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The Dutch police system is in a systemic transition. Traditionally the organization works as a first responder service, steered towards an incoming flow of help requests and incidents, as well as investigations in current cases. The new vision in the Dutch police is to go to a pro-active organization that is primarily driven by intelligence: an information and knowledge intensive process that should predict the likely occurrence of criminal and public order acts. The roll-out of this new paradigm in the police organization is widely accepted but in practice it stalls. The authors designed in a multi-disciplinary team a game with two goals: First, re-convey the message that the new paradigm will be the future of the organization, and second, to find out where and why the roll-out halts in the 26 police regions. This paper goes into the methodological challenges faced in the design of the game. The main challenges were found in the acceptability of evaluation schemes in such a political and societal field and the need for detailed resemblance of the real police information system. The authors describe the design process, the solutions used and their outcomes after the simulation day.
Intelligence has been recognized as being important in policing since very long. Most commonly, intelligence is seen as the information gleaned from various sources (secret intelligence agents) on the activities of known or suspected active criminals. Since the 1990s several drivers caused the intelligence to be viewed as more, starting in the United Kingdom. One driver was the newly created knowledge that most crimes were committed by a small number of offenders (Kleiven, 2007). By targeting on the criminal instead of the crime, the police would be able to be proactive and prevent crimes to happen. Another driver was the increasing workload and, as a result of this, the increasing need to decide on how, where and when to use police resources as to combat crime as efficiently and effectively as possible. For both drivers, the police are in urgent need for information on patterns in criminal activities, series of crimes, hot spots, and opportunities for criminal activities. Not only is intelligence needed for evidence to prosecute crimes, it is also needed to make an analysis of all sorts of information to predict crimes and to proactively and objectively direct police resource decisions (Ratcliffe, 2008). Intelligence also includes the interpretation of crime and incident data and community information on a range of issues. Intelligence-led policing can be defined as the use of analyzed information and knowledge by decision makers to decide on police resources.

Intelligence-led policing has an international resonance whether in the United Kingdom, the United States of America, Australia or in the Netherlands. In this paper we will focus on the implementation of intelligence-led policing in the Netherlands.

The Dutch police are organized in 25 regional police forces and one police force working at a national level. Since the end of the 1990s, intelligence-led policing has been incorporated by the Dutch police forces. The focus was on criminal activities, but was extended to public order as well in 2005. The implementation of intelligence-led policing in the regional police forces in the Netherlands was characterized by diversity: different police forces gave different priorities to implementing intelligence-led policing and they made different choices in the implementation of the concept. By the end of 2007, the Board of Police Commissioners identified the need to formalize intelligence-led policing into a policy that could be adopted nationally by the 26 police forces. A national model was required and the National Intelligence Model was released (SBGI, 2008). A national program was started in the beginning of 2008 to facilitate the implementation of the National Intelligence Model in the 26 different police forces.

The National Intelligence Model (NIM) was widely accepted by the police as a model to professionalize police practices and to secure a more
effective gathering, sharing, analysing and use of intelligence. Still, it remains an aspiration to implement the NIM. It requires major organizational reforms in IT systems, in the intelligence departments, in analysis techniques, for local police officers, for strategic decision makers. Such major organizational reforms can be successfully implemented only if there is wholehearted commitment and understanding to them from the most senior officers in the force. Since the police service has lacked an intelligence culture, the senior officers have different levels of knowledge, understanding and acceptance of the National Intelligence Model and intelligence-led policing.

This paper discusses some methodological issues faced by the design team of a gaming simulation used as an intervention in the NIM introduction. The next section discusses why gaming was chosen. Section 3 discusses the design challenge of capturing an open-ended and unstructured problem in a game. Sections 4 and 5 describe the project structure and design process, key to solving the design challenge. The actual game design is presented in Section 6, and the results of the actual on-day session with adjunct-commissionaires of police are in Section 7. The paper ends with conclusions on the successfulness of the approach.

2. WHY GAMING?

The program management leading the introduction of NIM thought they needed ‘something different’ from the usual talk sessions and presentations to address this phase in the NIM. An intervention was needed soon, because of the dynamics in the project. The goals to reach via playing the game are:

1. Re-convey the message that the new paradigm will be the future of the organization.
2. Find out where and why the rollout halts in the 26 police regions.

