e-learning module development pitch

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Goals of a module

- Guide the students through an assignment preparation/course content.
- Deconstruct a problem into its core elements.
- Engage students with the material and with their partner(s)
- Be useful as reference materials when studying (standalone demonstrations) or guide a student through content (worksheets)

Mainly: use of Jupyter Notebooks (either in JupyterLab or VS)

Creating a repository of Jupyter Notebook materials

Challenges	Content is adequate to the context(s) in which it will be used
	Successfully engaging students
	Fulfilling the learning outcomes
	Enable constant evaluation
Approaches	Use of notebooks to generate a set of course materials, worksheets and standalone *dashboards*/*apps*.
	Provide students with the strategies they need to master the learning outcomes. Limit the complexity of the examples and focus on maximizing reflection and discussion.
	Enable students to work together, discuss and provide feedback on each module.

Types of materials and exercises using Jupyter Notebooks

Worksheet	**Read and shift-enter materials/ Examples and counter-examples.**
	Fill in the blanks, run and reflect
	Tweak parameters, run and reflect
	Simple widgets that help reduce the complexity of a concept
Notebook as a dashboard /app	Standalone dashboards with a focus on tweaking and visualizing some model
	Interactive modules students can use to test their own scripts

Problem definition (text, images…)

```
Sample code (Example / Counterexample)
```

Output to be discussed

A. Barba *et al.*, 2019
Teaching and Learning with Jupyter

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Problem definition (text, images…)

```
for    in      :  # Fill in
       …
```

Output to be discussed

Can be necessary for further steps

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Problem definition (text, images…)

```
a = “ ”
b = “ ”
```

```
c = a + b
```

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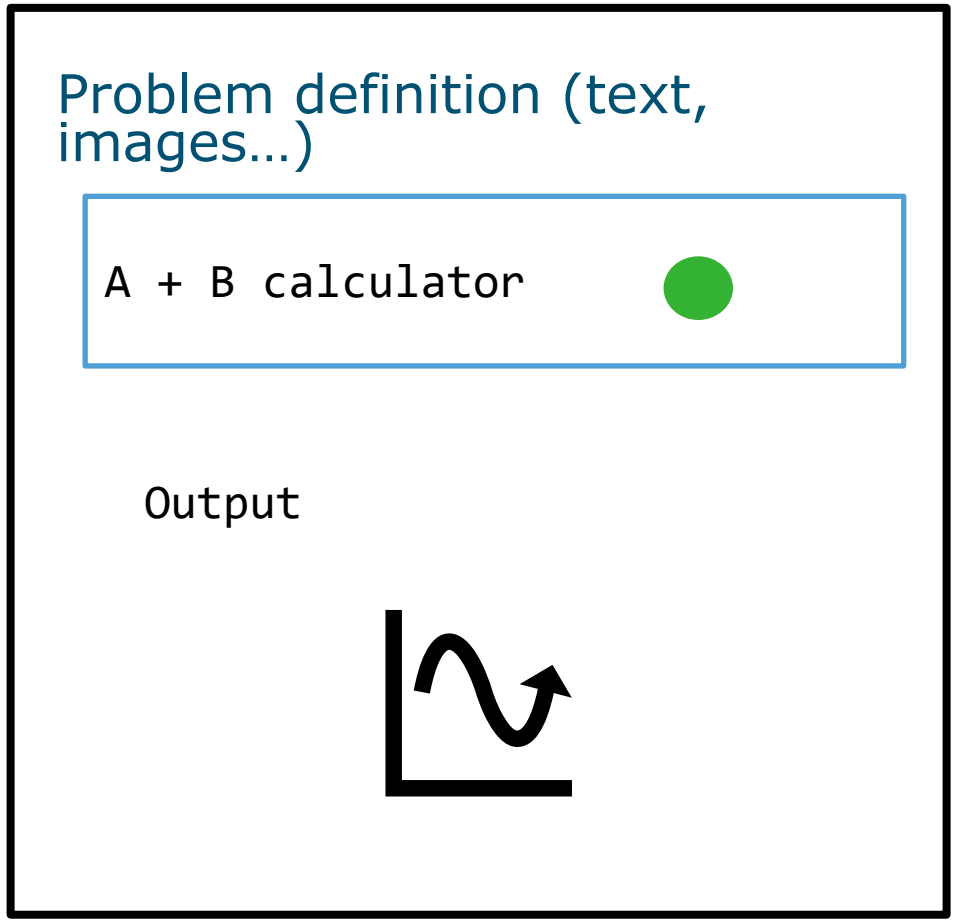

