

Problem Structuring Methods

Problem Structuring Methods for Policy Analysis in Multi-Actor Systems

Course Information and Assignments

Open Courseware version, January 2014

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Note: This Study Guide is intended for use by Open Course Ware students. TU Delft students following the regular course “spm2110 Analyse van Complexe Omgevingen” or “tb211 Analyse van Multi-Actor Systemen”, should NOT use this Study guide, but should use the “Studiehandleiding” that that is available at the Blackboard site for TU Delft students.

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General information about the course

Course learning objectives

This course teaches students to conduct a systematic exploratory analysis for complex policy problems in a multi-actor environment. The goal of such an exploratory analysis is to develop a better understanding of the various dimensions involved in a complex problem, based on which an agenda for meaningful further in-depth analysis activities can be developed.

The course consists of a part containing methods and applications, and a part containing theory to provide insight into the capabilities and limitations of policy analyses within a multi-actor process.

Upon successful completion of the course, the student is able to structure complex policy problems and set up an agenda for meaningful subsequent analysis. More specifically, a student who has completed the module is now able to:

1. Write an issue paper containing the results of a broad exploratory problem analysis, resulting in a proposition for meaningful subsequent policy research;
2. Apply three types of methods for rational-analytical problem exploration to an existing problem at the interface of technology, society and public policy, in a meaningful and coherent fashion:
 - a. System analysis, including an initial problem demarcation
 - b. Actor analysis
 - c. Future exploration
3. Set up an agenda for meaningful subsequent research activities that help to inform policy decisions, based on previous problem exploration, using quantitative methods for systems engineering and policy analysis that are taught in other modules of the curriculum;
4. Reflect on the possible roles of a policy analyst and argue which role(s) a policy analyst can meaningfully fulfill in certain situations, in support of an existing problem owner facing a complex policy problem.

Methods and examination

This course consists of a theoretical component as well as an applied component focused on the use of methods for conceptual analysis. The focus is on the latter. The applied part consists of executing several analyses of a complex problem, in which the multi-actor complexity plays a particularly important part. The theory-component is made up of theories that reflect on the use of policy analysis in policy processes, along with more in-depth and broadening material regarding the specific methods and techniques of analyses.

Method: Self-study and Assignments

This course uses online tutorials to complement literature. These tutorials function as a replacement of regular lectures. Use of the online content is coupled to assignments that provide the building blocks needed for writing an issue paper (IP). Roughly speaking, one assignment is coupled to each tutorial. Students can check their understanding of a tutorial, by taking a short 'self-test', consisting

of a limited number of multiple-choice questions. To test the understanding of the complete set of course materials, an exam is available online, together with an elaboration of the answers.

Course Materials

A decent understanding of the course requires the following supplies:

1. **Course website:** The course website “Multi-Actor Systems: Problem Structuring Methods” contains all important content: instruction videos, hand-outs, articles, and references to further information.
2. **Course book:** Bert Enserink, Leon Hermans, Jan Kwakkel, Wil Thissen, Joop Koppenjan, Pieter Bots (2010) Policy Analysis of Multi-Actor Systems. Publisher: Lemma/Boom, The Hague. ISBN 978-90-5931-538-9 (175 pp.0)
3. **Selected additional readings:** Suggestions are made in Course book and in dedicated sections of the tutorials on the Course website. These readings may be helpful to interested Open Course Ware students.

Workload

This course represents the equivalent of 5 European Credits, which represents a study load of roughly 140 hours. Regular students take this course over a ten-week period, which means an average study load of 14 hours a week.

Examination

The course is graded using two methods: issue paper and written exam. Both account for 50% of the final grade. Note that Open Course Ware participants will not be graded for their efforts.

Similar TU Delft Online Courses

This course focuses on problem structuring for policy analysis in multi-actor systems. It is taught as part of the BSc programme “Technische Bestuurskunde” (Systems Engineering, Policy Analysis and Management) at TU Delft. The MSc programme Engineering and Policy Analysis (EPA) contains two course that are closely related and partially overlapping.

The course “Principle in Policy Analysis” discusses basic techniques for the analysis of complex problems, including the use of system diagrams and contextual scenarios. It cover the entire cycle of problem solving. Our course on “Problem Structuring Methods” focuses exclusively on the problem formulation stage, placing more emphasis on working in an ill-structured environment and putting the multi-actor complexity fully into the mix. As such, it is an addition and enrichment to the course “Principles of Policy Analysis”.

