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Awareness Development Across Perspectives Tool (ADAPT)

Topics 3, 2

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ABSTRACT

Reality can be viewed from several perspectives or disciplines. Due to their background, training and education, soldiers developed a military perspective which is not solely restricted to kinetic activities. In current missions, military personnel is confronted with a reality in which other perspectives play important roles, such as social-cultural, social-psychological, social-economic, governmental, and political perspectives. To reach desired effects it is necessary to view and share the mission context from multiple perspectives during the collection and analysis of information (Intelligence), during the planning and implementation of operations and activities (Decision making), during the deployment, adjustment and monitoring of operations (C₂), and during the evaluation of obtained effects (Operation Analysis).

This paper describes an approach to integrate various perspectives into a mission, namely by the development of a set of instruments which support task force commanders in multidisciplinary thinking. In this preliminary study, small (multi)disciplinary project teams of subject matter experts have been set up to formulate significant determinants, mediators and consequences relevant to the delineated perspective. The perspectives together intuitively represent targets and clusters of behaviors that can be influenced, and facilitate which type of interventions can be formulated, how they should be implemented and their (higher-order) effects evaluated.

INTRODUCTION

Current missions increasingly require a diversity of courses of action (CoA) on different domains. For example, inhibiting opium production [14, 20] stimulating school attendance of girls [8], or preventing police corruption [12], are all typical behavioral changes that require non-military measures, though fall within the current military scope. Because nowadays missions are about influencing the perceptions, attitudes, and behaviors of different parties, one may call them influence operations¹, or effect based operations².

Each operation like Peace Support Operations (PSO), Stability, Security, Transition Reconstruction (SSTR), or Counterinsurgency (COIN) operations is more or less an influence operation, where the military personnel can be regarded as “behavioral change agents”. All current operations coincide with the notion of an integrated approach³ defining how political, military, and development goals relate, in theory and in practice [23]. In theory, these concepts are exhaustively described and in numerous ways defined. In practice, these concepts demand that a (civil-) military commander and his staff first

¹ “Influence operations are focused on affecting the perceptions and behaviors of leaders, groups, or entire populations. Influence operations employ capabilities to affect behaviors, protect operations, communicate commander’s intent, and project accurate information to achieve desired effects across the cognitive domain.” [21]

² “Effects-based operations are coordinated sets of actions directed at shaping the behavior of friends, foes, and neutrals in peace, crisis, and war” [18]

³ Many terms are used to denote an integrated approach, like comprehensive approach, 3D (Defense, Diplomacy, and Development) approach, whole-of-government approach, etc.

need to identify which behavioral changes should be prioritized. Second, they need to analyze how to actually change the identified behavior, before they can formulate and test a CoA. Because both steps heavily rely on information operations⁴ (InfoOps), one would expect that InfoOps would be guiding and leading current operations.