These two goals have a different logic. The first one is a ‘send’ message. The second one entails opening the black box of the police regions and making the leaders of the NIM implementation in their respective regions (the adjunct commissionaires of police) willing to share their resistances.

The two different logics can be combined in gaming, following the traditional 5-C model of Duke and Geurts (2004) of what gaming can do:

1. It can enhance Creativity through a playful way of dealing with the topic
2. In a game session Communication can occur that is impossible in the real world, as people are brought together to really do something, leaving their positions outside. The game itself can also communicate a message through the designed experience.
3. When all participants understand the outcomes of the game, \textit{Consensus} can be reached on what is the path to the future.
4. Because of the part people had in the solution, they are more likely to show \textit{Commitment} to future developments when they align with the game conclusions.
5. In the game, participants may find new ways for \textit{Coordination}, as they are in interaction in a simulated environment, outside their usual patterns of power and control.

For the program management, the first goal matched with the Communication function of gaming, in a passive sense. The second goal matched the functions consensus, commitment and coordination. Together, this was sufficient reason to go for gaming as an intervention method in this phase of the NIM.

3. DESIGN CHALLENGE

To capture the essence of the NIM in a game was a major design challenge, unlike many previous projects of the game designers. There were two dominant aspects in this game design that made it more complex than the ‘regular’ games. First of all, capturing police work in a gaming simulation is capturing an ‘unstructured problem’ in a structured simulation. Mason and Mitroff (1973) defined an unstructured problem as one for which one or more of the sets of actions, values, outcomes, or states of nature are unknown; Eilon (1985) differentiated structured from unstructured decisions in terms of “the degree of clarity with which the decision maker perceives his task”.

Of course it is possible to capture unstructured problems in a gaming simulation. Bekebrede (2010) proved that games are excellent tools to learn about complex systems that by definition have unstructured problems. However, most games do this at a higher order of abstraction (Duke and Geurts, 2004). Detailed games that are more like simulations, with a low order of abstraction, are known to test hypotheses (like Meijer et al., 2008) and common in role-out of new procedures and systems (Wenzler, 2003). Using it for open-ended questions like our second goal is far less common, and for good reason.

Reitman’s (1964) conceptualization holds that problems are ill defined as the result of “open constraints,” solution attributes that can be specified or “closed” variously by the solver, allowing subjective factors to determine the solution. Thus, the fugue problem’s unstructuredness is reflected in the fact that different composers (or even a single composer on different occasions) will close the problem's open constraints in various ways, resulting in distinct compositions/solutions (Smith, 1988). Police work in steering committees (an essential part of NIM) is exactly the joint decision making
on capacity planning in a world that is dictated by an unpredictable stream of events (crimes, etc). The relation between the level of reaching the goal of the police organization (the reduction of crime, promotion of safety and reduction of disorder in an efficient, effective and fair and decent manner (Vollaard, 2006)) and its daily decisions is notably hard to make. A link between police effectiveness and daily decisions could come from for instance validated system dynamics models (Van Zijderveldt, 2006)

In a gaming simulation that should facilitate a detailed process similar to real police steering work, the open constraints of the real world should be maintained. This fits with what Druckman (1994) calls the need for ‘fidelity’ in games that teach specific goals instead of general, more abstract, principles.

4. PROJECT STRUCTURE

A project team was formed to design the gaming simulation. Delft University of Technology was leading in developing the gaming simulation. Their expertise and experience was used to transform the NIM into a learning experience through gaming simulation. They were also in the lead for project management and watched the strict timeline of the project. The timeline was strict because the implementation of the NIM had already been started and the sooner the deputy police chiefs were involved the better that would be for the implementation of the NIM.

The content for the gaming simulation came from two parties: the Program Intelligence of the Dutch Police and the lectureship Intelligence of the Dutch Police Academy. The Program Intelligence is a temporarily program to facilitate the implementation of the NIM over the 26 Dutch police forces. The Program knows about the latest developments of the NIM implementation, she knows about things that go wrong and that go well and therefore can indicate which details should get attention in the gaming simulation and which details should not. The lectureship Intelligence of the Dutch Police Academy is involved for a more conceptual level of understanding of the NIM and to link to the education and learning environment of the Police Academy. Eventually, the training and learning experience offered by the gaming simulation should be incorporated in the existing education programs.