The MSc EPA course “Policy Analysis of Multi-Actor Systems” is similar to this on problem structuring methods, and uses the same course book. However, this “Problem Structuring Methods” course is predominantly a hands-on course that explains the use of problem structuring techniques and the preparation of a full issue-paper. The MSc course covers these methods in a much faster pace, and accordingly with somewhat less detail, and does not require the preparation of a full issue paper. The MSc course adds more on the use of policy analysis in decision-making, the role of knowledge and knowledge-brokers, and the psychological and institutional factors in communication and policy making.

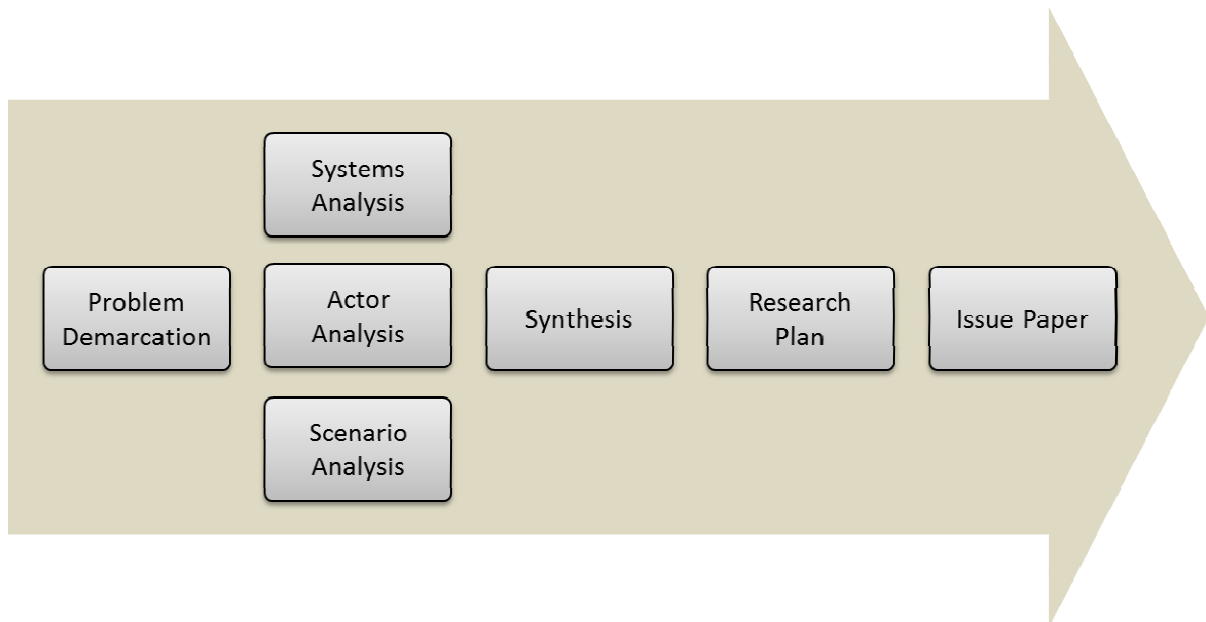
Introduction to course assignments

Introduction to the assignments

A crucial part of this course is writing an issue paper. The issue paper emphasizes problem exploration, resulting in a proposal for (quantitative) subsequent research. The issue paper is written for a predefined topic. Open Course Ware students are free to choose their own topic, or they can select one of the topics used in the examples on the website or in the course book. In past years for example, topics included Transit-Oriented Development, smart grids, greening infrastructure development, offshore wind energy, coastal zone management, biofuels and air quality.

Students are (in pairs) tasked with analyzing the situation *from the perspective of a client of their own choice*, coming up with a useful problem formulation, and stating how the planned research could contribute to clarifying and (partially) solving the problem situation. The resulting issue paper, treated as if it were written for (one of) the involved actor(s), contains the specifications and results of the problem analysis and a proposition for further research to benefit the client.

The book *Policy Analysis of Multi-Actor Systems* and the website *Problem Structuring Methods for Policy Analysis* present the steps and methods that are used to perform a problem exploration, develop a research plan and writing an issue paper. The figure below is taken from the book and depicts the steps to be taken. The assignments leading up to the issue paper are based on these steps. The following pages explain the assignments.