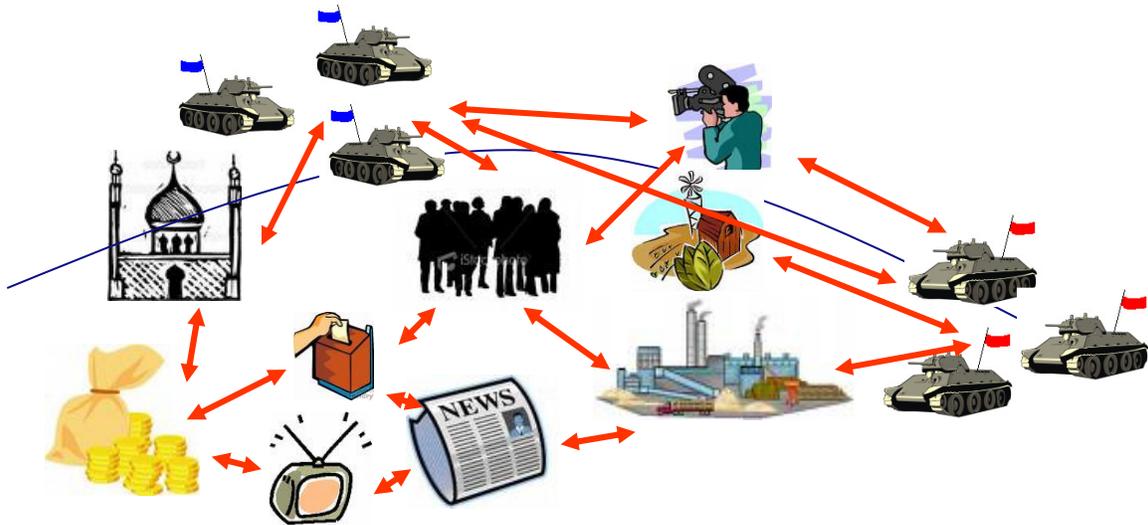


Figure 1. The current operational environment visualized as a networked influence diagram

However, in practice, InfoOps are rather a part of and supporting military missions. There are at least two reasons for this. The first reason is that the focuses of InfoOps are on insurgent groups [6, 19]. The vast intelligence apparatus is unable to answer fundamental questions about the operational environment and the people they seek to persuade [6]. The second reason is that influence operations are very complex. In order to be as effective as possible one must take into account cross-scale (like individual, community level, or tribal) and cross-domain (like PMESII) aspects and relations, and factors that drive or disturb the operational environment [10], one must decide with whom to cooperate, and one must decide which soft and/or hard power to use. To reach desired effects it is necessary to view and share the mission context from multiple perspectives.

At least at three stages these perspectives become necessary, namely during collection and analysis of information (Intelligence), during the planning and implementation of operations and activities (Decision making), and during the evaluation of obtained effects (Operation Analysis). First, regarding intelligence, perspectives should enable the TFC and his staff about which information they need to collect viewed from a certain perspective. For example, police corruption may be viewed as an undesired behavior but motivations/causes may differ (from [3, 4, 12]), e.g., factors that are intrinsic to policing

⁴ “Information Operations is a military function to provide advice and co-ordination of military information activities in order to create desired effects on the will, understanding, and capabilities of adversaries, potential adversaries and other parties approved by the NAC in support of Alliance operations, missions and objectives.” [2]

as a job, the nature of police organizations, the nature of 'police culture', the opportunities for corruption presented by the 'political' and 'task' environments, and/or the acceptance of what we see as 'corruption' in certain cultures. Second, regarding decision making, perspectives should provide insight to the TFC and his staff about which CoA elicits which *intended* and which *unintended* effects. For example, the TFC and his staff may plan to supply development assistance with the intention to do 'good'. Though, aid has both material and symbolic implications which can aggravate disputes within the broad context in which it is delivered, raising ethical and practical dilemmas for programmers [9]. For example, the response of the tsunami of December 26, 2004 in which over 30,000 people died in Sri Lanka. This response has probably had the effect of further de-legitimizing the state and entrenching the positions of anti/non-state actors [7]. Another example regarding Sri Lanka, from [22], is about the provision of 3000 houses in a community consisting of equal percentage of Tamil, Sinhalese, and Muslim populations. In this case, the principle of equity (needs-based allocation) was subordinated to the political expedient of equality (arithmetic allocation). Perspectives may not give a straightforward solution to the proposed balance, but at least they should provide insight to a TFC and his staff that such principles exist, and that they should be taken into account. Third, and last, regarding evaluation. In order to learn from experiences, perspectives should support the TFC and his staff in the process of sense-making (What did actually happen? Why did it happen? [16]). Different perspectives may have provided different principles of how the operational environment is composed. Nevertheless, which principle holds or is main important may differ from time and space, and should be incorporated, described, and/or updated within the perspectives. In this way, the lessons learned about the environment, (un)intended effects, and the CoA become disseminated, and available for new rotations.

There are various ways to integrate these various perspectives into a mission. The first option is to train officers the adaptive skills they require prior to deployment. Expert adaptive thinking under stressful performance conditions requires considerable training and extensive practice in realistic tactical situations until thinking processes become largely automatic [17]. Coaching by subject-matter experts (SMEs) is a key part of the learning process to enable the student to develop expert habits. The second option is to introduce these subject-matter experts into a mission forming fusion centers [6] or fusion cells [15]. For example, [15] describe the incorporation of various SMEs, e.g. tribal advisor, development advisor, legal advisor, religious expert, into an advisory group. This group performed various forms of analysis like mission analysis, analysis of options on how to achieve desirable effect in a (non-)kinetic way, and analysis on how to integrate the desirable effects in a plan. Although this advisory group introduces multiple perspectives in the theatre of operations, its coordination and influence on the military planning- and decision-making processes is yet limited.

