representation of the theme,
- features hexes focusing on vulnerable zones,
- features a quick summary of a few essential rules.



The dice (3 sets of 95 dice, of 4 different colors – 1 set per table):

- are manipulated to stimulate thinking and mental computation,
- are piled up in order to establish a visual representation of threat levels,
- are rolled to engender calculation,
- are placed on specific spots to mark results,
- are used to keep score.

The cards (3 dozens cards – a dozen cards per table):

- are manipulated and passed from player to player,
- give information that helps determine the positions, colors and numbers of dice to place on some zones on the board.

The presentation screen, used to present the slides of the lecture, is also used to:

- visually present the context and the rules of the game,

²⁸ Wheaton, “Teaching Strategic Intelligence Through Games.”

- illustrate – via short animations – the action that players have to do, at every phase of the game,
- show the final results of the game.

Outlines²⁹ of the game

The game has been entitled *Bellerophon*.³⁰ It is supposed to take place in a risk assessment context at fictitious *Greater Montreal Sir-Wilfrid-Laurier International Airport* (YSL). A previous vulnerability assessment had presumably taken place and had determined 16 particularly vulnerable zones. The classroom is divided into three groups of 5 to 6 students each. Each group (or *team*) is tasked to produce a threat assessment and accordingly allocate security resources on vulnerable zones to protect the airport site against upcoming attacks.

Each team has at its disposal 95 dice, of 4 different colors, each color depicting a type of threat: *Terrorism, Common crime, Protest, Airport competitors*. On every zone, threat levels are represented by piles of dice of the same color: from 0 die, a *very low level threat*, to 3 dice, a *high level threat*.

Three dozen of special cards are shuffled and evenly dealt between teams. Those cards are of three types:

1. Cards reproducing an International Civil Aviation Organization (ICAO) security standard³¹ or a section of the related Canadian Aviation Security Regulations.³² Hint: actually, as standards and regulations address *vulnerabilities*, Type-1 cards are useless for assessing *threats*.
2. Cards featuring only excerpts from the general interest press, about aviation security. Hint: as a matter of fact, these cards do not help players predict upcoming attacks.³³
3. Cards featuring only excerpts from documents about aviation security produced by various law enforcement agencies, federal administrations and airport services. Hint: these are *intelligence* products but, for obvious reasons, they are not mentioned this way to the players. It happens that the more Type-3 cards a team gets, the better.

²⁹ As a more detailed description of the game can be obtained by contacting the author, only outlines of the game will be presented in the following sections.

³⁰ From *Bellerophon* (the name of the Greek mythic hero who rode the winged horse Pegasus and defeated the Chimera) with an emphasis on the latin prefix *aero* (like in the french word *aéroport*).

³¹ International Civil Aviation Organization, Annex 17 to the Convention on International Civil Aviation: Security, 9th ed. (Montreal, Qc.: International Civil Aviation Organization, 2011), available at: <http://www.bazl.admin.ch/dokumentation/grundlagen/02643/index.html?lang=fr>.