Suggested schedule

A suggested schedule, covering one tutorial per week, is shown below. It is based on a ten week period, spending roughly 14 hours each week.

1. Introduction.
 - a. Familiarize yourself with the course, read Chapters 1 & 2 of the course book, decide about a topic for your issue paper. Review an issue paper
 - b. Problem demarcation (for the topic of your choice)
2. Systems Analysis
3. Actor Analysis
4. Exploring the future / Scenario analysis
5. Synthesis and Storyline
6. Research Plan
7. Prepare first full draft issue paper
8. Roles of policy analysis (Theory & reflection)
9. Completion of issue paper
10. Exam

Assignment 0: Reviewing an issue paper

An issue paper is an important tool for a policy analyst. An issue paper reports the results of the first exploring problem analysis, in preparation of further policy analyses. Examples of common variations of the issue paper are offers for policy studies and strategic advice, substantiation for offer-requests, but also 'policy explorations', 'position papers' and similar texts.

This course teaches you to set up an issue paper, using specific methods of (qualitative) policy analysis. Each week of the course is often dedicated to a part of the analysis, based on a certain method. When performing these partial analyses, it helps to keep your eye on the final goal: a comprehensive and convincing issue paper. Therefore, it is useful to start the module by briefly focusing on this goal. This is the reason that the first assignment consists of reviewing an existing issue paper.

Resources:

- Course book: Chapters 1 and 8
- Website: Tutorial Synthesis & Storyline for an Issue paper: Issue paper Review form and Issue paper for review (topic: Waste management in the Netherlands)

Method:

1. Get into character as the problem owner in the issue paper. Read the main text of the issue paper in its entirety. Hereafter, also read the appendices.
2. Use the 'Review form issue papers' (found on the Course website) to judge the three main elements of the issue paper:
 - a. Does the introduction match the problem that you, being the problem owner, experience?
 - b. Is the subsequent problem analysis convincing and sufficiently extensive? Does the analysis add any knowledge beyond that which may be assumed known in advance?
 - c. Does the proposed further research seem useful and achievable?
3. Use the judgment of these three main elements to support your final judgment: do you, being the problem owner, find this issue paper convincing and useful? Would you be willing to spend money on the proposed research, to be executed by the writer(s) of the issue paper?
4. Based on your review, give at least three concrete suggestions to improve the issue paper.

Product:

A completed review, following the format of the 'review form'. Maximum of two A4's.

Assignment 1: Problem demarcation

The first Assignment follows Step 1 of the problem exploration in the course book. This is discussed on the course website in the tutorial “Problem Demarcation”. Decide on your client for the issue paper and look into the problems this actor experiences. For this, we use a means-ends diagram.

Resources:

- Course Website: Tutorial “Problem Demarcation” (clips & additional resources)
- Course book: Chapters 1, 2, 3, most importantly §3.3.1 – §3.3.2

Method:

1. Spend *at least* four hours on during the first days to study case materials on the topic for the issue paper. Insufficient preparatory reading about the case for the issue paper will inadvertently lead to an insufficiently detailed problem definition. This results in an unstable base for further work, which will lead to delays or worse. Look for information on the internet and in libraries.
2. Decide on a problem owner/client. Use the case information to make a short list of actors that seem to be most involved. Select a client that appeals to you and that seems to face one or more difficult choices in addressing the problem.
3. Construct a means-ends diagram. Perform this step from the perspective of the client of your choice, initially disregarding the objectives of the other actors.
4. Based on a possible focal objective in the means-ends diagram, formulate a first problem statement. What situation is desired by the problem owner, what lies between that desired situation and the current (or future) situation, what means can be used to bridge this gap, what are the unwanted side effects of these means, and what is therefore the dilemma? In other words: problem = gap + dilemma. “How to reach X, without Y or Z?”.
5. Now formulate *at least* two other problem statements. For example (this is only a suggestion!) one that is derived from a lower level objective in the means-ends diagram (more in the direction of a certain means) and one on a higher level (focused more on the fundamental objectives of the problem owner). Finally, make a choice of the problem statement that you prefer and support it with arguments. Keep in mind: you are working in the interest of your client (problem owner). Look for the problem statement that matches best with the interests of the client.
6. Use the means-ends diagram to set up a first outline of a short sketch of the problem for the client. This text (1-1,5 page) will be the base of the Introduction of your issue paper. Pay attention to the following elements: who is the problem owner, what is the context in which they have to work, what is the problem (“gap”), what are the possible causes and effects of this problem situation, what is the intervention perspective of the problem owner and what is the dilemma (what makes the choice difficult)?