As part of a four-year research program, called 'Support for Information Operations by using multiple perspectives' initiated by the Netherlands Armed Forces (NLD-AF), this paper describes a third option to integrate various perspectives into mission. This option is about the development of a set of instruments which support task force commanders (TFCs) in multidisciplinary thinking. We believe that dedicated information on the basis of different perspectives of the situation provided by an easily accessible system would

support the TFC and his staff considerably during intelligence, planning, and evaluation. In this preliminary study, it is described how such a system can be build and what methodological processes are required to do so.

METHOD

In order to develop the required set of instruments we should determine several aspects:

- The identification and selection of relevant perspectives
- The knowledge-acquisition of the perspectives
- The implementation and representation of perspectives

In several projects, small (multi)disciplinary teams of subject matter experts determined how to deal with these aspects.

Perspective identification and selection

The approach used in determining the perspectives [5] was to look at effect based operations as a wicked problem. Wicked problems are complex problems, often not well defined and solutions are very dependent on the point of view of different stakeholders [13]. To get from a wicked problem to a well or semi-structured problem we used Morphological Analysis (MA). MA is a problem-structuring method, which results in an inference model which strives to represent the total problem space and as many of the potential solutions to the given problem complex as possible. A morphological model is built by a group of domain specialists in an iterative process in workshop sessions.

The use of this approach for structuring the complex and dynamic system in which a Task Force operates is new. The integrated systematic way of tackling the wicked problem involving experts from different fields both military and civil leads to a generally accepted model of the problem space. Three workshops were facilitated, spread out over 5.5 days, which involved approximately 120 hours of specialist input.

These three workshops were held with participants representing different backgrounds ranging from NGO to military and political:

1. The first workshop contained a first brainstorm on the different actors and stakeholders which can be identified in the operational area and the different aspects that play a role in a peace-keeping mission. Then, these dimensions were clustered into a set of relevant dimensions⁵ on TF level.
2. The second workshop contained an evaluation of the dimensions which had been generated during the first workshop. As a second step we started to fill in the variables describing the dimensions. These variables are decisive behaviors concerning the dimensions, supporting the effect a TFC focuses on. A scenario, based on a desired effect, was used to fill in the variables.

⁵ We use the term 'dimension' to describe problem aspects, we sub-divide dimensions into 'parameters' and we use the term 'perspective' to indicate from which stack holder point of view we are looking at the problem complexity.

3. The third workshop was used to take a fresh look at the dimensions in the model and see if they could be condensed. This resulted in the current dimensions. The workshop days were also used to relate the parameters of the model. We used a cross-consistency matrix⁶ to determine the dependencies between the model parameters.

The purpose of this of this methodology is not to produce a complete and exhaustive morphological model but to identify the relevant dimensions. The reason for using the CCM is because it is a way to check whether or not the set of dimensions is (over) complete, well defined, generally phrased etc. If the model does not work on this level one needs to go back to the level of the dimensions and make adjustments based on the new insights.

Perspective-based knowledge acquisition

The elaboration of each of the perspectives comprises among other things the determination of the relevant and essential questions for that perspective by means of scientific concepts and related measurable factors. The realization of the perspectives is important to finally develop and test methods/ instruments to support integrated intelligence, planning, and monitoring processes.

Each perspective can generically be regarded as shown in Figure 2. In case of ‘influencing’ the desired effects can be formulated as stimulating, or inhibiting (/preventing) of certain (classes of) behavior of certain targets (individuals, communities, clans, etc.). Certain scientific concepts (from one discipline) coincide with these behaviors. Moreover, these concepts may have a qualitative/quantitative basis defined by indicators. These indicators can be used to monitor or measure the current state of affairs in relation to the effects wanted. Measured over time, indicators provide insight into the progression or the deterioration of the effects.

