Planning learning and teaching activities

the case of the MSc course ”Solving complex management problems”

Tavella, Elena

Published in:
Improving University Science Teaching and Learning

Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
Tavella, E. (2017). Planning learning and teaching activities: the case of the MSc course ”Solving complex management problems”. In F. V. Christiansen, L. Ulriksen, & I. Prestholm (Eds.), *Improving University Science Teaching and Learning: Pedagogical Projects* (pp. 369-380). Department of Science Education, University of Copenhagen. http://www.ind.ku.dk/publikationer/up_projekter/improving-university-science-teaching-and-learning---pedagogical-projects-2017---volume-9-no.-1-2/

28

Planning learning and teaching activities

– the case of the MSc course "Solving complex management problems"

Elena Tavella

Department of Food and Resource Economics
University of Copenhagen

Introduction

In this paper I describe the development of the MSc course (7,5 ECTS, elective course) "Solving complex management problems" (which I plan to suggest to the Department of Food and Resource Economics as a new course). This course is designed for students interested in implementing strategies to adapt to climate change, as well as enhance food security; efficiently using natural resources while reducing CO_2 emissions; driving processes to support the establishment and development of sustainable, local initiatives (e.g. green communities and food networks); and ensuring that nature and its richness are used in a sustainable balance between ecology, economy and society. In the course I will teach students a range of approaches known as Problem Structuring Methods (PSMs) that were designed to address and make progress with complex and uncertain problem situations that involve multiple (conflicting) stakeholders and issues. Those situations are also called "wicked" because it is often not clear what the problem is and how it can be resolved (Rosenhead and Mingers, 2001; Franco and Montibeller, 2010). Such problem situations typically occur in the practice of natural resource management, climate change, environmental sustainability and sustainable development, for which PSMs can be useful. For instance Hjortsø, 2004 used PSMs to support public participation and decision making in natural resource management; White and Lee, 2009 for developing sustainable cities (Bristol in UK in the specific case) through the formation of a sustainability network for the city and produc-

tion of an outline of a sustainability charter; and Gregory, Atkins, Burdon, and Elliot, 2013 for improving the management of marine biodiversity at a multi-user coastal side in the UK.

Scholars have recently reported their experience with teaching PSMs to students, as well as the challenges they face in teaching PSMs (e.g. Ackerman, 2011; Carreras and Kaur, 2011; Córdoba-Pachón, 2011; Hindle, 2011). In my teaching – I have been teaching PSMs for 5 years in two different courses – I have also experienced those challenges.

In this paper I focus on the challenges of teaching PSMs and describe how I will address them by planning learning and teaching activities in the course "Solving complex management problems". I suggest and plan the implementation of learning and teaching activities by drawing and reflecting on PSM and educational literature, as well as my own experience in teaching PSMs and discussions with my colleagues concerning the planning of the course. Focusing on how to address challenges in teaching PSMs through learning and teaching activities is important in order to: (i) enhance students' motivation to actively engage in the activities; (ii) improve learning outcomes for students; (iii) enhance students' abilities and motivation to apply PSMs in practice (e.g. in their academic and professional careers); and (iv) contribute to supporting and improving teaching practice in the PSM community and other disciplines that use PSMs.

Teaching problem structuring methods

Problem structuring methods (PSMs) have been developed to assist stakeholder groups in addressing 'messy' – complex and uncertain – problem situations through participatory and interactive conversations and building of mostly qualitative models on e.g. flipcharts (modelling; Fig. 28.1) (Rosenhead and Mingers, 2001; Franco and Montibeller, 2010). Conversations and modelling are typically facilitated by an expert, external to the stakeholder group, within workshops (Ackermann, 1996; Huxham & Cropper, 1994). Based on stakeholders' expression of perceptions the facilitator builds models (graphical representations usually on flipcharts) representing the problem situation of common concern. Building models helps stakeholders (i) articulate, structure, define and analyze the problem situation; (ii) better understand and learn from the problem situation; and (iii) make joint decisions and achieve agreements on actions for alleviating the problem situation and making progress (Rosenhead and Mingers, 2001;

Franco and Montibeller, 2010). The family of PSMs includes, for instance, Strategic Options Development and Analysis, Strategic Choice Approach, Soft Systems Methodology and the Viable Systems Model (Rosenhead and Mingers, 2001; Mingers, 2011).