Product:

A Word document or PDF file, containing the following:

- A first outline of the problem: written text of 1-1,5 pages that can serve as the base of the Introduction to the future issue paper.
- A means-ends diagram with a short explanation of maximum 1 page of A4 (500 words)
- Overview of the case study literature that was used to develop the problem statement

Assignment 2: System analysis incl. score-card

A preliminary outline of the problem is now in place, supported by a means-ends diagram. The next step is to map out the most important aspects of the problem in a structured manner through a complete system diagram, and to discuss the meaning of this system diagram for your client.

Resources:

- Course Website: Tutorials “Systems Analysis” (first part, mono-actor) and “Problem Demarcation” (second part, dealing with the setting up and use of an objectives tree)
- Course book: Chapter 3, especially §3.3
- If available: materials from the TU Delft Course “Principles of Policy Analysis”

Method:

1. Follow the steps from §3.3 of the course book by Enserink et al. Pay special attention during the setup of the objectives tree; carefully read paragraph §3.3.2 of the course book and review the clips about Problem Demarcation in detail!
2. Set up an objectives tree and carefully reflect on the objectives as you formulate them for your client: What does it mean to want to achieve objective *X*? How can one measure the realization of this objective? Deduce clear and measurable criteria from the objectives tree.
3. Now construct, starting from the operational objectives from the objectives tree, a causal relation diagram. Distinguish the objectives, means, (external) context factors and system factors. Pay close attention to substantiating the assumed causal relations. Ideally, every relation is substantiated by a reliable source! Use the literature to also estimate the importance and order of magnitude of certain relations and parts of the system.
4. Show your findings in a system diagram and justify the demarcation you made: what do you take into account and what not (anymore) and why is that better? (Note the iteration with your initial Problem Demarcation and means-ends diagram.)
5. Check for consistency between the different diagrams and for their usefulness against the initial problem formulation. Amongst other things, check if and how the dilemma in the initial problem statement is represented in the constructed system diagram. A qualitative score-card will help (see p.75 of the course book). Revise or sharpen your problem statement in necessary.
6. Interpret the results: what does this mean for your problem owner?

Product:

A Word document or PDF file, containing your name(s), the problem owner of your choice and the initial problem statement from the last assignment (may be improved). Contents:

1. Partial analyses, readable on an A4 or Letter sized paper in black and white, with a short explanation and substantiation for each diagram (max 1 page or 500 words per diagram/table):
 - a. Objectives tree with explanation and substantiation
 - b. System diagram (including the causal relations) with explanation and substantiation

- c. Score Card (qualitatively filled out using the system diagram) with explanation and substantiation
2. A short text with interpretation and conclusions for your problem owner (“so what?”). Minimum of half and maximum of a full sheet of A-4 (250 – 500 words)

These diagrams and the accompanying texts are the base for the annexes of the eventual issue paper. The main text of the issue paper cannot be written yet in this stadium, not even as a rough draft. This is only possible once the picture is more complete; which requires a better overview and insight, based on the next two assignments. The interpretation and conclusions do provide input for these assignments and for the synthesis and for the storyline to be constructed later on.

Assignment 3: Actor analysis

At this point it is clear that your client is not the only actor who influences the problem and its solutions. In order to gain more insight into the role and positions of the other actors, an actor analysis is carried out.

