MoSS Coursework 2, 2023/24

23 October 2023

Due: Friday of Week 11 (1 December) at 12:00 noon (report), as per Coursework Planner in Learn Ultra. Presentations on Thursday of Week 11 (30 November), 16:00-18:00.
No extensions: due to being group work.
Weighting: Report is 40% of the course mark; Presentation is 10% of course mark.

Relationship to Learning Outcomes

This coursework is meant to assess Learning outcomes 2 (partly), 3, and 4 and 5.

> 2) investigate a sustainability system question, identify system elements and their interactions, and codify a system model using an appropriate model description framework

> 3) critique and interpret the results / output of models of sustainability systems

> 4) communicate findings of sustainability modelling studies, including uncertainty, to a variety of audiences

> 5) work collaboratively and accountably with other students to formulate, explore and communicate a sustainability system model

Overview

We (the course organisers) have formed interdisciplinarity groups (I.e. mixes of Informatics and non-Informatics students) that we've tried to match to students' interests as expressed in the survey in Week 5.

Your task is to work accountably with the other members of your group to investigate a sustainability system question and to communicate your group's findings to other members of the course and the course lecturers.

1. Your group will identify a question or questions about a system or connected systems, and either:
   a. Formulate and implement a model of the system(s), or
   b. Obtain existing model(s) from the literature and ensure you can run them.
2. Your group will then explore the behaviour of the system model(s) to address your question(s), with the focus on addressing the question(s) posed in Step 1.
3. Your group will write up your findings, including a description of the model, in a report.
4. Your group will also give a presentation of its results to the course lecturers and fellow students.

Submission

Your group will submit:

1. A project report in a format of a paper from the field (length 5,000-8,000 words, excluding references) describing the question, the model(s), the results, and discussing the significance of the results and the limitations of the models. The report should be targeted at an expert audience, who are familiar with the systems being modelled and with the modelling framework.

2. An ODD for the model (as an appendix to the report), which may be based on an existing ODD, with clear acknowledgement. There is no limit on the length of the ODD, but it should not be longer than necessary.
3. The group will also make a group presentation of the material in the report. The presentation should be targeted at an informed adult audience. We will release the requirements of the presentation later.
4. An archive file containing the simulation and analysis code of your model.
5. Evidence about how you have worked collaboratively and accountably as a group, for example, a folder containing brief minutes of weekly meetings, stating who was present and absent, checking progress on actions from the previous meeting, and deciding on actions for the next week.

Each individual in the group will submit a form with a question asking "Did each group member contribute reasonably equally to the project" and a short (max 250 word) reflection on how the group worked together, and your contribution.

Assessment Criteria

The work will be marked using a grid-based rubric with the following criteria:

Project report including an ODD and evidence of accountability:

- Clear description of question and systems modelled
- Success in getting existing models running and/or formulating and implementing new models
- Exploration of model behaviour
- Discussion of relevance of model results for question, and limitations of the work
- Clarity of exposition
- Clear evidence that the group has been working collaboratively and accountably

Presentation:

- Clarity
- Appropriate level
- Communicates main report findings
- Shared group presentation

Allocation of marks to individuals

We would like this project to simulate as much as possible the experience of working in a multidisciplinary team in an industry, government or NGO setting. In such settings there is rarely an attribution of individual credit at the end of the process, leading to a ranking of team members. Therefore, if all members of the team agree that each other member contributed roughly equally to the project, we will give all team members the same mark.

However, a team member who is clearly not doing their share of the work, or is uncommunicative, would be held to account by their teammates and manager. If not all members of the team agree that the contribution was roughly equal, we will investigate the group's evidence about who contributed, (e.g. the minutes of the weekly meetings), and the individual statements.