5. DESIGN PROCESS

The complete design process took 5 months from first project meeting until the final session. The project team had weekly to bi-weekly
meetings. The first 2 months got spend on getting to a system schematic, following the Duke and Geurts methodology (Duke and Geurts, 2004). The last three months got spend on iterative design cycles. Formulating a system schematic in an open problem proved difficult. On one hand, the logic of steering committees and information desks was clear, based upon the NIM documentation (except for the interaction between the national and regional level). The NIM however, although decided upon in 2008, was about to be updated according to newly gained insights by the Dutch police. The NIM documentation, therefore, could not be used as fixed point in the design process. Because of this, many iterations were required to come to an agreed upon design to start developing the game.

During the development of the game, daily new insight about the NIM tended to influence the design decided upon. This was partly due to new insights gained by the Dutch police because of the transformation they were going through. Partly this was due to new insights gained by the project team because of the explicit model they were exposed to by the game itself. The game provided better insights into the NIM. Through better insight, the specific elements to include were improved and re-arranged.

Although every game design method advises to test multiple times with the real target group of participants, this was impossible in this project. There are only 26 deputy police chiefs, who can only be used once, and that should be at the final event. We organized two test sessions with people from the information organization. The first one used some project leaders on intelligence and students from the police academy. In this session the processes of steering committees and information knots was tested on the interaction and interdependencies. The session was a success, leading to optimism among the game designers.

The second test session used the same project leaders, plus a larger group of senior officers from all over the police organization. In this test session the processes of the information organization were the key aspect to test. This session was a massive deception. The game design at that time was absolutely incapable of providing the steering committees with sufficient information to steer on.

In addition to the test sessions, the project team held a review with two of the deputy policy chiefs. At that point in time, the project team proposed the use of a system dynamics model that was formulated in a different project two years before in one regional police force. The model contained actions of police forces and their effects on safety, security, public order and service levels of the police. The model would have been the ultimate bridge for the game to judge the actions of the steering committees and to simulate effects on a qualitative level between rounds. The deputy police officers protested about the use of this model. In the light of the political developments, the discussion on performance contracts be-
tween the parliament and the police forces and because of several crises in the past few years they warned against any judgment about the quality of the decisions of the deputy police chiefs. Based on this, the project team had to decide to skip the model and to let the judgment on the quality of the steering committees to a very senior police officer that was hired to facilitate the process.

6. THE GAME DESIGN

Following Meijer (2009), the design of each gaming simulation consists of four elements: roles that play the game and influence the flow and result of the game, rules that describe what processes the actors do and how they interact, incentives that determine why people act in a game and constraints that limit the choices. On top of the design, two elements have to be added to be able to play a session: the load determines the parameter setting and initial state of the game, and the situation explains where, how and why the session will be held. In the NIM case, the roles and rules were fixed and known when designing the game. Part of the incentives and constraints were open-ended. These two open elements complicated the design of the game, as we will describe below.

6.1. Roles

Within the NIM there is a separation between steering committees, who decide on police resources, and information desks, organizational departments where intelligence officers work and prepare crime and security reports for the steering committee, so called security information products. The work of the information desks is either directed by the ‘intelligence agenda’, a document that describes the yearly strategy of the steering committee and translates this into a calendar of information products needed for this, or by incidental requests for information from the steering committee. There is an information desk at three different geographical levels: the national level (NIK), for every geographical police region (RIK) and within each police force for the geographical districts in the region (DIK). Steering committees exits at these three levels likewise. The chairmen of the steering committees represent their geographical area in the higher-level committee. Each information desk works for the steering committee that has the same geographical focus. The information desks collaborate with each other for analyses that go beyond their own geographical focus.

In an early stage of designing the game, the choice was made that the adjunct commissionaires will play the role of members of the steering committees (SC) at regional or national level. Steering committees at the level
of the district are left out of the game. The SC’s will manage a fictive police region to abstract from their real-world situation. During the game they should experience the added value of intelligence-led policing and the role the information desks and the steering committees should have in that.