Resources:

- Course Website: Tutorial “Actor Analysis” (all clips), Tutorial “Systems Analysis” (second part , on the multi-actor situation)
- Course book: Chapter 4, especially §4.3 and §4.4
- Optional: John Bryson, 2004, ‘What to do when stakeholders matter’, *Public Mngt Review* 6(1): 21 – 53

Method

1. Follow the steps from §4.4 of the course book. Start from your problem statement.
2. Identify and characterize the actors that are relevant to your problem statement and the system as described in your system diagram.
3. Make a formal chart to depict the formal relations between the actors.
4. Describe the problem perceptions of these actors and list their resources.
5. Determine which actors are “critical” for the problem owner, which of the actors will be “dedicated”, and whether each actor is expected to either support or oppose the problem owner. Summarize this using the “overview table for classification of interdependencies” (Table 4.6 of the course book).
6. Connect the actor analysis to the other analyses. Use the information on the “multi-actor perspective” part of the Tutorial “Systems Analysis”. The insights gained from this actor analysis can be a reason to change your problem statement, demarcation and system analysis. The critical actors should be considered in your analysis. In particular: which new criteria and factors should be taken into consideration now that it is clear that your problem owner should take these actors into account? And does this lead to new relevant context factors, or to new means? Specify these changes in terms of adaptations to your system diagram. Add means of other actors to the system diagram, indicating the controlling actors where these are different from your client. Possibly, some of the initial context factors may need to be changed in ‘means’; Not means for your client, but means controlled by other actors active on the chosen level of analysis.
7. Interpret the results for your client: “so what?”. Can you think of any possible coalitions? How can you activate potential supporters? Can opponents be neutralized, or is there an option for compensation or mitigation? Does the current legislation leave room for certain strategies? Conclusions are not limited to “process recommendations” but also to the identification of knowledge gaps.

Product:

A Word document or PDF file, bearing your own name(s), the client you selected and the initial problem statement of the previous assignment (may be improved). Contents:

1. **Tables and diagrams** to support the steps in the actor analysis:
 - a. Formal chart (textbox 4.4 course book)
 - b. Table showing the problem perceptions of the different actors (Table 4.3 course book)
 - c. Table listing the resources of each actor and the importance + (ir)replaceability of these resources (Table 4.5 course book)
 - d. Summary table of actors – critical/dedicated/supportive or no? (Table 4.6 course book)
 - e. Short explanation and substantiation of previous steps, totaling to no more than 1 page (500 words)
 - f. List of favorite “search terms” for finding information on the actors and their problem perceptions, resources, formal powers etcetera.
2. A short text with **interpretation and conclusions** for your problem owner (“so what?”). Between a half and whole page (250 – 500 words)

Just like the previous assignment, this forms the base for the (mandatory) annexes of the final issue paper. Make sure that the accompanying text for the different tables and diagrams always pays explicit attention to substantiation and references to sources, but also the implications. What does this mean for your problem owner?

The interpretation provides direct input for the synthesis and for the storyline that is to be constructed later on. This is likely to be primarily based on the final table/grid (Table 4.6 and/or Figure 4.1 of the course book)

Assignment 4: Scenario Analysis

The world keeps changing. This means that the environment of a system is dynamic. This affects the behavior of the system: problems can disappear but new, sometimes unexpected, problems can also emerge. Dynamics in the environment of the system can influence its behavior in several different ways. Deployment of resources has a different consequence, actors value the consequences differently than at first, different means become available, etcetera. Conclusions based on a system analysis can therefore become obsolete very fast if you do not take into account the future, or the ways that the system context can change.

How to handle these time-dependent dynamics in your issue paper? Explore the future of the system context, of the environment of the system that you demarcated for your problem. Use the problem statement, system diagram and actor analysis that you set up earlier as a starting point. Use the methods from Chapter 5 *Exploring the Future* of the course book. Process the outcome of the scenario analysis into the system diagram and the conclusions that you drew from previous analyses.

Resources:

- Course Website: Tutorial “Exploring the Future”
- Course book: Chapter 5, especially §5.3 and §5.4

Method:

A step-by-step plan for designing context scenario scan be found in Section 5.3 of the course book.

Identifying relevant external factors and ‘driving forces’ (Table 5.2, step 1-3)

The choice of contextual factors shows the relationship between the system and its environment. Contextual factors are also known as context factors or external factors. The environment of the system is almost always dynamic: the contextual factors change over time and this can have consequences for the system itself but also for the actors. If the value of the contextual factor changes (for example, the oil price decreases, growth speed increases, chance of failure decreases) this influences its impact on the system (the value of the internal factors are influenced) and/or on the system outcomes of interest (the values of criteria change).

Use your system diagram to explore the system context.

In **step 1** you define the bounds for you future exploration: What is the problem statement for which the future exploration is carried out?