⁶ In a cross consistency matrix (CCM) the relation between the parameters within a dimension are set. As mentioned earlier, it takes more than one dimension in order to get things done and to achieve effects in complex social systems. Therefore, one needs knowledge and insight in the relations between the dimensions, e.g. between the different parameters in the model. It means that when you want to achieve an effect, conditions that are decisive are linked as a group.

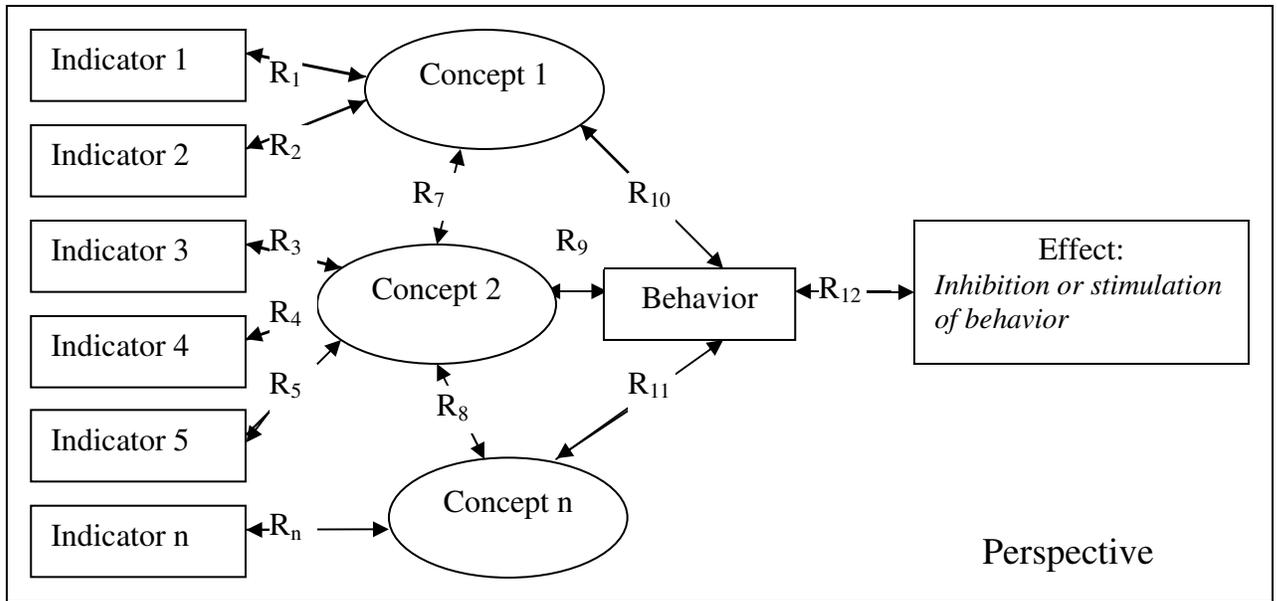


Figure 2. Generic overview of a perspective

One may view the perspective as generic influence-diagram. Each perspective differs in described concepts, their interdependencies, and their indicators, but there is partially overlap. Moreover, the formulated (un)desired behaviors enforce further integration because each perspective may or may not have pointers, which are (groups of) concepts related to those behaviors.

The perspectives serve as a generic knowledge-base, and will unfold into a far more detailed and referenced digital knowledge base when put in a mission context. This means that the generic knowledge base will provide generic factors and principles, whereas a use case e.g. Sudan will provide application of these principles regarding the Sudanese environment. For example, the principle of social proof and the principle of individualist and collectivist cultures are described and linked in the generic knowledge base, and the specific cultural aspects and how they relate to applying this social proof principle should be determined for the Sudanese context. The same holds for the description of the identified (un)desired behaviors.

For each of the selected perspectives from the morphological analysis a group of experts related to this perspective (two to three experts) was asked to gather content for the tool. In order to have a certain degree of consistency in the gathering of content the use of a template was encouraged. The used template was a result of 1) letting each expert group elaborate on several given concepts, of which it was already know they would be important to use (i.e. corruption, crime, misbehavior, intimidation, and discrimination), and 2) afterwards selecting which template was thought to be most suiting for all groups. There were many different possible templates and the selection therefore needed to be done by both a theoretical expert and a field expert. Finally it was discussed with all expert groups until there was an agreement.