The role of information desks will be partially automated and prepared for. The interaction between the steering committee and the information desk will be implemented by having real chiefs of information desks play this role. Since the game is designed for the deputy police chiefs, the chiefs of information desks are instructed to behave in certain ways to increase the learning experience for the deputy police chiefs.

6.2. Rules

Rules in the NIM consist mostly of processes that determine the decision-making cycles. When we model the processes according to the National Intelligence Model, we see an intelligence cycle that looks similar to the one of Jerry Ratcliffe (Ratcliffe 2008). The information desks interpret information about the security and crimes in their geographical area and produce security information reports for the accompanying steering committee. This steering committee decides on police resources based on this information with the intention to impact security issues in the geographical area. The steering committee can make three kinds of decisions. One is impacting the criminal situation by physical police work such as increasing the capacity of crime investigation teams or by shifting the focus of neighbourhood police officers to different areas. Two is influencing the criminal situation by addressing these issues to partners in security, for example addressing the issue of an unsafe traffic situation to the municipality. Three is concluding that more information is needed to make a sound decision on the security issues. In this case, the information desks receive an assignment for this.

![Figure 1. Intelligence cycle.](source-after-Ratcliffe-2008)

In the Dutch system, as of 2010, the national level is not institutionalized yet. The 26st police force that facilitates the national level is equal to all other police forces in the hierarchy. So, a process description of the
national steering committee and the interaction between this steering committee and the committees at regional level was lacking for designing the game. In the gaming simulation, the participants would be forced to think of the role of the national level through playing a national steering committee. As the rules around the mandate of this committee cannot be based upon the real world, they have to be left up to the players to decide. This made the interaction between the levels of hierarchy open-ended and complicated the design of the game.

6.3. Incentives

As was described above, using real world performance indicators to create an incentive scheme for the participants appeared to be incomprehensible given the political sensitivity of the subject. Now the designers were faced with the dilemma of how to make participants actively involved in the game. After many discussions and consultations, we took the risk of only using the deputy chiefs themselves as an incentive. This meant that they were told to steer the best they could and that they would evaluate their work and principles in an afternoon session. To provide a safe environment in which they could really tell each other what they thought, the afternoon session was separated from the game in place and audience, as all the game facilitators were excluded from this session.

6.4. Constraints

The constraints for the NIM game had to be designed at two different levels. At the first level there is the constraint of the fictive police force: how much money, people and other capacities are available to steer with. This was all based on real data from 4 regions and averaged. All constraints were laid out in a description of the fictive police region.

At the second level there are the constraints of the information organization: what would they be able to deliver in terms of information products? As discussed above, the challenge here was to keep it as open as possible. In the best situation, we would have the real information of real regions with a real information organization. Because this would bring in sensitive information again (“your region is managed badly”), the best we could do was finding real information and making this anonymous. Therefore we got an anonymous database of all records in the police systems of the last 4 years, the public reports on safety in 5 regions and 3 intelligence agenda’s and internal reports showing trends and figures. From this, we constructed 4 regions that were different enough to be playable without direct links to a real region, but also real enough to point to a real region in case this would yield discussion on the quality of the numbers. A constraint on the databases was that because of anonym-
ity we could not make case-based correlations on particular offenders or on modus operandi.

7. SESSION

7.1. Load and situation

On June 10th of 2010, the deputy police chiefs met in Eindhoven, the Netherlands for the gaming simulation. The deputy police chiefs were divided over four fictive regional police forces in the game, each in a different role varying from chief of police, chief of criminal investigations department to chief of a geographical police department within the police force. Together these chiefs form the steering committee at regional level. One deputy police chief played the role of chief of the national police force and was chairman of the national steering committee, which furthermore contains the four chairmen of the regional steering committees. The five teams (four regional police forces and one national police force) were each accompanied by a chief information. These chiefs information are familiar with the NIM as they are the ones that implement the NIM in the regional police forces. The chiefs information furthermore know very well what kind of information can and cannot be produced by the IT systems. And they are instructed for the game. During the gaming simulation a student supported the chief information in extracting the requested information from the IT systems instantly. In this way, the chiefs information can fully focus on supporting the deputy police chiefs in their gaming experience on intelligence led policing.

