

Stimulating sustainable implementation of educational innovation in engineering education

Perry den Brok & Cindy Poortman – SEFI Deans Conference, UTwente, 24-26 May, 2023



Development of a framework to evaluate course innovations

- Context: course innovation fund at WUR & innovation literature
- Type of projects: short in duration (1-2 years), small budgets (10-30 kEuro), mostly single courses targeted, small number of innovators, some educational support
- Collected/analyzed data:
 - Innovation fund proposals (approx. 90)
 - Interviews with (selection of) project leaders, educational directors, involved teachers
 - Looking at project outcomes/products (if available)

Innovation evaluation framework

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- 1. General Characteristics of the innovation project:** *Course level, chair group applying, budget, etc.*

 - 2. Type of (and characteristics of the) innovator:** *Collaborations across science groups, team composition, etc.*

 - 3. Reason for the Innovation:** *What are key reasons for the innovation?*

 - 4. Goal of the Innovation:** *Which educational goals is this innovation project aiming to meet?*

 - 5. Conceptual underpinning of the innovation:** *Is there a theoretical, empirical, conceptual underpinning?*

 - 6. Type of curricula innovation:** *What aspects of the curricula/course are innovated?*

 - 7. Newness of the innovation:** *How new is the innovation?*

 - 8. Depth of innovation:** *How deep is the change fostered through the innovation?*

 - 9. Learning domain innovation:** *Which main learning domains will be enhanced through this innovation?*

 - 10. Competence domain innovation:** *Which competence will be enhanced through this innovation?*

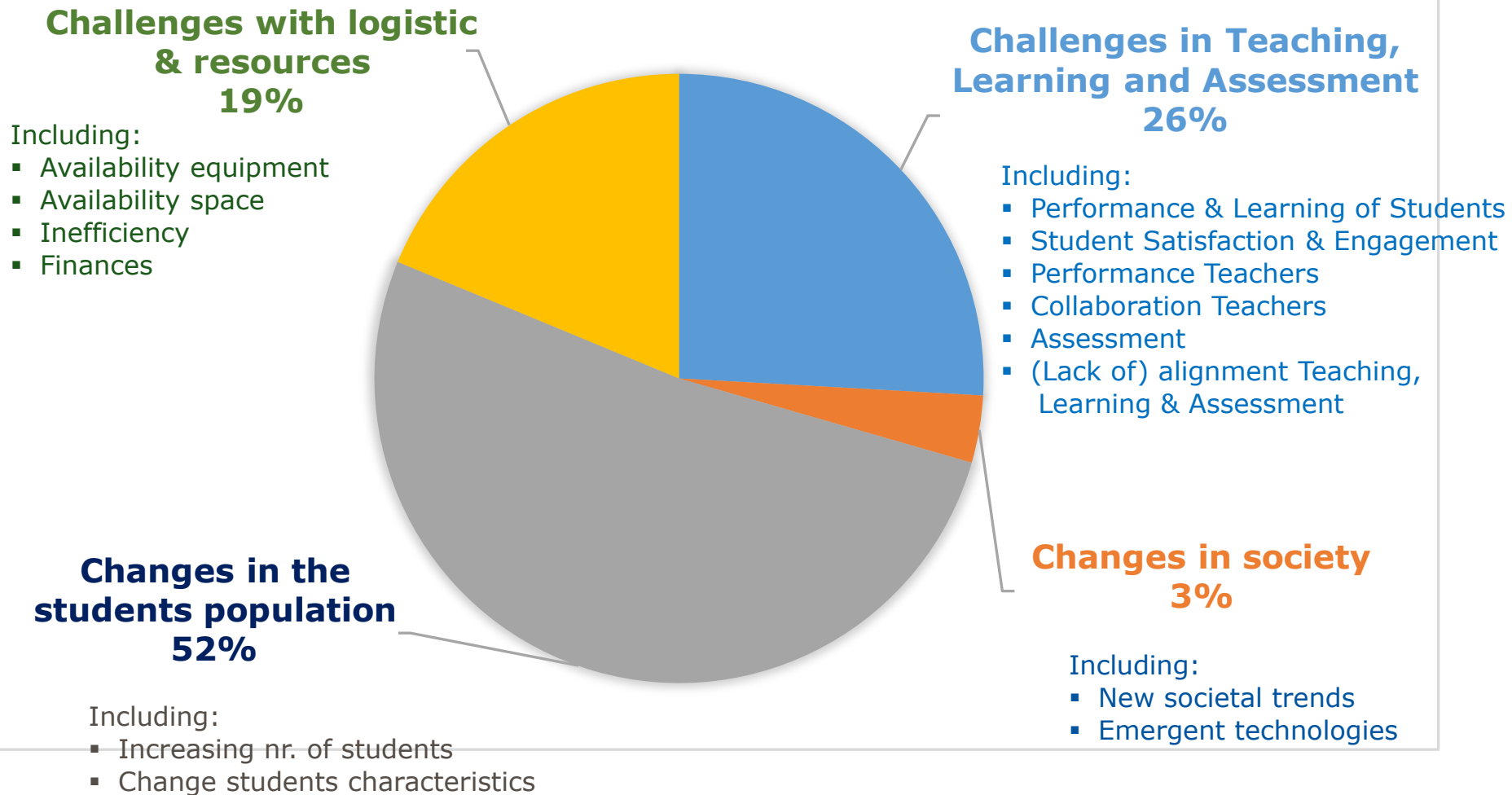
 - 11. Connectivity curricula-society:** *Is this innovation concerning linkages between curricula- society?*