The gathered content eventually became a set of instantiations of the selected template. Though there was a possibility that each instantiation possibly overlapped with those of other expert groups, each group was asked to generate content individually. Also they were asked to remain conscience of the fact that eventually military personnel is required to understand at a glance what has been written down. Eventually all instantiations were integrated into non-redundant content. This integrative approach and the focus on eventually supporting military personnel in the field makes this content different from what one can find in regular books or on the internet.

Implementation and representation

As has been described in the previous sections the fundamental hypothesis to be tested is whether it is possible to build a system that provides dedicated information on the basis of different perspectives of the situation (i.e., the selected perspectives) which is expected to support the TFC and his staff considerably in making decisions regarding CoA. In order to test this hypothesis and for demonstration purposes, a tool, named Awareness Development across Perspectives Tool (ADAPT), has been implemented. The architecture of this tool is depicted in Figure 3. ADAPT contains two components: A dedicated *Semantic wiki* website and navigation tool *COOL*, which are described below.

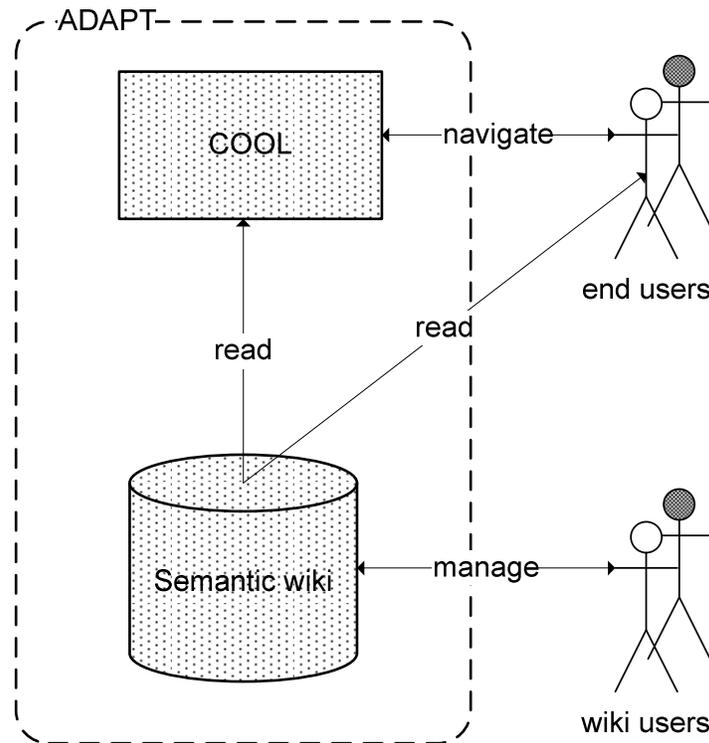


Figure 3. Architecture of ADAPT

Semantic wiki

The first component in Figure 3 is called “Semantic wiki”. Conventional wikis⁷ are web applications whose content is collaboratively added, updated, and organized by its users. Wikis are content management systems where content is editable through a web page interface. The difference with other content management systems is that it is the users that can create the content, define the relationships, and establish the links between web pages. A well-known wiki is Wikipedia.org. Wikis are especially useful for creating knowledge management portals [11]. A team of *wiki users* can maintain a wiki that includes the management of ongoing content supply and user rights. In the case of the tool ADAPT, a wiki is used for properly storing all generated content by the expert groups. The experts themselves delivered their content through the wiki web-interface.

What makes the used wiki *semantic* is that it also stores information about the semantics of the content in the wiki. A semantic wiki⁸ is a wiki that has an underlying model of the knowledge described in its pages. Regular, or syntactic, wikis have structured text and untyped hyperlinks. With semantic wikis, on the other hand, one can capture or identify information about the data within pages and the relationships between pages. The following semantic information is stored in the semantic wiki:

- **Perspectives:** For each concept it is indicated whether it has any meaning given a certain perspective. The result is a subset of perspectives for each concept (= wiki page).
- **Behaviors:** For each concept it is indicated whether it is a behavior or a regular concept.
- **Links:** One can derive from the presence of semantic links that two concepts are related to each other in the following manner in running text (in case of the concept “Germany”):
... the capital city is [[has capital::Berlin]] ...
This means that the concept “Germany” and “Berlin” are related to each with respect to Berlin being the capital of Germany.