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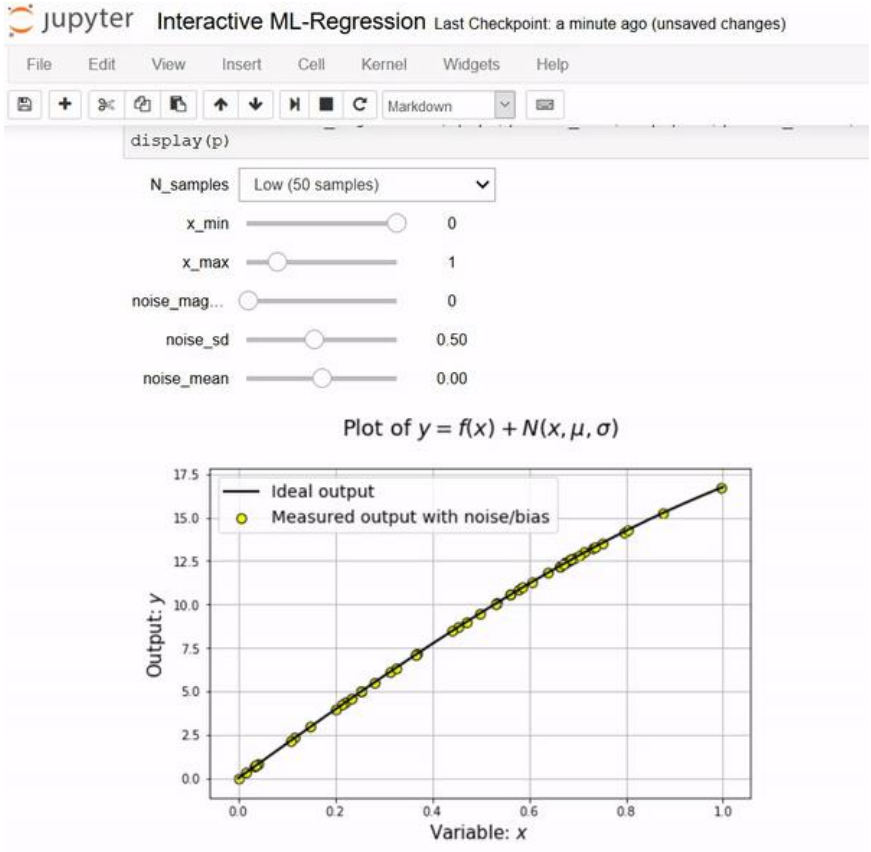


tirthajyoti/Interactive_Machine_Learning: IPython widgets, interactive plots, interactive machine learning (github.com)

Limitations and setbacks

Students should bear in mind the differences between notebooks and scripting.

How to make notebooks foolproof?

- Introduce the functioning of notebooks and basic troubleshooting skills (restarting kernel, rerunning previous cells…).