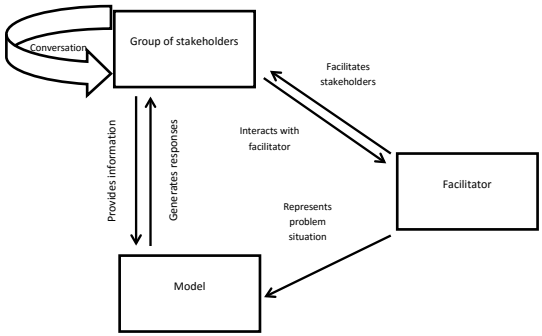

Fig. 28.1: The iterative process of facilitated and model-supported group conversation (adapted from Franco and Montibeller, 2010, p. 495)

Scholars have recently reported and discussed their experience with teaching PSMs to students through the use of modules (including seminars and lectures), case study approaches, laboratory settings and simulations, and group discussions and exercises; literature study, guest speakers, illustrating examples from own and others' experience, reflection, and apprenticeship (e.g. Ackerman, 2011; Carreras and Kaur, 2011; Córdoba-Pachón, 2011; Hindle, 2011). In reporting their experience scholars (e.g. Ackerman, 2011; Carreras and Kaur, 2011; Córdoba-Pachón, 2011) have also highlighted challenges they face in teaching PSMs, such as:

- giving students confidence in not being able to 'solve' the problem and not having the 'right' answer; helping students recognize that for instance helping stakeholders to better understand the problem is also valuable and encouraging students to feel comfortable with the mode of applying PSMs; highlighting the potential of using PSMs for addressing complex and uncertain situations through group dialogue instead of mathematical, optimization techniques;

- teaching methods (e.g. how to build models) as well as facilitation skills (e.g. manage group dynamics, active listening, asking questions) that support students in applying PSMs; teaching facilitation is particularly difficult because much of what a facilitator does while managing workshops is tacit and under articulated, thus difficult to transfer to students;
- teaching theory as well as practice (theory/concepts and methods) covering a broad range of material within the time allocated;
- helping students learn how to deal with complexity rather than reducing it to its elements and trying to address them in turn, and with stakeholders continually changing their understanding of the problem, thereby continuously changing the graphical representation of the problem situation; helping students feel comfortable in dealing with richness and messiness of complex and uncertain problem situations;
- providing students a learning context which resembles the real-management world.

In my teaching – I have been teaching PSMs for 5 years in two different courses (Technology Assessment and Animals and Sustainability; in the form of single lectures) – I have also experienced those challenges. Within "Solving complex management problems" students will learn about PSMs to solve complex and uncertain problem situations – that are related to the practice of natural resource management, climate change, environmental sustainability and sustainable development – through group dialogue, and how to apply those approaches in practice (in a workshop-format with a group of stakeholders).

Learning and teaching activities

In this section I describe learning and teaching activities – that I identified by drawing and reflecting on PSM and educational literature, as well as my own experience in teaching PSMs and discussion with colleagues on planning my course – aimed at improving learning outcomes. I plan to implement those learning and teaching activities in order to anticipate and deal with the aforementioned challenges of teaching PSMs. Different learning and teaching activities that help achieve the intended learning outcomes of "Solving complex management problems" can be suggested, specifically:

Learning and teaching activity	Intended learning outcome
Lectures and reading assignments	List, describe, explain theory, methodology, techniques and approaches
Group discussions	Apply participation and oral communication in practice
Group exercises in class and group project work (to be submitted in a written format by the end of the course)	Collaborate in interdisciplinary teams; analyze and understand complex settings and issues; propose and manage solutions; formulate, plan and implement projects; design, lead and manage group processes to tackle problem situations; discuss and collaborate to reach consensus; identify suitable approaches to address particular problems; and communicate in a written format
Feedback sessions with peers and the teacher on group exercises and project work	Any of the intended learning outcomes above can be addressed depending on the group's specific needs and wishes for feedback

In the following I specifically outline how I plan to carry out feedback sessions and group work. Feedback and group work are particularly important in the context of "Solving complex management problems" because they help students monitor their progress and development as learners and members of a group; identify challenges and possibilities for improvement necessary for learning and successfully completing the course; address the challenges in learning how to use PSMs outlined above; and enhance the chances of producing quality work and perform at the exams.