The addition of the above semantic information for each concept in the semantic wiki has the advantage that the wiki is more easily, and more informed, searchable, in the same way as one can query a database. This meets an important requirement for ADAPT: it should be easily accessible and searchable by people who are not interested in a full overview of the available knowledge on a given subject.

⁷ Wikipedia, online: <http://en.wikipedia.org/wiki/Wiki>

⁸ Semantic wiki, online: http://en.wikipedia.org/wiki/Semantic_wiki

COOL

The second component in Figure 3 is called “COOL”. This is an abbreviation for “*CO*ncept *toOL*”, a tool that assists the *end users* (i.e., the TFC and his staff) in their navigation through the semantic wiki. Because wikis are primarily used by academics as informal learning tools or large less dedicated knowledge bases [1], it is not expected to be a useful system by its own to assist the military end users.

Because of this it was decided to build this additional navigation tool around the semantic wiki. As you can see in Figure 3, COOL can read information from the semantic wiki. This information comprises semantic information and information based on the structure of the content in the wiki. Based on this information, COOL is expected to have the following roles:

- **Interface:** It assists end users without requiring them to have knowledge about the structure or content of the wiki. It behaves as a shell on top of the wiki, without showing the complex structures beneath. How exactly the two layers communicate with each other is not relevant for the end users.
- **Portal:** The wiki content is easily accessible through an intuitive interactive interface using mindmap visualization techniques.
- **Filter:** End users are led to the relevant content without having to read unnecessary text to get there.
- **Automation:** It can be seen as a system which automates part of the navigation for the end user.
- **Overview generator:** It is a dedicated tool and therefore supports in making clear what the relevant concepts are.
- **Problem-based searcher:** One can navigate based on a given perspective and intended influence of behavior.
- **Addition:** The end user can still use the regular navigation tools for the wiki. It is expected to be a more user-friendly alternative for regular wiki navigation which is available at all time in a tab within the wiki.

One can navigate using COOL using an interaction panel, which serves as a means for the end users to indicate their preferences concerning navigating through the wiki, and a mindmap⁹ which is an interactive tree of clickable nodes (concepts) and labeled edges (links between concepts). The panel contains the following items:

- **Concept:** The end users can indicate whether they want an overview of the concepts related to a particular indicated concept. When this is done the regular wiki will adapt to this by switching to this concept as well. COOL will look up the concept and show all related concepts (also dependent of other settings), including all labels on the edges of the generated mindmap. When this item is

⁹ Wiki-Mindmap, online: <http://www.wikimindmap.org>

empty, an overview will be given of all behaviors (provided “behaviors” is switched on). This item is default empty.

- **Depth:** The end user can indicate whether they want a large mindmap (higher natural number or empty (= ∞ , and will show the largest possible mindmap)) or smaller mindmap (lower number with 0 lowest). This item is set default on 1. The depth is calculated by the largest number of edges (regardless their direction and without cycles) from the concept indicated at “Concept” to any other concept in the generated mindmap.
- **Behaviors:** Only show behaviors (e.g. corruption, crime, discrimination, intimidation). If for the item “Concept” a concept is given that is not a behavior and “behaviors” is switched on, the generated mindmap will be empty.
- **Perspectives:** All selected perspectives are mentioned here and can be switched on or off. Switching a perspective on means that end users want to use this perspective. If all perspectives are switched on, the largest mindmap possible will be shown (also dependent on other settings).
- **Search:** Button to generate a new mindmap. Each new alteration on the panel requires a click on this button.
- **Results:** Shows the mindmap once the “search” button or a node on the mindmap is clicked. Clicking on a node on the mindmap is similar to an indication at “Concept” that one wants an overview of this concept. So in that case it is not needed to click on the “search” button.

RESULTS

Perspective identification and selection

The results regarding the determination of relevant perspectives are visualized in Figure 4. At the first workshop, 31 aspects were defined (Figure 4a) and these were clustered into 9 dimensions on TF level (Figure 4b).

