135

A scaffolded group-based Soft Systems Methodology approach for learning and teaching wicked problems

Joy Garfield, Amrik Singh

Aston University, Birmingham, United Kingdom

Research Domains

Learning, teaching and assessment (LTA)

Abstract

As the future leaders of a society that is increasingly complex and challenging it is important that higher education students have a good grasp of social, political, economic and environmental issues and also feel equipped to propose reasonable recommendations. This can seem a daunting prospect for anyone let alone higher education students some of which may have little or no prior experience of working in these areas. This paper discusses the use of the Soft Systems Methodology in a scaffolded, group-based approach to provide postgraduate students with a framework to learn about and engage with complex issues. A case study of techniques used at a UK university are discussed together with examples of complex problems that have been used in the classroom and selected for assessments as a way of illustrating the sorts of problems that students tackle.

Full paper

Soft Systems Methodology (SSM) (Checkland, 1986) has been successfully used in many different contexts for complex problem-solving (e.g. Aryee and Hansen, 2022; Sharma, et al., 2019). With it's seven stage structure it provides a framework for structuring/framing wicked problems by initially thinking about what is happening in the real world from the point of view of different stakeholders. An idealised world without any constraints is then explored from different stakeholder perspectives so that different wants/needs for a new system can be considered. The comparison between the real world and idealised worlds allows for an eventual accommodation of future ways forward.

Soft Systems Methodology is currently used at Aston University, UK to teach complex problem solving to postgraduate students. A scaffolded (e.g. Bruner, 1960) group-based approach has been found to produce a deeper understanding of concepts and yield better overall results, particularly given that students are international postgraduate students. For the majority of the students their first language is not English and they are new to complex problem-solving.

Teaching sessions are structured around the different stages of the Soft Systems Methodology. Group work is used so that students support one another in their learning of the concepts and then apply these individually to their chosen assessment topic. Students self-select their groups of 5 to 6 students. The

UK criminal justice system is taken as an in class example and students are asked to think about a particular complex area to focus on, e.g. overcrowding in prisons in a particular city. Terminology can be particularly complex and hard to grasp if your first language is not native English. Therefore, as acknowledged by Wonkhe and Pearson (2023), accessible language is used throughout teaching as a simple way to avoid feelings of isolation and disengagement.

The first task related to SSM involves students identifying the stakeholders and their power/interest in the complex situation. Students are then taught the concepts of a rich picture and draw a rich picture as a group for their chosen problem situation using white board paper. The rich picture itself enables students to understand the real world, stakeholder issues, conflicts, and relationships together with who interacts with the problem from outside of its boundary. Students present their rich pictures to the wider group for formative feedback. This helps with constructive feedback and a deeper understanding of the complex issue.

For the realisation of the idealised world students put themselves in the shoes of the stakeholder. This involves interviewing one another about what they would want for a system without taking into consideration any constraints from different stakeholder perspectives. Students are then enable to expand these statements as a group to take into consideration the different aspects of CATWOE (Customer, actor, transformation, worldview, owner and environment). From this students construct a conceptual model, again on white board paper and again receiving formative feedback from other student groups. By gaining a better understanding of the real world from drawing the rich picture and thinking about an idealised world and possible transformation activities, students are then able to construct a table to compare the real and idealised worlds which helps to support the thinking about changes going forwards.

The assessment takes the form of a client report where the student acts as the consultant. Students are required to take each aspect of the SSM and apply it to a complex, ambiguous problem with 12 to 15 stakeholders. Examples of topics chosen by students for their assessment have included housing refugees in the UK; online exams or in person exams at University; homelessness; impact of the pandemic on tourism; child marriages in India, a start up in France to reduce plastic packaging; finding the appropriate route for a railway between two cities in Germany. Prior to starting their assignment students are asked to submit a proposal form for formative feedback. This enables tutors to check that it is a complex and ambiguous problem situation and encourages students to make an early start on their assignments. Students can also seek tutor feedback before assignment submission by asking the tutor key clarification questions and are given a template for key things to include in the assignment.

The impact of using this approach in the classroom was seen in module assessment results. Prior to using the scaffolded group-based approach there was a 25% failure rate on the module. This reduced to less than 5% over three years. Students regularly comment on how they appreciate the group-work, formative feedback throughout and structuring of the sessions.

References

Aryee, J. and Hansen, A.S. (2022) De-politicization of digital systems for trade facilitation at the port of Tema: A soft systems methodology approach, *Case Studies on Transport Policy*, 10(1), pp. 105–117.

Bruner, J. S. (1960). *The Process of education.* Cambridge, Mass.: Harvard University Press.

Checkland, P *(*1986). *Systems Thinking, Systems Practice*. Wiley: Chichester.

Sharma, R. et al. (2019) "Design of Blockchain-based Precision Health-Care Using Soft Systems Methodology," *Industrial Management & Data Systems*, 120(3), pp. 608–632.

Wonkhe and Pearson (2023) *Building belonging in Higher Education, recommendations for developing an integrated institutional approach*, Blake, S., Capper, G. and Jackson, A. (Eds), Wonkhe and Pearson.