Feedback sessions

In the course "Solving complex management problems" I plan to organize sessions in which formative feedback is given to students. Formative feedback is particularly useful for enhancing student's learning because it is based on forward-looking reactions to accomplished products and those that still need to be finalized (Rienecker and Bruun, 2015). Below I describe three opportunities (inspired by of Edinburgh, 2010) for using formative feedback, which I plan to implement in my course.

Self-assessment of group work

In my course groups of students design and formulate a project report to be handed in prior to the exams. At the beginning of the project I give students two self-assessment forms – based on the learning outcomes of the course, project requirements and academic practice, which they can use to continuously assess and discuss their own progress within the groups. The forms consider skills to manage the process of group work (A1) and the content and structure of the final project report (A2), thus allowing for the challenges in teaching methods as well as facilitation skills, and theory as well as practice to be addressed. The students are encouraged to use the forms for continuously assessing their own performance and share and discuss it with other members of their groups in order to identify opportunities for adaptation and improvement at individual as well as group levels. While and after assessing progress students are welcome to ask me for feedback on their assessment and progress, which is either given online (in a written format), during face-to-face discussions or through audio-records (that can be replayed by students; students have the opportunity to audio-record my oral feedback e.g. with their mobile phones). The students are given the opportunity to choose a form of feedback and are also encouraged to specify which aspects and parts of the assessment/progress my feedback should address.

Teacher's written feedback on the project report

If specifically asked by the students I also provide written feedback on selected parts of the project report (when other types of feedback are not meeting the intended learning outcomes of specific groups). My written feedback aims at outlining opportunities for improvement by spotting gaps and providing theoretical, methodological and/or practical guidance illustrated with examples from my practical and academic experience. Overall, the suggested improvements prioritize two or three points that the students can feasibly make progress on. When necessary my written feedback also addresses the challenges of teaching PSMs mentioned above.

The groups are in charge of clarifying when such feedback is needed, contacting me and indicating in advance which comments they would find most helpful. Students are encouraged to discuss and reflect on my comments across groups in class time assigned for project work (e.g. what my comments might mean, why they might be important and how they might be acted upon).

Peer-feedback of group work

Peer-feedback of group work comprises a mid-project and an end-project session, within which two groups present and comment on each other's project work. During a one hour session one group presents its work, project status and need for feedback (students are encouraged to specify what they need feedback on) to the peer-group and the teacher, followed by feedback by the peer-group and the teacher (30 min. per group). Feedback may also, depending on the group's need for feedback, be based on the self-assessment forms (A1 and A2). Then the groups switch roles. The feedback sessions are supervised by the teacher. Groups are encouraged to specify which aspects and parts of the work the feedback should address, and to continue the feedback sessions independently either face-to-face or online after the sessions (also after reading each other's work). When necessary and depending on the group requirements the feedback also addresses the challenges of teaching PSMs mentioned above.

Group work

In the course "Solving complex management problems" I plan to combine lectures in which I introduce different PSMs and how they are applied in practice with group exercises in which students apply those PSMs (or parts of them) for addressing assigned problems and delivering specified products. Additionally, groups of students apply PSMs for addressing a complex and uncertain problem situation of their choice (in agreement with the teacher), and write and submit a project report. In planning and carrying out group work I draw on literature describing problem-based and project-organized teaching (e.g. Krogh and Wiberg, 2015), group work (e.g. Christensen, 2015) and teaching PSMs (e.g. Ackerman, 2011).