Culture	Education	International framework	Politics	Juridical
History	Demography	Basic social services	Economics	Sociology
Military	Geography	Opposing forces resilience	Safety	Rules of the game
Loyalty	Infrastructure	Governmental	Medical aspects	Technology
Religion	Social economics	Media/ communication	Humanitarian	Financial
Geopolitics	Agriculture	Morality/ ethics		

(a)

Anthropological “norms and values”	Financial	Judicial	Governmental	Non-military threats
Communication	Security	Economics	Politics	

(b)

Cultural – Religious	Information & Communication	Martial	Political – Governmental	Socio-Economic
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(c)

Figure 4. 4a: initial 31 aspects defined by brainstorm and discussions; 4b: 9 clustered dimensions on TF level; 4c: final 5 perspectives.

Filling in the cross-consistency matrix did not result in reducing the problem space; however it did support organizing the parameters. While going through the cross-consistency more relationships became clear and apparent. These parameters and relationships served as input for the perspectives themselves.

In a final phase, the nine identified dimensions were formed into 5 perspectives:

- Cultural-Religious
- Information & Communication
- Martial
- Political-Governmental
- Socio-Economic

These 5 perspectives served as basis for the further creation of a set of instruments which support task force commanders in multidisciplinary thinking. This meant that 6 project teams were formed: one project team to create the content for each defined perspective, and one overall project team to integrate and visualize all perspectives, in a structured and consistent way.

Perspective-based knowledge acquisition

The result of the template selection procedure is shown in Table 1. This template is used throughout the semantic wiki. Though, not all header names are appropriate or useful in the description of each concept. Nevertheless, the template enhances structure and (comfortable) reading.

Table 1. The template used for the acquisition of perspective-based knowledge.

Header name	Description
Name	The name of the concept (either an indicator, regular concept or a to be influenced behavior)
Definition	What is this concept?
Description	Context (where), typologies (what), manifestations and examples (how)
Actors (who)	Who are involved?
Causes/reasons (why)	Why is it happening?
Perspective pointers	Relevant questions to ask oneself, possibly for each perspective, tips and tricks, do's and don'ts, etc.
References	Further reading, mostly external sources

Implementation and representation

The tool ADAPT was implemented as an instantiation of the architecture and requirements described in the method-section. Mediawiki was chosen as a basis for the implementation of the wiki, because it is the most used wiki around and has many extensions that can be used. See Figure 5 for example a snapshot of the wiki tab of ADAPT. As can be seen, the selected template was used to describe the concept of “Intimidation”. The end user can navigate to this page both in a regular way, i.e. by using “search” or by clicking on the link “intimidation” on other pages, as well as through the use of COOL (Figure 6).

The screenshot shows the ADAPT interface for the 'Intimidation' page. At the top left is a circular logo with letters A, D, T, A, P. The top navigation bar includes 'page', 'discussion', 'view source', and 'history' tabs, along with a 'Log in' button. The left sidebar contains a 'navigation' menu with links like 'Main Page', 'Community portal', and 'Current events'; a 'search' box with 'Go' and 'Search' buttons; and a 'toolbox' with links like 'What links here' and 'Related changes'. The main content area has a 'Contents [hide]' section listing 18 items under two main categories: '1 Intimidation' and '2 MAP'. Below this is a tabbed interface with 'Intimidation' and 'MAP' tabs. The 'Intimidation' tab is active, showing a definition: 'Intimidation means to frighten into submission (1).'. It then has a 'Description' section with three paragraphs and a bulleted list of techniques, such as 'Threatening by spreading rumors (e.g., Someone who warns another person not to take the train tomorrow "because he has heard something").'.

Figure 5. Interface of ADAPT, with a view of the description of the concept “Intimidation”.

See Figure 6 for the interface of a first implementation of the COOL tab of ADAPT. In this (simplified) example you can see that from the five possible perspectives (i.e. Social Economics, Information and Communication, Culture and Religion, Politics and Government, and Martial), Social Economics has been switched on. This means that only those concepts related to the Social Economics perspective are included in the mindmap which is shown below “results”. Also “Corruption” is indicated next to the “Concept” item, which results in an overview of the concepts related to “Corruption” in the mindmap and that “Corruption” also can be viewed through the regular wiki tab of ADAPT. Furthermore, the depth of three is used which results in a maximum number of edges from “Corruption”.