 - 12. Evaluation Strategy:** *Will this innovation project be evaluated and how?*

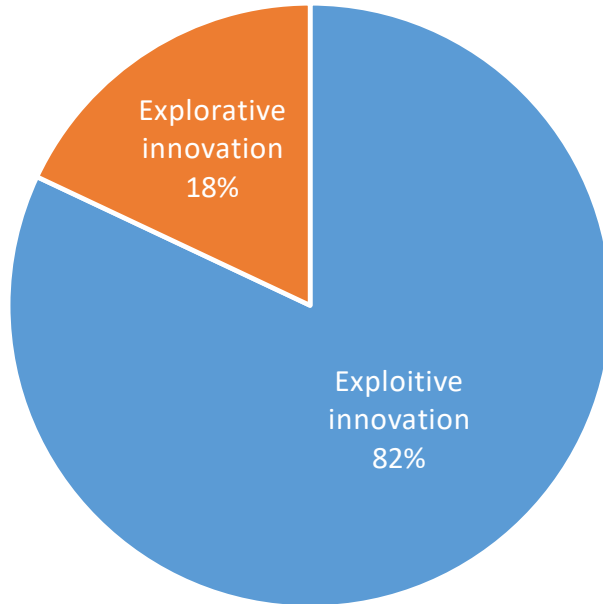
 - 13. Dissemination Strategy:** *In what way this innovation project will be disseminated?*

 - 14. Product(s) to be developed:** *What products will be developed through the innovation?*

Reasons to innovate



Innovative character



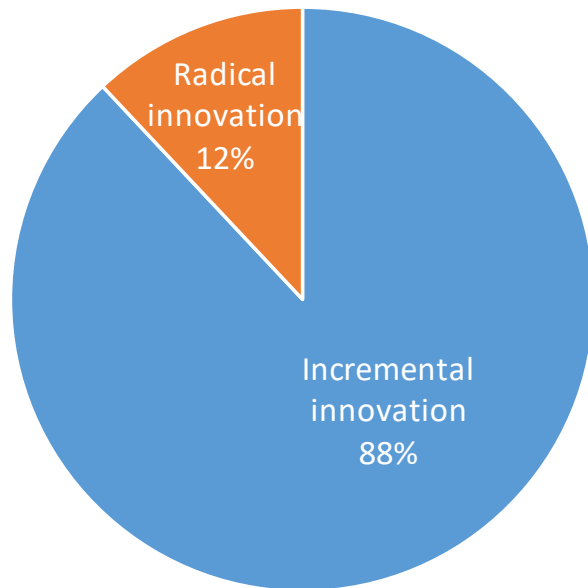
Exploitive Innovation: The innovation focuses on implementing 'already known' tools, approaches, etc.