The learning outcome of group work depends on students' ability to collaborate, which can be enhanced by establishing a collaboration framework in advance, describing how collaboration should take place (Krogh and Wiberg, 2015). In my course a collaboration framework is developed by each group for writing the project report according to the concept of 'student directed' organization. Student groups, thus, set independently their agenda, manage and define their project, and take ownership by defining and processing group issues. Each group is required to send a written collaboration framework to the teacher by mail (by Tuesday of week 5), to which feedback (e.g. on the content of the framework and the process of

the group work) is provided depending on the group's specific need for feedback (Krogh and Wiberg, 2015). The collaboration framework must include the following aspects and deliverables:

Content of the project	one-pager describing the problem situation the group will address based on key-words related to the definition of complex and uncertain problem situations; which approach the group will use for addressing a particular problem situation, why the group has chosen the approach and what is the aim of applying it
Mode of facilitation	facilitation by one or different members in turn; names
Timeframe	literature review, application of PSMs, writing of project report
Tasks and deadlines	who is doing what and by when
Workshop	from week 5 each group is required to independently (outside class hours) apply the chosen approach to address the problem situation within a facilitated workshop, which is audio- and video-recorded. The audio- and video-records will be used for presenting the project work in class including aspects of group facilitation, group dynamics, building and analyzing models, as well as challenges and benefits of using the selected approach

I acknowledge that the suggested learning and teaching activities have not yet been implemented in the course, however I based my argumentations on PSM and educational literature, as well as my own experience in teaching PSMs and discussions with my colleagues concerning the planning of the course.

References

Ackerman, F. (2011). Getting "Messy" with Problems: The Challenges of Teaching "Soft" OR. *Informs Transactions on Education*, *12*(1), 55–64.

Ackermann, F. (1996). Participants' perceptions of the role of facilitators using group decision support systems. *Group Decision and Negotiation Journal*, *5*(1), 93–112.

Carreras, A. L. & Kaur, P. (2011). Teaching Problem Structuring Methods: Improving Understanding Through Meaningful Learning. *Informs Transactions on Education*, *12*(1), 20–30.

Christensen, G. (2015). Group work. In J. D. L. Rienecker P.S. Jorgensen & G. Ingerslev (Eds.), *University teaching and learning* (pp. 189–199). Samfundsliteratur.

Córdoba-Pachón, J. R. (2011). Abstracting and Engaging: Two Modes of Systems Thinking Education. *Informs Transactions on Education*, *12*(1), 43–54.

Franco, L. A. & Montibeller, G. (2010). Facilitated modelling in operational research. *European Journal of Operational Research*, *205*(3), 489–500.

Gregory, A. J., Atkins, J. P., Burdon, D., & Elliot, M. (2013). A problem structuring method for ecosystem-based management: The DPSIR modelling process. *European Journal of Operational Research*, *227*(3), 558–569.

Hindle, G. (2011). Teaching Soft Systems Methodology and a Blueprint for a Module. *Informs Transactions on Education*, *12*, 31–40.

Hjortsø, C. N. (2004). Enhancing public participation in natural resource management using Soft OR – an application of strategic option development and analysis in tactical forest planning. *European Journal of Operational Research*, *152*(3), 667–683.

Huxham, C. & Cropper, S. (1994). From Many to One – and Back. An Exploration of Some Components of Facilitation. *Omega*, *22*(1), 1–11.

Krogh, L. & Wiberg, M. (2015). Problem-based and project-organised teaching. In L. Rienecker, P. S. Jørgensen, J. Dolin, & G. H. Ingerslev (Eds.), *University teaching and learning* (1st ed., pp. 215–227). Samfundslitteratur.

Mingers, J. (2011). Soft OR comes of age – but not everywhere! *Omega*, *39*(6), 729–741.

of Edinburgh, U. (2010). Enhancing feedback: Ideas, strategies and case examples. Accessed: 22-02-2016. Retrieved from http : / / www . enhancingfeedback.ed.ac.uk/staff/resources.html

Rienecker, L. & Bruun, J. (2015). Feedback. In L. Rienecker, P. S. Jørgensen, J. Dolin, & G. H. Ingerslev (Eds.), *University teaching and learning* (1st ed.). Samfundslitteratur.