The goal in **Step 2** is to list the contextual factors that are relevant to the future environment of the system. First inspect the contextual factors of your system diagram critically and from a multi-actor perspective. Are these indeed contextual factors, in other words factors that cannot be influenced by the problem owner? Which factors are themselves subject to change or uncertainty? Which factors are relevant, in other words influence how the uses of certain means lead to outcomes of interest?

Now you expand your list. Discussion and brainstorming are useful techniques for this step. Be sure to discuss the possible consequence of the change of these factors (↓,↑) on the likely effect of means on outcomes of interest.

In **step 3** you research which developments are responsible for the dynamics in the contextual factors. We call these developments driving forces, in other words the developments that change contextual factors.

Driving forces often coincide with trends, crises, and innovations that influence the system. Suppose the oil price is a relevant contextual factor, then political stability in the Middle East could be considered a driving force, because war leads to possible interruption of the oil production and result in scarcity and consequences for the oil price. Prevent the (continued) existence of blind spots in the future exploration. Research (possible) developments in the five STEEP categories: Society, Technology, Economy, Environment, and Politics.

You have completed step 1-3 if you have a list of 10-20 context factors, know their influence on the system (↓,↑) and mentioned the driving forces that determine the value of these factors.

Designing scenario logic (Table 5.2, step 4-5)

In **step 4** you distinguish between the driving forces based on low/high uncertainty and low/high influence on the system. In order to do this, make a table like Table 5.5 from the course book. For **step 5** you select the most important driving forces to make a scenario logic. The driving forces from the quadrant 'high uncertainty/large influence' are used as axes to span the space in which the scenarios will be placed. Name the two extremes of each axis: if "climate change" is a driving force for the increase of power demand due to air-conditioning, then the axis can be delimited by "fast rise in average temperature" and "slow rise in average temperature".

You have completed step 4-5 once you have selected two or three axes and are able to motivate your choice for these specific axes in relation to your problem statement and demarcation.

Work out and apply scenarios (Table 5.2, step 6)

Work out your set up (**step 6**). Pick 3 or 4 interesting scenarios that are typical of the space between the axes and describe their global content. Come up with an appropriate name for each scenario and work out each scenario in a text of maximum 1 page. Use the book or the tutorial example 'Wind at Sea' to gain more insight into the form in which this step has to be worked out.

Once the scenarios have been elaborated, you have to take care that the system diagram is consistent with the choice of scenarios: have all relevant context factors been included in your system diagram? (NB: This step is not mentioned in the book but it is important in order to enable interpretation of the consequences of the future)

You have completed step 6 once you have described and named 3 or 4 scenarios, and have added their content to the system diagram (iteration).

Structuring the consequences of possible futures (Table 5.2, step 7)

What exactly are the implications of the scenarios for your problem and client? You can organize and structure these consequences using a qualitative table of consequences. Now you can draw conclusions!

You are already familiar with the qualitative table of consequences for evaluating the effectiveness of means (Table 3.1 of your course book). Listed below are examples of tables which help to investigate the effect of external factors (EF) and scenarios on achievement of objectives. How does the value of the criteria (C) change due to the developments in the environment of the system (+ or -)? Now you can determine the impact of the individual scenarios on the achievement of objectives. Does this call for investigation? Does this call for additional deployment of resources by the problem owner or other actors?

Table Qualitative consequences of external factors or scenarios

| Criteria→ | C1 | C2 | C3 | C4 |
|-------------------|----|----|-----|----|
| ↓External Factors | | | | |
| EF1 | + | ? | - | |
| EF2 | - | | | ? |
| EF3 | | | +/- | |
| EF4 | | - | | |
| EF5 | + | + | | |

Table Qualitative consequences of scenarios

| Criteria→ | C1 | C2 | C3 | C4 |
|------------|----|-----|----|----|
| ↓Scenarios | | | | |
| Scenario 1 | + | | - | |
| Scenario 2 | + | +/- | - | |
| Scenario 3 | | +/- | | + |

You have completed step 7 once you have indicated and organized the consequences of the different scenarios, and written a short summary on the possible future changes (or futures) that are relevant to the problem. Now you can answer the questions below and process them into your storyline.