To prepare for the gaming simulation, each deputy police chief received a short description of the gaming simulation the day before, containing a description of the simulated country as well as a description of the role they had to play during the game. The gaming simulation itself started with a briefing in which the simulated country was presented. The characteristics of each region were presented, the regional police force and the related crime and public order issues were presented and the steps to take in the game were explicated.

The participants then gather in their newly formed police forces and exchange their ideas and questions. After ten minutes the chiefs start the first monthly regional steering meeting. In such a meeting the problems related to crime and public order in the region are addressed and they decide on the police resources. The better the participants are able to use the information and ask the right questions, the better the intelligence and the better they know what is going on.

Following on the regional steering meeting is the national steering meeting in which the issues that are relevant on a national level are ad-
dressed. The better participants are able to collaborate, the better they can tackle crime and public order issues. The round ends with a second regional steering meeting. The participants would observe the effects of their decisions and actions over the past month; they would experience the effects of collaboration on a national level and would feel the lack of intelligence to support them in their decision-making.

This cycle of briefing, regional steering meeting, national steering meeting and regional steering meeting is replicated in round 2 with a slight modification. During the briefing the participants receive feedback on the way they performed in the first round. This feedback is based on observations on how they use intelligence in their decision making process. This feedback gives the participants ways to improve their functioning in the second round. The learning experience for the participants in the two rounds is focused on experiencing a lack of intelligence and experiencing how it could be when you would have an intelligence-led police force.

7.2. Dynamics over the 2 rounds

The two rounds worked out in the sense that all processes in the game could be finished. The quality of the information organization however was very different between the four steering committees. In two ‘regions’ the information organization was able to come up, in time, with creative products based on the databases, documents prepared and some creativity. One region did not function well. The steering committee asked unspecific, broad questions, the information officer was not able to slim this down, and the student support could not keep up and blocked. The 3rd region held middle ground between the good and the bad ones. In the malfunctioning region, the open constraints of the police issue led to a lower-quality game play and less positive attitudes afterwards. What played a role too here was that a few officers were in this team that were deemed difficult. One of them specifically tried to hi-jack the game in between the rounds, verbally trying to tackle the game leader. After an intervention everybody agreed to continue, but this set an atmosphere.

8. CONCLUSIONS

The Dutch police has been transforming from a reactive police to a proactive police based on the concepts of intelligence led policing. The National Intelligence Model translates the concepts of intelligence led policing into work practices for the Dutch police. The National Intelligence Model was widely accepted by the police as a model to professionalize police practices and to secure a more effective gathering, sharing, analyzing and use of intelligence. Still, it remains an aspiration to implement the NIM. It
requires major organizational reforms in IT systems, in the intelligence departments, in analysis techniques, for local police officers, for strategic decision makers. Such major organizational reforms can be successfully implemented only if there is wholehearted commitment and understanding from the most senior officers in the force.

We developed a gaming simulation to increase the level of understanding and commitment of these most senior officers, the deputy police chiefs. The gaming simulation serves two goals. First, increasing the level of understanding through experience. Two, identifying barriers for implementation of the National Intelligence Model in the 25 Dutch police forces.

The development of the game appeared to be more complex than most other games. The open-ended character of intelligence led policing and the accompanying National Intelligence Model are due to that. First of all, the National Intelligence Model was under development. This required a lot of iteration during the design phase of the game, but also during the development of the game slight modifications were made. Designing the game resulted in gained understanding of the National Intelligence Model with the actors involved.

Designing games for open-ended situations will become more and more common. In today’s networked society, (inter-) organizational structures tend to be more fluid and changing constantly. This might require a different approach to designing games than the traditional methods we currently use. Simulation techniques and validations will become more and more prominent. The designing of the game was an interesting way to learn about the structures, interactions and relations in the real life situation that was being simulated.

The gaming simulation can be considered successful in serving the two goals. Most of the participants gained more understanding of and appreciation for intelligence led policing. And most of the participants identified changes they wanted to implement in their police force to increase the level of intelligence led policing in their organization.

The game is not incorporated in the educational programs of the Dutch Police Academy. The amount of people required for reasons of support to run the game (almost a one to one support) makes it inefficient to be used in recurring education programs.

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