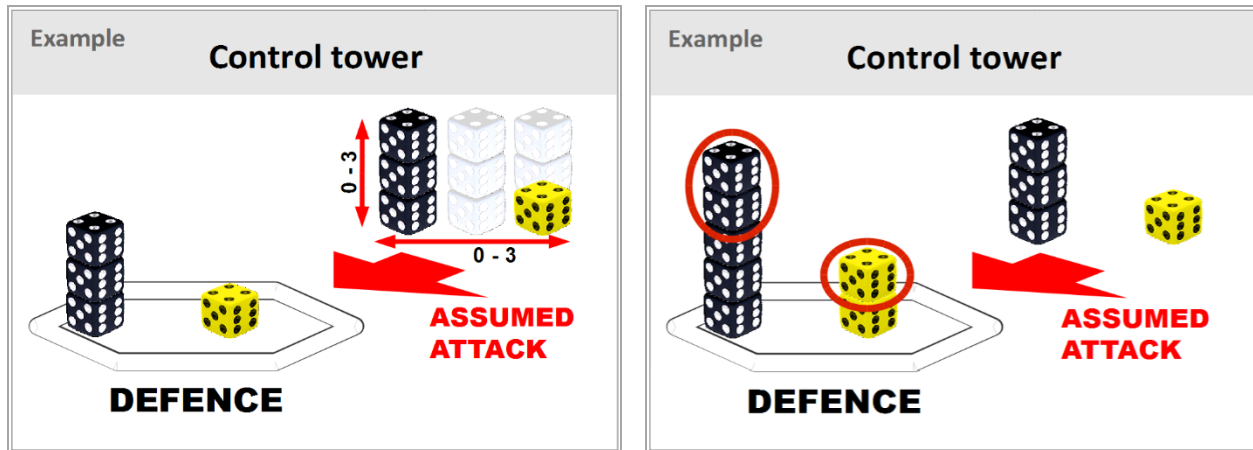
³² Canadian Aviation Security Regulations, op. cit.

³³ “A newspaper is supposed to tell you who, what, where and how. An intelligence organization is supposed to tell you that, but more important, to tell you why and what's next. (...) A journalistic organization is essentially backward-looking. (...) An intelligence organization is supposed to really be focusing on what is going to happen. And that's a very different task.” Friedman, George, “About Intelligence vs. Journalism,” Stratfor video, 4:18, January 1, 2012, <http://www.stratfor.com/video/about-stratfor-intelligence-vs-journalism>.

To do their threat assessment, the players may use the cards to help them:

- determine the natures of the threat and place dice of the corresponding colors,
- evaluate the threat level and pile up the dice of a same color.

It should be reinforced that cards do not give information on every threat on every zone. Players also have to think about the best possible threat assessment. Once it is complete, remaining dice are then allocated to better secure chosen zones, should attacks occur.



1. Players assess threats on every zone of the board.

2. If they still have dice at their disposal, players may allocate additional resources to better secure the zone.

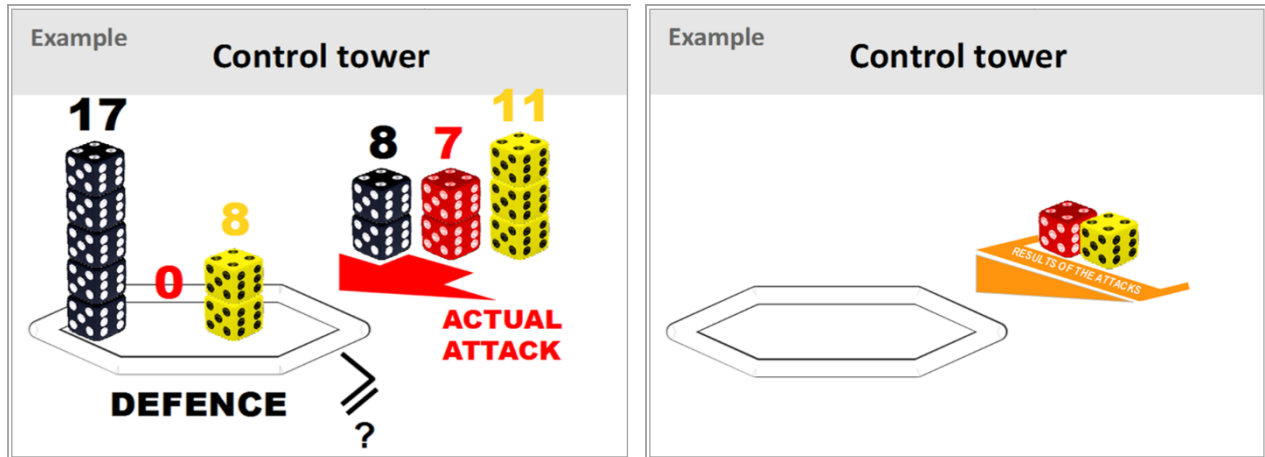
Then, the vulnerable zones are under attack! To play the role of the attackers, in each team, a player is chosen to go and sit at another table. Each attacker gets her own box of dice (*attack dice*). The attacks on the airport are resolved as follows.