Formulation of issues and knowledge gaps related to uncertainty about the future

Complete the assignment by interpreting the results of your future exploration for your client. State whether the problem, as you have stated it up to now, will still be relevant in the future and why this is (not) the case. Are there future-related issues that your client has to take into account? Do these influence the effectiveness of some of the identified means, or their efficiency? Can the future involve a change in objectives or their evaluation? Or can the network of actors change in the future or introduce new means and instruments? Many future developments will be uncertain. Identify knowledge gaps that are connected to this uncertainty and ways to deal with those (e.g.: some may

lend themselves to further research, others may need to be monitored to see how events develop). Choose which results of your exploration are relevant to the storyline of the issue paper.

Step 8 discusses the actual monitoring of the different possible context conditions, but this task is beyond the scope of problem analysis. Sometimes it might be useful to include such activities as part of the research plan.

Product:

A Word document or PDF file, bearing your own name(s), the problem owner you selected and the initial problem statement of the previous assignment (may be improved). Contents:

1. **Tables and diagrams** for each step in scenario analysis, readable on A4-sized paper in black and white:
 - a. Overview of context factors and underlying driving forces
 - b. Classification of driving forces based on influence and uncertainty
 - c. Scenario logic
 - d. Three of four scenario elaborations
 - e. (Updated) system diagram
 - f. Score Card showing consequences of scenarios (qualitative, based on system diagram)
 - g. Short explanation and substantiation of previous steps, in total no more than two pages (1000 words)
2. A short text containing **interpretation and conclusions** for your problem owner ("so what?"). Between a half and whole page of A4 (250 – 500 words)

Just like the previous assignment, this forms the base for the (mandatory) annexes of the final issue paper. The interpretation provides direct input for the synthesis and storyline in the next assignment.

Assignment 5: Synthesis and storyline issue paper

The purpose of writing an issue paper is to formulate the problem of your client (more) accurately and to convince the client/problem owner of the fact that certain (policy) research is necessary to make a good decision. The convincing will only succeed if you write your issue paper as a kind of story about the problem owner, the situation she is in and the choices that she faces. If your client can identify with the main character of the story and the described problems, the conclusion of the story will convince her. And this conclusion should be that performing certain research will produce knowledge that helps your client in making a decision.

In order to clarify the most important insights and the most important message for your client, you will develop a storyline. A storyline is a document of about 2 to 3 pages, in which you display the steps of the argument of your issue paper, in logical order using bullet points. This storyline combines all the relevant insights from your previous analysis activities and results.

Resources:

- Course Website: Tutorials “Synthesis and Storyline” and “Systems Analysis” (multi-actor clips)
- Course book: Chapters 6 , 8 and Appendix

Method:

1. Study the material from the course book and the website mentioned above. (NB: for now you can disregard the part ‘Research plan’ when setting up the storyline)
2. Check all previous analyses, paying special attention to the interpretation: “what does this mean for your client?” What have you learnt since the first assignment? First, a preliminary problem statement was formulated. Thanks to the elaborate problem exploration you have identified the shortcomings of that problem statement, thought about the consequences for the system demarcations, investigated the influence of other actors and mentioned the uncertain developments and knowledge gaps that lead to new problems and questions. Did you make correct assumptions about the problem initially? What are the most important insights from the different parts of the analysis? What main conclusions can be drawn?
3. From this, identify the most important new insights, as well as the major gaps in knowledge: what should the client still get to know in order to be able to come to a well-informed decision with respect to their problem?
4. Put everything away for a day or more and do something else. Next, you write a maximum of three to five sentences about:
 - a. What is the problem (dilemma) that your client faces?
 - b. What is your most important message to your client, based on your analyses?
 - c. Which conclusions and knowledge gaps are a logical result of this?Make sure that the message displays a sense of original yet thorough thinking – it should be clear that your problem exploration resulted in new insights or a valuable new perspective.
5. Elaborate this main line of your argument in a more elaborate storyline. Every ‘bullet’ in the storyline roughly represents a single paragraph in the resulting issue paper.

- a. Ensure that the different steps are connected logically to each other and that the storyline clearly states the lacks in knowledge and supports them with appropriate arguments.
- b. Also ensure that all aspects are covered: (technical) system and the objectives and means of the client, the challenges and opportunities that arise from interdependencies with other actors and important yet uncertain future developments.
- c. Don't forget to refer to relevant case materials and to the appropriate parts of analysis from the annexes to ensure a proper grounding of the different points of the storyline.