Examples: *development knowledge clips, digital handbook, feedback fruits application, electronic self-tests, on-line rubrics, peer assessment, in class case studies, on-line forum, implementation existing apps, thesis ring, etc.*

Explorative Innovation: The innovation focuses on creating and implementing something 'new' like a 'new' tool, a 'new' approach etc.

Examples: *create a learning tool for complex systems decision making, a virtual lab (digital simulation), a new step-by-step learning approach for data analysis, on-line gallery of interactive pictures to understand complex interactions, games*

Depth of innovation



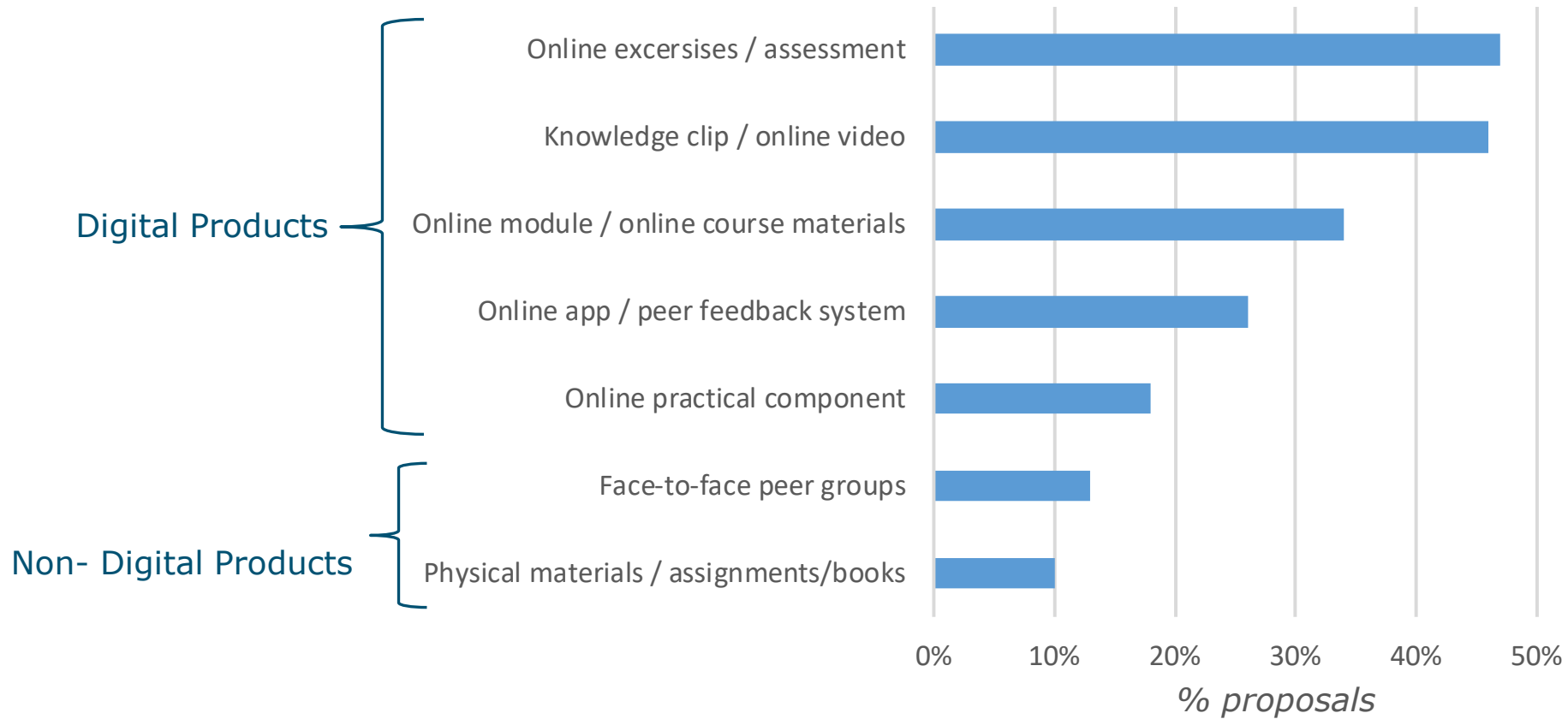
Incremental innovation

The innovation focuses on making superficial or incremental changes in some components of the course or learning process of the students, while the fundamental characteristics of overall the course design remain the same