Working as a group

It is up to you how to work as a group, but we suggest the following ideas to make your group successful:

1. In your initial meeting, agree on how you will work together, e.g.
   a. Where and when you will meet, perhaps roles, tools etc.
   b. How you will communicate between meetings (Teams/Email/...)
   c. What tools you will use to manage your work, including version control systems
   d. Scheduling – are there any times when you're all going to be busy?
   e. Roles: are you going to specialise in different roles or work in subteams?
   f. Records: how will you keep a regular record of your progress? (E.g. minutes of weekly meetings, Microsoft planner or Trello board).
   g. Perhaps share with each other things that you have found helpful or unhelpful in groupwork
2. Meet weekly, in person if possible – this should help with communication.
3. Communication is key – as an individual it is your responsibility to respond in a reasonably timely fashion to questions from other members of your group - you might want to agree expectations about how soon to expect replies at the initial meeting.
4. At weekly meetings, someone should act as minute-taker to ensure that a record of the meeting is kept that includes the names of those present or absent and a record of progress on actions and a list of action. This role could rotate.
5. Try to deal with any issues as they arise, rather than letting them build up.
6. Make allowances when other team members have unavoidable difficulties, e.g. illness.

In the first instance, we hope you can deal with issues within the group, but if it's proving difficult to resolve a problem, please contact Nigel and David.

Support for working in a group

We'll run a session in week 6 to help you get started, and we will have weekly drop-in sessions in the lab slot (Thursday 16:10-18:00). We will also run weekly sessions in the Friday Q/A time (11:00) for groups to report/discuss progress and issues – this is for project groups to learn from each other.

Assessment Effort

5 hours in week 6 and 13 hours/week for weeks 7-11 a total of 70 hours, allocated as follows.

Anticipated schedule

This schedule Is indicative. In practice you may find yourselves working in parallel at times, e.g. on writing and analysis, or background research and implementation.

Week 6: Getting started

- Wednesday: Lecture: Group Project preparation/allocation, present example project
- Groups should meet, decide how to work together, and start thinking about ideas
- Thursday: Lab if required
- No Friday Q&A.

Week 7: Deciding on project ideas

- Groups should be formulating possible questions and finding relevant papers and models, and starting to write the purposes and patterns section of the ODD. If formulating a model, sketching influence diagrams.
- Thursday: lab time drop in for help with project ideas
- Friday 12-1: groups present to each other, discussions

Week 8: Formulating/running models

- Monday p.m. Submit (by email to Nigel and David) 1-2 side project summary for formative (non-graded) feedback – aims, purpose and patterns, outline methods, experiments to be run. In the case of formulating a new model, the outline methods could give the approach (system dynamics or agent-based) and the entities and state variables, and perhaps a sketch influence diagram.
- Wednesday: feedback on summaries emailed to groups
- Start work on implementing or running models
- Thursday: lab time drop in for help with project models / get feedback on summary submitted
- Friday 12-1: groups present to each other, discussions

Week 9: Running experiments

- Models should be running, with analysis being developed and results by the end of this week
- Thursday: lab time drop in for help with project models
- Friday 12-1: groups present to each other, discussions

Week 10: Analysis and writing

- Analysis may continue. Should be writing by the middle of this week.
- Thursday: lab time drop in for help with project models
- Friday 12-1: groups present to each other, discussions

Week 11: Writing and presentation preparation

- Finishing writing, and bundling up code and evidence of work as a group.
- Thursday: presentation session (2 hours max), 10 mins per group, 7 groups
- Friday: report, code and evidence of collaboration due 12:00.

Example of a project idea

An example of a project idea could be as follows. Based on Martin and Schlüter (2015, Combining system dynamics and agent-based modeling to analyze social-ecological interactions—an example from modeling restoration of a shallow lake. *Front. Environ. Sci.*, 3. https://doi.org/10.3389/fenvs.2015.00066), obtain the agent-based and system-dynamics model from the authors, and become familiar with the models run in NetLogo. Run and analyse the system dynamics model of lake ecology, to explore the stable states and tipping points.   Run and analyse the agent-based model of householder behaviour with regard to sewage systems, to explore for example sensitivity to parameters. Run the combined models as the paper authors did to see if results can be reproduced, and explore if/how model coupling can change the results. The report then writes up these explorations – essentially building on the original paper to explore details. The presentation would present these findings to a less expert audience.