Product:

A Word document or PDF file, bearing your name(s), containing:

1. 2 to 3 pages with a storyline in bullet points including references to literature and annexes
2. List of sources (literature and websites)
3. Parts of the analysis as annexes

Based on the storyline you can now set up an appropriate research plan and write a first full draft of your issue paper.

Assignment 6: Research plan

In the research plan you describe the knowledge gaps you identified and, in detail, the research objectives, questions and methods of a proposed follow-up research. Suggestions for form and content of a research plan can be found in Chapter 7 of the Course book.

Resources:

- Course Website: Tutorial “Research plan”
- Course book: Chapter 7

Method:

1. Start from the problem statement and the identified knowledge gaps, based on your storyline.
2. Make a motivated decision for one of the identified knowledge gaps that lends itself well to further research.
3. Formulate a main research question and several sub-questions for researching this knowledge gap.
4. Conceptualize the model behind your research. What are the most important research variables and relations that are needed for answering the research question?
5. Operationalize some of the most important research- or model variables and indicate how you would be able to gather the data needed for analysis.
6. Make a motivated decision for a suitable method for performing this research.
7. Outline the main steps to be taken as part of the research and add a realistic time planning for the execution of the research.

Product:

A short research proposal of maximum 3 pages (1000-1500 words). This is the base for the final part of the resulting issue paper. At least include the initial problem statement, the main research question and sub-questions, the basic model conceptualisation, accompanying research method, and pay attention to data collection and available information sources.

Assignment 7: Draft issue paper and self-review

You are now ready to prepare a first full draft of your issue paper, using your (revised) storyline and research plan.

Minimum demands for a first full draft of your issue paper

- The main text (excluding appendices) is between 4000 and 5000 words
- The main text is a fluent text that is readable, even in absence of all other text
- All main parts are present in the main text: Introduction, Problem analysis, Research plan
- The main text mentions the insights that result from the analyses
- The problem analysis describes system, actors and (future) uncertainties
- Conclusions and lacks of knowledge have been formulated
- There is a research proposal with a clear main question, conceptualization and method
- The issue paper is supported by external sources and literature, including bibliography
- All requested and used models are present as an appendix, complete and with substantiation:
 - Means-ends diagram and objectives tree
 - System diagram(s) (incl. causal relations)
 - Future exploration using context scenarios
 - Actor analysis

Product:

Draft issue paper, fulfilling the demands listed above.

Self Check / Self Review:

You can check your (draft) paper for sufficient quality yourself by filling in a review form, similar to the form used in the very first assignment for reviewing an existing issue paper. This form lists a set of elements that need to be covered in an issue paper and requires you to motivate how your issue paper covers each of these elements. If you are having troubles in the motivation, this signals a necessary improvement of your issue paper. If you have not paid any attention to a certain element yet, you will definitely have to append your issue paper.

Assignment 8: Roles of policy analysis

So far, the assignments have concentrated on the parts needed for a policy analysis issue paper. However, a policy analyst with academic credentials should also be able to reflect on her role in the larger context of policy making processes and institutions. For instance, when you look into it, you will find that there is a significant debate on the role of analysis in decision making, and on the interface between science and policy, especially for the complex multi-actor problems for which one would typically prepare an issue paper.

Study Chapter 2 from the course book, on “Problem Formulation in Complex Environments”. Take a look at the clips and the additional resources suggested in the Tutorial “Roles of policy analysis” on the course website.

Also, if you have not yet read the full chapters covering the various methods in the course book, this would be a good time to study those. For instance, the Chapter on “Exploring the Future” not only explains how to develop and use contextual scenarios, but it covers also other methods that are commonly used by policy analysts to get a grip on uncertain future developments.

Assignment 9: Final issue paper

Improve and complete the full draft of your issue paper into a final version that could be shared with an actual client.

Assignment 10: Final (written) exam

Apart from the issue paper, the mastering of theory and methods of this course is tested using a written exam. This exam consists of a part containing multiple choice questions and a part containing open questions.

The course website contains practice material in preparation of the exam. Try and make the self-test questions and assignments that are available on the course website. When you feel well prepared, also make the full exam posted on the website. Can you complete the exam within three hours?

Solutions to the exam are available in a separate file on the website.