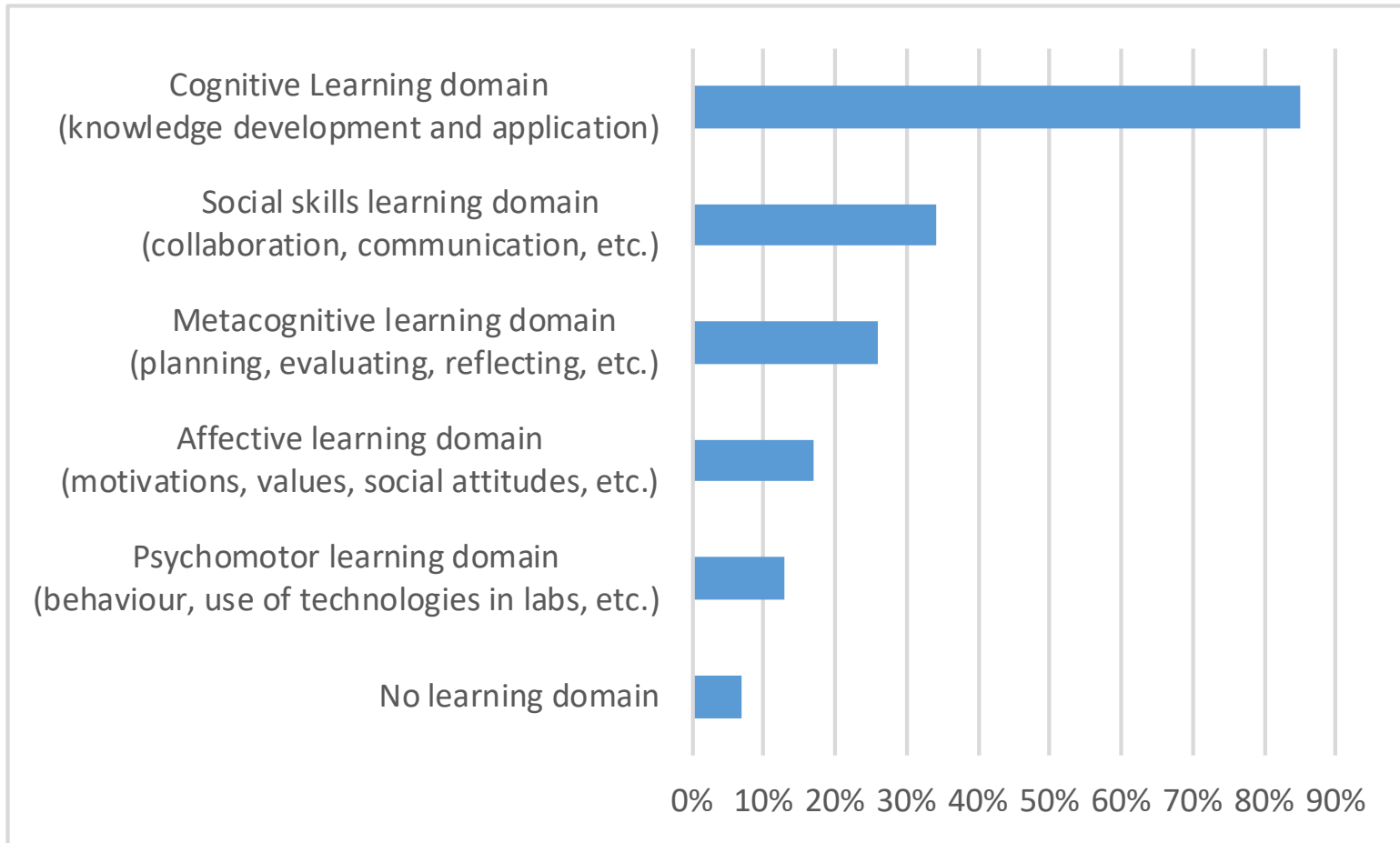
Radical Innovation

The innovation focuses on fundamental deep changes within the course requiring a re-structuring and re-design of the course.