On the presentation screen, all vulnerable zones are successively shown, with the dice depicting the *actual*³⁴ nature (colors) and force (number of dice piled up) of the attacks that take place on that very location. Each nature (color) of attack is resolved successively. At each table, the attacker rolls the number of attack dice as shown on the screen. One of the players in the defensive team rolls the dice of the same color that have been placed on the same zone of the game board.

- If the defence roll is over or equals the attack roll, the attack fails. All dice of this color are removed from the board. No point is scored.

³⁴ They depict a fictitious – though realistic – threat assessment carried out in the context of YSL airport.

- If the attack roll is over the defence roll, the attack succeeds. All dice of this color are removed from the board, but one die of this color that is left on the zone, as a marking die (for keeping the score).



1. Dice are rolled successively for each color.³⁵

2. Once all attacks have been resolved for this zone, only marking dice remain on the board.

Then, the next nature (color) of attack is resolved. Once every attack has been resolved on the zone, team and attacker play on the next zone of the board. And so on.

Once all attacks have been resolved on all 16 zones, the score is kept by counting the marking dice on the board – each color of marking die has a specific value.³⁶ Points are added up to establish the final score of each team. The team with the lowest number of points wins. Its members receive a symbolic award and the game ends here.

All scholars in the field of game-based learning agree on the fact that the game doesn't teach anything *by itself*. The learning takes place through “the most important part of the activity,”³⁷ the *debrief phase*, during which the outcomes of the game are put in context. Scholars explain that “the assumption of oral debriefing is that all participants learn the same things at the same time and in the same manner.”³⁸

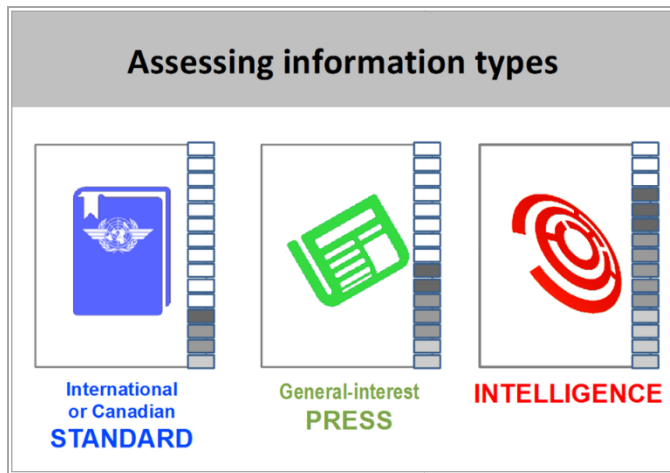
³⁵ This example is for illustration purposes only. It is not an actual depiction of the attack dice as they appear on the *control tower* zone during the game.

³⁶ Terrorism: 3 pts – Common crime: 2 pts – Protest: 1 pt – Airport competitors: 1 pt.

³⁷ Van Ments, Morry, *The effective use of role-play : Practical techniques for improving learning*, 2nd ed. (London: Kogan Page, 1999), 133.

³⁸ Petranek, Charles F., Corey, Susan & Black, Rebecca, “Three levels of learning in simulations : Participating, debriefing, and journal writing,” *Simulation and Gaming* 23, vol. 2 (June 1992), 174-182, available at: http://deepblue.lib.umich.edu/bitstream/handle/2027.42/69040/10.1177_1046878192232005.pdf; see also: Harteveld, Casper and Raphael Bidarra, “Learning with games in a professional environment : A case study of a serious game about levee inspection,” *Learning with Games* (2007), 555-562, available at: <http://graphics.tudelft.nl/~rafa/myPapers/bidarra.LG2007-2.pdf>; Jacobs and Dempsey, “Simulation and Gaming: Fidelity, Feedback and Motivation”; Kriz, Willy C., “Creating Effective Learning Environments and Learning Organizations through Gaming Simulation Design,” *Simulation & Gaming* 34 (2003), 495 -511, doi:

In the case of *Bellaerophon*, teams are now told to sort their cards by type. After quickly passing through the cards, they now have to grade each type of cards by putting between 1 and 5 dice on every pack of cards according to their usefulness for assessing the threat (1 die: useless – 5 dice: essential). Then, they have to explain their marks. To compile the results, a specific slide is projected directly on the classroom whiteboard. The grades given by each team are "piled up" by blackening the boxes.³⁹



Students eventually find out that the most adequate information actually comes from intelligence products. The word *intelligence* is then introduced.

Now that they have experimented the need for intelligence in order to adequately secure an airport, the lecture may begin. Classroom chairs and tables go back to their initial configuration. Students are then taught the rudiments about:

- the definition of intelligence,
- the purpose of intelligence (and the difference with journalism),
- the main different natures of intelligence (military – security – criminal – competitive),
- the different levels of intelligence (tactical – operational – strategic),
- the intelligence process,
- the importance of our security officers and constables in our intelligence network in order to collect and validate information that may lead to actionable intelligence in order to better protect the airport sites.

An educational game about intelligence – For what results?

10.1177/1046878103258201, available at:

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.112.8756&rep=rep1&type=pdf>; Stibbard, Jeff, *Training Games – From the Inside* (Chatswood, NSW: Business & Professional Publishing, 1998).

³⁹ Each shade of grey depicts the grades of one team. – These grades are from an actual game.

Results of the game in the classroom

To date, the *Bellerophon* game has been used in classroom only twice. Although the conclusions drawn from the experience are still partial and temporary, some of them match previous observations made by specialists in the field of game-based learning. Moreover, feedback data have been collected from observations in the classroom and from the results of a feedback form, filled after the class by students and by three observers from the Airport Patrol training department. The results pointed out a few flaws, in particular in the explanation of certain rules of the game, but those have been corrected since. The results also reveal a very high rate of satisfaction. Students and observers enjoyed the class, the materials and the method of teaching. But more important, the game seems to have reached its main objective.

Bellerophon turned out to be an excellent incentive. Students were more involved in this class than in former ones (with no game) on the subject. The game allowed a much larger proportion of students to participate in the class, instead of just sitting quietly in the classroom.

In each team, threat assessment generated small-group dynamics⁴⁰, through a constant interaction between players, by discussion, cards interpretation and *try-and-fail* positioning on the game board. It has also been observed that interaction between players generated a meta-cognitive process known as 'thinking aloud', that is verbal expression of the normally covert mental processes:

“Learners are encouraged to contact other team members to discuss and negotiate subsequent steps, thus improving, among other things, their social skills. (...) Students explain their game process to their fellow players throughout the game play. (...) Among three meta-cognitive strategies developed for effective game-based learning, the ‘thinking aloud’ strategy is the strongest variable affecting social problem solving ability.”⁴¹

Furthermore, the insertion, at each table, of an 'enemy' to play the attacker and roll the attack dice has created an appropriate tension that reinforced the power of attraction and the purpose of the game. But what about the effectiveness of the game to teach its purpose?

⁴⁰ Faria, A.J., “The changing nature of business simulation/gaming research : A brief history,” *Developments in Business Simulation & Experiential Learning* 27 (2000), 84-90, available at: <http://sbaweb.wayne.edu/~absel/bkl/vol27/27ar.pdf>; El-Shamy, *Training Games*, 36-37.