Rosenhead, J. & Mingers, J. (2001). *Rational analysis for a problematic world revisited. problem structuring methods for complexity, uncertainty and conflict*. John Wiley & Sons Ltd.

White, L. & Lee, G. J. (2009). Operational research and sustainable development: Tackling the social dimension. *European Journal of Operational Research*, *193*(3), 683–692.

A Self-assessment of group work – management of the process

This form is useful for continuously assessing, adapting and improving your own skills and those of the group to manage group processes. Please use this form to assess YOUR OWN, personal performance in managing the process of the group work. You are encouraged to share and discuss your assessment with the other members of your group.

SKILLS	EXCELLENT ATTAINMENT OF CRITERIA	Excellent = 5	V. good = 4	Good = 3	Acceptable = 2	Poor = 1	FAILURE TO ATTAIN CRITERIA
Collaborative, Interactive and Supportive skills	Creates a safe environment; encourages free exchange of ideas; respects others' roles/responsibilities; empathic to other members; listens actively; contributes with own perspectives; excellent at negotiation and conflict resolution.						Very critical of other; makes minimal guarded contributions only; insensitive to others; speaks too much and does not hear others' contributions especially if they conflict; confrontational or denies conflict.
Leadership skills	Excellent contribution to ideas, defining objectives, shaping and planning work; builds and motivates the team.						Makes no significant contribution to ideas, defining objectives, shaping and planning the work; no attempt to encourage others.
Implementation skills	Outstanding ability to put ideas into action; evidence of extensive self-directed learning; can be relied upon to complete and on time.						No significant contribution to implementation of plans; very limited evidence of self-directed learning; work brought back to the group is of poor quality; incomplete or late.
Evaluation skills Adaptability	Demonstrates reflective practice; evaluates progress and results; adapts in light of evaluation or changes circumstances.						Does not evaluate progress or results; finds it difficult to adapt plans even when circumstances alter.

Table 28.1

B Self-assessment of group project report – content and structure

Before you hand in your final project report, please as a group give a rating of how confident you are that you have met each of the criteria: (C = Completely confident; P = Partially confident; N = Not at all confident) and adapt your report accordingly

	C	P	N
Addressed the problem situations throughout the report?	□	□	□
Described problem situation from a holistic perspective?	□	□	□
Clarified need for problem solving and application of PSMs?	□	□	□
Achieved match between problem situation to address and choice and description of PSM(s)?	□	□	□
Choice of PSM(s) justified and explained?	□	□	□
Organized it clearly with structure appropriate to problem situation?	□	□	□
Synthesized a range of material into a coherent whole?	□	□	□
Provided applicable recommendations to client and justified?	□	□	□
Checked for spelling and grammar?	□	□	□
Written in an appropriate academic style (references, citations, structure)?	□	□	□

Table 28.2

UNIVERSITY OF COPENHAGEN
DEPARTMENT OF SCIENCE EDUCATION

This is number one and two in the eighth volume in a series of publications of educational development projects made by participants in the teacher development course for assistant professors and post-docs held by the Department of Science Education, University of Copenhagen.

The aim of the series is to provide insight into the kinds of educational tasks and problems new teachers are facing, and to show how they manage them in inspiring ways.

Improving University Science Teaching and Learning

Pedagogical Projects 2017

Volume 9, Number 1-2

Frederik Voetmann Christiansen
Lars Ulriksen
Idunn Prestholm

University of Copenhagen

Improving University Science Teaching and Learning – Pedagogical Projects 2017, vol. 9, no. 1-2

Improving University Science Teaching and Learning

Pedagogical Projects 2017

Department of Science Education
University of Copenhagen

Published by the Department of Science Education, University of Copenhagen, Denmark

E-version at http://www.ind.ku.dk/publikationer/knud
Printed at www.lulu.com
Typeset in LaTeX

The anthology can be bought through the marketplace at http://www.lulu.com

Improving University Science Teaching and Learning – Pedagogical Projects 2017, vol. 9. ISSN: 1904-2000

Contents