Some findings: resulting products

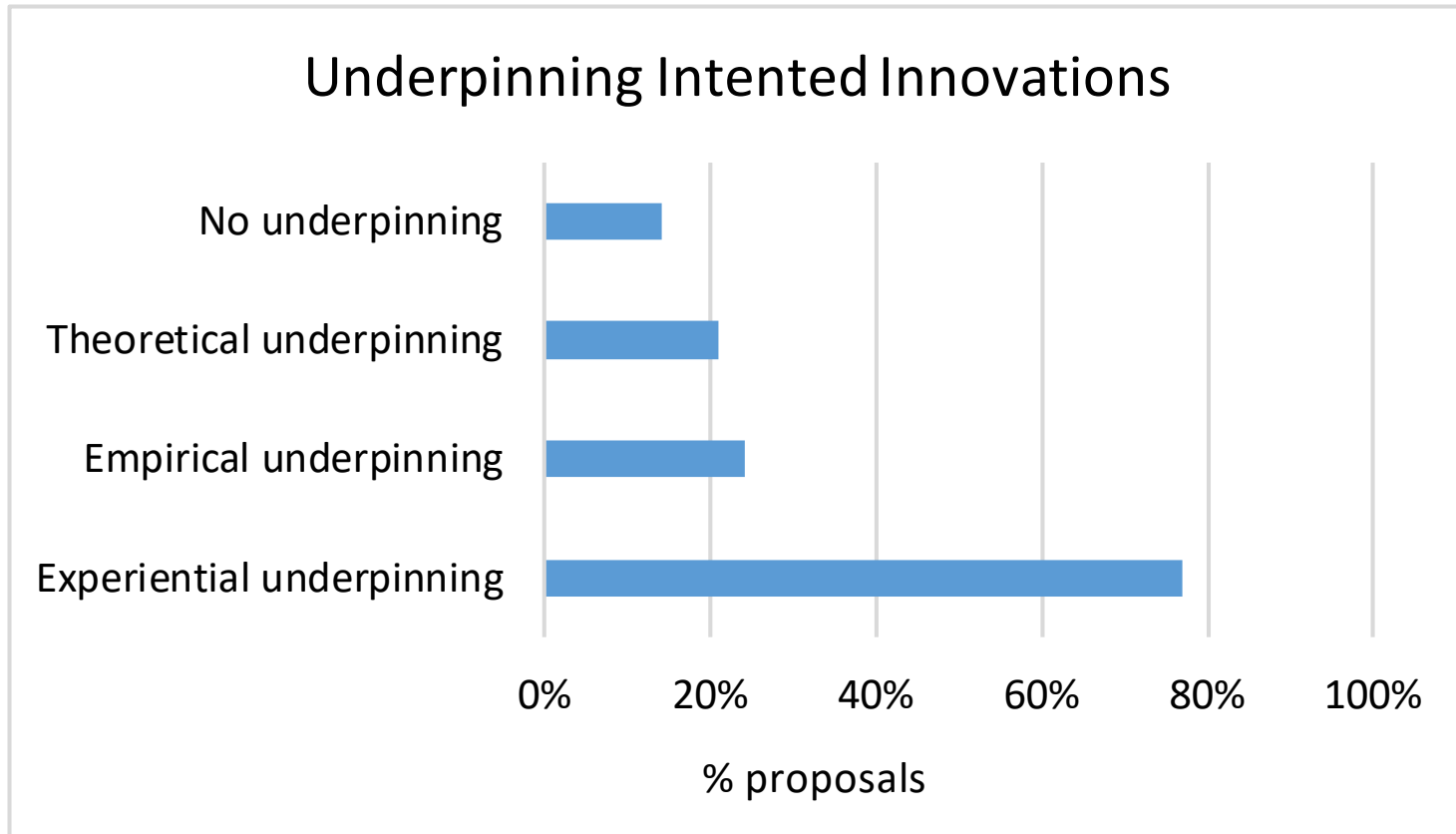


Some findings: learning domain