⁴¹ Kim, Bok-yeong, Hyung-sung Park, and Young-kyun Bek, “Not just fun, but serious strategies: Using metacognitive strategies in game-based learning”, *Computers & Education* 52, 800-810, quoted in Moisés Kirk, “Not just fun, but serious strategies: Using metacognitive strategies in game-based learning” (presentation), available at: <http://kyoumu.educ.kyoto-u.ac.jp/cogpsy/personal/Kusumi/bbs09/metacognitive.pdf>; for another application, see Heuer Jr., Richards J., *Psychology of Intelligence Analysis* (Washington, D.C.: Center For The Study Of Intelligence, 1999), 67, available at: <https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/psychology-of-intelligence-analysis/index.html>.

According to Wheaton, designing games that teach specific matters – like intelligence – proved to be complex.⁴² He also states he now intends to design his own training games in order to better teach intelligence *with* games rather than merely *through* them.⁴³

It is impossible not to agree. In the case of lectures for the Airport Patrol officers' initial training, it is not necessary to get a game that *teaches* the rudiments of intelligence. What is needed is a game that:

- help students not having prejudice regarding intelligence,
- help them understand the purpose of intelligence,
- and ultimately get them more involved in the intelligence function in our company.

What do students really retain from the rudiments of intelligence in the lecture part of the lesson? Probably not much. But that is not the primary objective. What they sure will remember though is that:

- intelligence is not a fancy word for '*cloudthreshing*',
- intelligence is paramount for adequately securing an airport,
- as security officers and constables at the Airport Patrol, they have a role to play in the production of intelligence.

As a matter of fact, at any moment of the class, no student expressed any concern about the relevance of such a training session about intelligence. On the contrary, in the feedback form, several students expressed the need for a longer class on the subject. The reason of this major improvement lies in the fact that the game made them understand the purpose of intelligence and how important it is for better securing an airport. This observation is fully consistent with the conclusions of authors who determined that game-based learning is one of the most efficient forms of teaching when dealing with personal development⁴⁴ and the acquisition of skills like change/reinforcement of enterprise values and culture.⁴⁵

Results of the game out of the classroom

Do the security officers and constables now more willingly contact our investigators to feed them with information? Presently, no measuring instrument has been developed. The game has been used first to test the receptivity in classroom. But the good reception now allows:

- another iteration of the experiment on a longer term and therefore the ability to implement a measurement;

⁴² Kristan J. Wheaton, "Myth #3a: I Want To Make A Game That Teaches... (The 5 Myths Of Game-based Learning)," Sources and Methods (blog), September 4, 2012, <http://www.sourcesandmethods.blogspot.ca/2012/09/myth-3a-i-want-to-make-game-that.html>.

⁴³ Kristan J. Wheaton, "Game-based Learning and Intelligence: A Summary and Re-boot," Sources and Methods (blog), March 6, 2013, <http://sourcesandmethods.blogspot.com/2013/03/game-based-learning-and-intelligence.html>.

⁴⁴ Léonard et al., "Les nouvelles pédagogies de la formation;" Kriz, "Creating Effective Learning Environments".

⁴⁵ Ibid.; Faria, "Changing nature of business simulation/gaming research".

- an assurance to the Airport Patrol's intelligence unit that the students are now much more receptive to intelligence matters;
- an introduction to our investigators at the end of the lecture, by allowing them to speak directly to the students about their job in intelligence. This step has been recently implemented and has been very well received by students who then were able to make an even better connection between the lesson and the airport reality. This may lead to an effective expansion of our intelligence network.

Moreover, in the purpose of enlarging our intelligence network, it has been decided to extend the use of the game to other departments at *Aéroports de Montréal*. Several groups of field staff have already been targeted. The ultimate objective is to be able to deliver the training session to the airport blue-collar workers. Because of their critical situation in the field through which they can get crucial information related to security and criminal activities, they would be essential assets in the intelligence network. They may be a tough audience to convince, but the *Bellærophon* game will ease the challenge.