These aspects could be tackled as extra modules in the course materials

Implementability

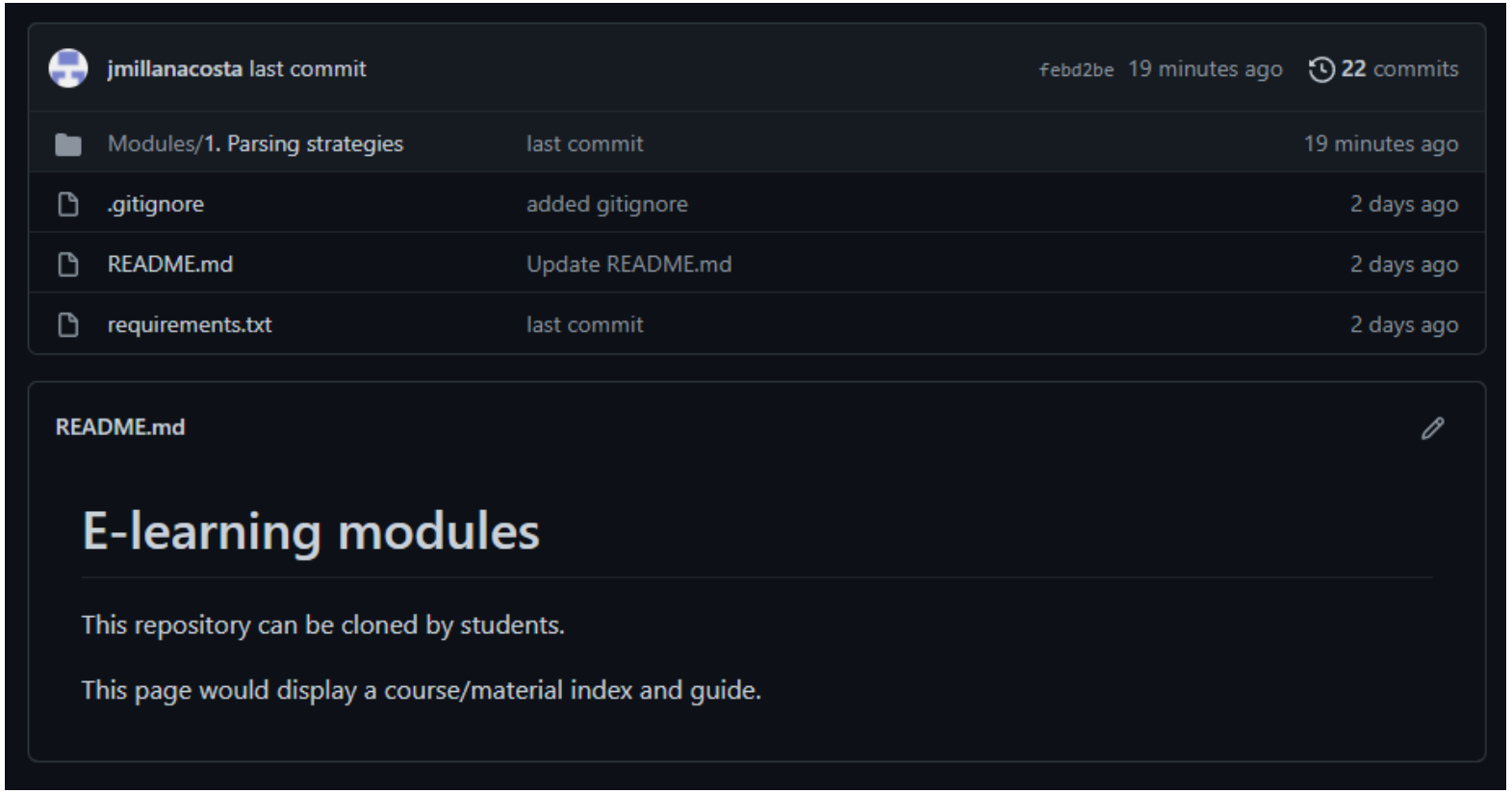
- Integration in BrightSpace:
  - Notebooks (.ipynb) as downloadable files

  Or?

Implementability

- Using GitLab for content delivery, teamwork and discussion
  - Students would copy the repository with the course contents.
  - Familiarize students with Git from assignment 1.
  - Content delivery through a course repository, like in many online courses.
  - Useful for teamwork
  - Students can use issues as a forum or to give feedback on the module.
  - Integration with code grading tools like CodeGrade is possible.

Example repository (hyperlink)



References

1. Teaching and Learning with Jupyter. https://jupyter4edu.github.io/jupyter-edu-book/index.html.