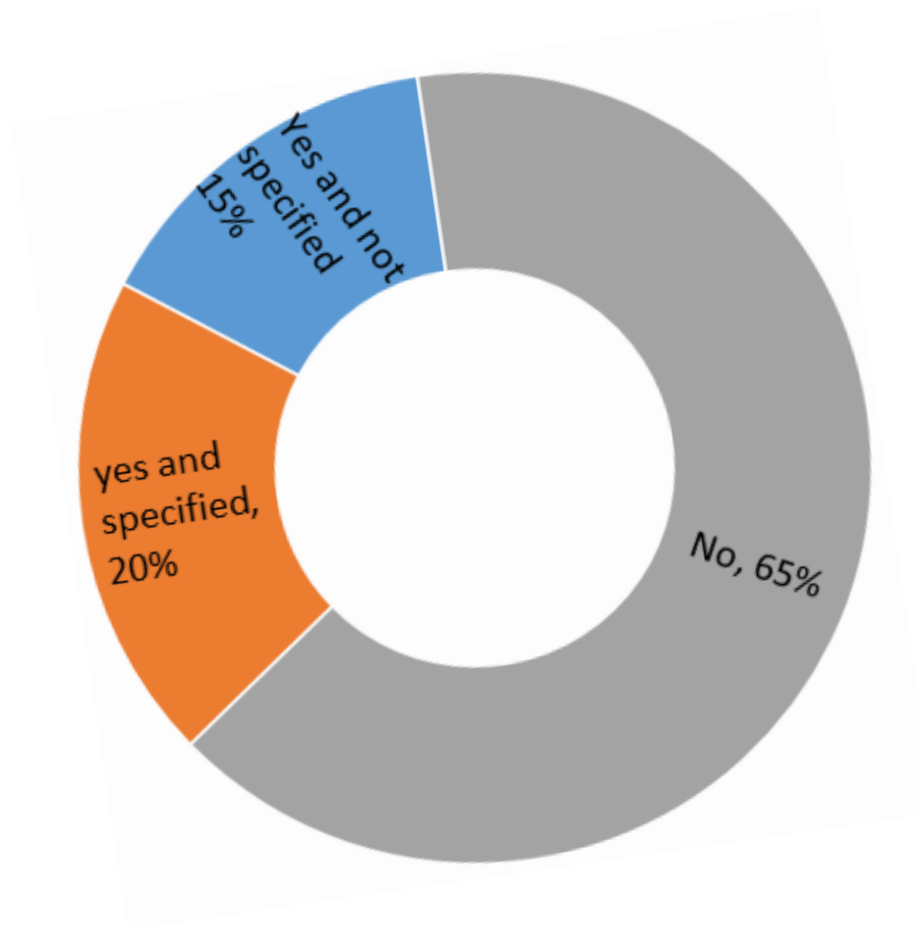


NOTE: a proposal can also foster more than one learning domain

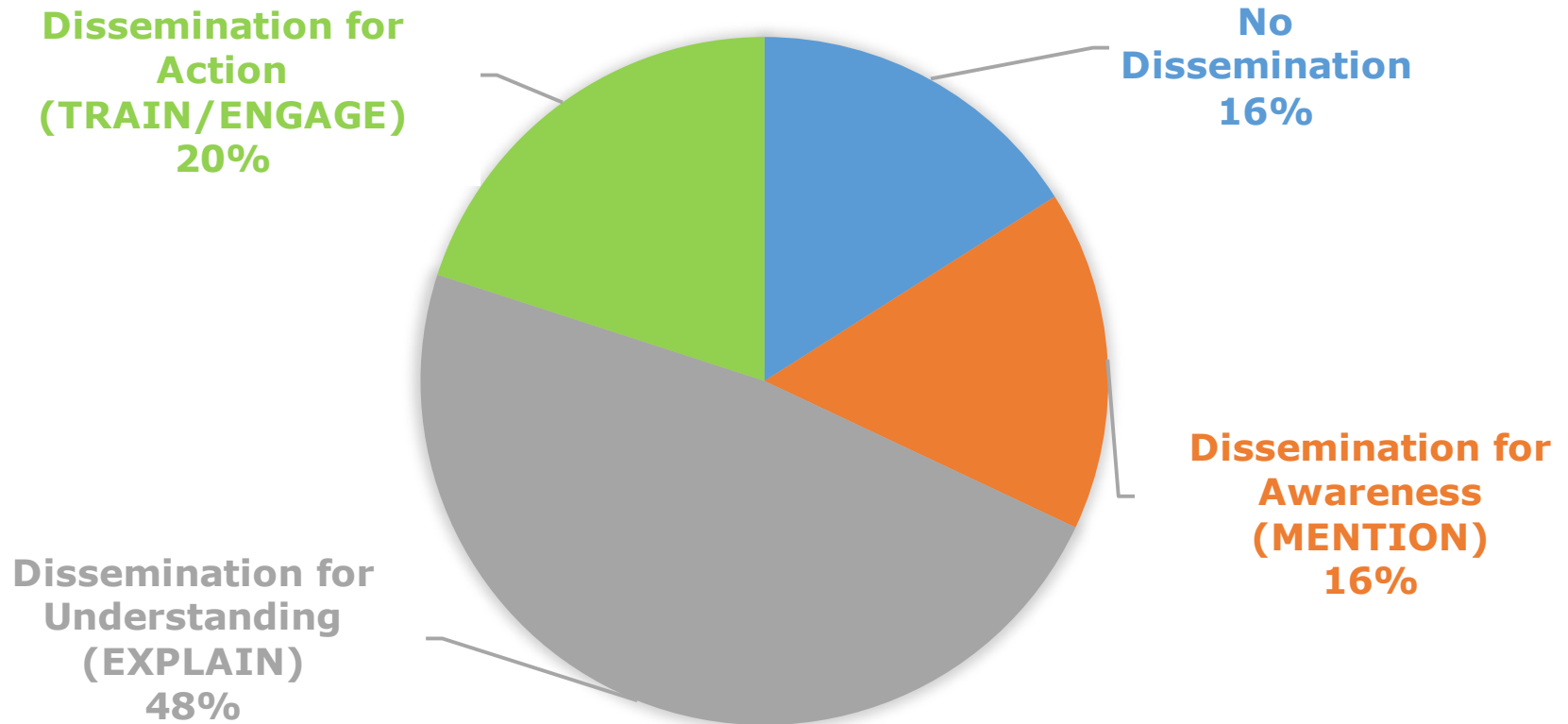
Some findings: underpinning



Some findings: evaluation strategy?



Some findings: dissemination?