Concept: Depth:

- Social Economic
 Information & Communication
 Behavior
 Cultural Religious
 Political Governmental
 Martial
-

Results

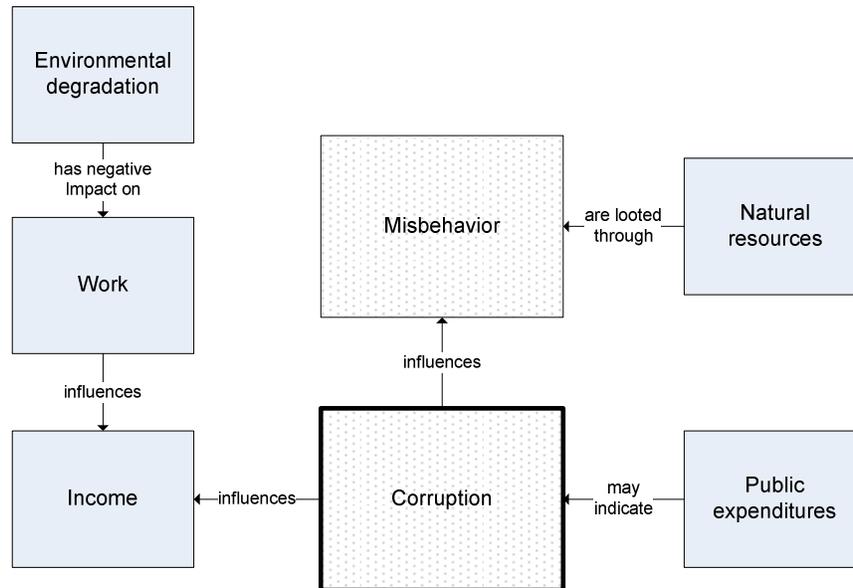


Figure 6. First implementation of interface of COOL (partly based on Wiki-Mindmap).

CONCLUSION/ DISCUSSION

Current (influence) operations are focused on affecting the perceptions and behaviors of leaders, groups, or entire populations. Nevertheless, the current ways of supporting a TFC and his staff in dealing with the soft (non-kinetic) aspects of affecting perceptions and behaviors in these operations are not sufficient. In this preliminary study, an approach to integrate various perspectives into a mission is described. This approach focuses on the development of a set of instruments to support task force commanders (TFCs) in multidisciplinary thinking.

In this paper, we have shown that we can build an easily accessible system that provides dedicated information on the basis of different perspectives of the situation. We have described methodologies for defining and selecting perspectives, for knowledge acquisition for each perspective, for linking perspectives together, and for ways of implementing and representing the perspectives. By using these (mutual connected) perspectives, it is expected that the TFC and his staff gain support in dealing with the soft (non-kinetic) aspects of affecting perceptions and behaviors in current operations. First, the perspectives support intelligence by providing a set of indicators, in checklist format,

of what a TFC and his staff need to map. Second, all (connected) perspectives support planning by providing insight into intended and unintended effects of certain CoAs. And third, the perspectives support evaluation by disseminating lessons learned about the environment, the (un)intended effects, and the CoA. Lessons learned can be incorporated as (re)new(ed) insights into the perspectives for new rotations.

In an iterative process, the content of the perspectives will be extended in close cooperation with military officers. At the moment, the knowledge, principles, and relations covered by ADAPT are rather generic. By tailoring ADAPT to certain context specific scenarios, and using these scenarios as input for military training, its usability will be tested and evaluated. The first test during a military exercise is planned in October 2010. In future, not only military personnel should be able to use the perspectives. The perspectives may provide value insights to NGOs or other (civil) organizations as well. First, these organizations have to deal with shaping and affecting perceptions and behaviors as well. Second, these organizations often work in close contact with the military. Nevertheless, communication and cooperation often proceed rather rigid. The multiple perspectives may serve as the missing link to improve this relationship.

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