About the power of training games – An hypothesis

Using such a method of teaching also had a repercussion on the way other introductory lectures are delivered. For instance, a short game has recently been inserted in the lesson on terrorism. Indeed, students often get confused because of the different existing classifications of terrorist and seditious activities. The purpose of the game is not necessarily to help remembering those classifications but to make students understand why scholars have developed them and what their implications are in the field for justice, police, military, and intelligence organizations.

Furthermore, a larger training game has been designed – soon to be tested at an upper managerial level in the company – about information security, dedicated to non-security-oriented managers. Security is difficult to sell to them: it costs but never yields money; moreover, security is considered as an impediment to conducting business. Thus the need to explain to managers what is actually at stake. Again, the point is not to teach managers what is precisely information security, but to explain to them why the matter is paramount in a competitive environment like ours and to get them involved in the process of adequately securing corporate information.

The process of designing these games, illuminated an intriguing aspect of game-based learning. Complex notions may appear as conceptual to laypersons. Having to teach them on such matters, there are undoubtedly benefits not to transmit a knowledge directly, but to use a game as a medium. By utilizing a game, the concepts are turned into game materials and rules that is *figures and algorithms*. In the *Bellærophon* example, using piles of dice to depict threat levels is a simple yet efficient way to illustrate the main purpose of intelligence: *reducing uncertainty* in the decision-making process.⁴⁶ For instance, rolling 3 dice generally gives a higher result than

⁴⁶ Fingar, Thomas, *Reducing Uncertainty: Intelligence Analysis and National Security* (Palo Alto, CA: Stanford University Press, 2011); See also: Hubbard, Douglas W., *How to Measure Anything*, 2nd ed. (Hoboken, NJ: John Wiley and Sons, 2010).

rolling just one; but a smaller uncertainty remains (dice are random by nature). Now, uncertainty is a central part of the appeal of games.⁴⁷

After the game, students are able to turn these figures and algorithms into concepts in a way that fits their professional needs and changes their mindset. For instance, through the debrief phase of a *Bellærophon* game, by grading themselves the relative value of each type of cards, students understand that intelligence is of high importance in the process of securing airports.

Game-based learning is about turning concepts into figures and algorithms, and then allowing students to turn these quantitative instruments into applied concepts. This could explain why popularizing with games can be a powerful learning tool.

Conclusion

Because of its proactive approach to security, establishing and maintaining an effective intelligence network is paramount to the Airport Patrol. So it is essential for ADM security officers and constables to be cognizant of the purpose of intelligence. Thus, they are given a lecture on the subject during their initial training.

A previous version of the lecture had been given several times, using a traditional teaching approach. The traditional approach evoked an initial reluctance from students to learn about intelligence, specifically a skepticism regarding the relevance of such a lecture. To address this issue, ADM's Airport Patrol 1) implemented a game-based learning approach, with a specially designed training game, deeply rooted in an airport security context; 2) introducing the word *intelligence* only in the debrief phase, after the end of the game.

This game-based approach has been used only twice in the classroom, but some positive results have already been noticed. Thanks to the game, students got interested in intelligence and better understood the interests of producing intelligence in order to adequately secure airports. Therefore, it is reasonable to think that, in the near future, it should be easier for Airport Patrol investigators to recruit on-the-job officers for their intelligence network.

Moreover, thanks to the positive feedback and hearsay the initiative generated, the opportunity now exists to:

- expand the *Bellærophon* training sessions to other staff teams at *Aéroports de Montréal* – especially non-security-oriented personnel – in order to widen the Airport Patrol's intelligence network;
- develop training games to address other key security topics.

This emergent game-based learning approach is actually not about *teaching* the rudiments of those topics to staff members. It is much more about making them understand the reasons why

⁴⁷ Costikyan, Greg, *Uncertainty in Games* (Cambridge, MA: MIT Press, 2013).

those topics matter and what they can do in their everyday work to better secure airport operations and protect our competitiveness. *Teaching* through games remains a tough challenge. *Popularizing* with games may be an easier tool to implement, but a powerful one: it is not so much about transmitting knowledge but changing mindsets and culture.