Sustainable educational innovation

Long-term AND in the entire institution


- As a routine
- Fitting the institutional context AND maintaining the core aspects of the innovation
- Continuing improvement

Essential

- Coherence in vision and policy is fundamental
- Institution organisation, context, individual characteristics and the innovation itself
- **Leadership** (distributed)

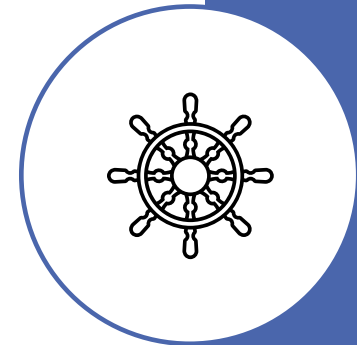
Factors influencing sustainability



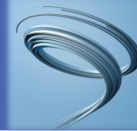
- Vision and policy
 - The Innovation
 - Organizational aspects
 - Leadership, individual stakeholders and Context
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Vision and policy

- Innovation goals in line with vision and policy
- Direction, monitoring
 - Communicate goals and importance
 - Evaluate progress
 - Quality monitoring
 - Active involvement stakeholders

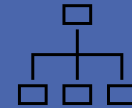


The Innovation



- Effective (evidence-informed?)
- Efficient (effort and budget?)
- Systematic (steps?)
- Visibility of progress

Organizational aspects



- Collaboration
- Knowledge dissemination
- Support =>

Leadership, individual stakeholders and context

- Leadership support
- More than 'time'!
- Context: e.g., student involvement, importance according to larger policy context
- Distributed leadership
(see <https://pro-u.reflectiontool.utwente.nl/> or QR-code; developed for secondary, used in other sectors too)



LEADERSHIP FOR SUSTAINABILITY



Organizing and (re-)designing the

e.g., vision and goals; resourcing and facilitation



Managing the teaching and learning

e.g., planning, concretely agreeing about next steps



Understanding and developing people

e.g., being available and knowledgeable

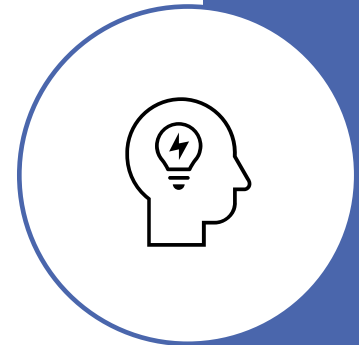


Organizational structures and

**e.g., offering support and encouraging connections
between colleagues**

'The sustainability meter'

- Vision and policy – the innovation – organizational aspects – leadership, individual stakeholders, and context
- Specific questions about the status of each
- For reflection and discussion purposes
- Digital version completed this summer



Discussion groups (until 10.35)

- Consider an innovation to be implemented in your context
- **A-groups: “Integrative Evaluation Framework ...”**
 1. Consider individually for 5-10 minutes (until 09.55)
 2. Elements in the framework that are new to you, or seem missing in your current processes/procedures/design?
 3. If you select 1 or 2 criteria, how would you ‘rate’ them for your innovation/case? (e.g., how innovative, at what goals directed, etc.) How satisfied are you?
 4. Then in your group together (until 10.25): discuss applicability, insights to what extent you control these aspects, and what needs most attention in your context
 5. **Starting 10.25: As a group use www.menti.com and use the code 4809 0915 to answer**
- **B-groups: Foundation pillar – “Agreement between vision and policy” And/Or the “Leadership” pillar**
 1. Consider individually for 5-10 minutes (until 09.55)
 2. Then in group together (until 10.25): discuss applicability, insights to what extent you control these aspects, and what needs most attention in your context
 3. **Starting 10.25: As a group use www.menti.com and use the code 4809 0915 to answer**

Sources

Thank you for your
attention!!

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Appendix – for end of session – follow up
policy recommendations based on
framework and findings

Follow-up: Policy recommendations

Proposal phase

- Stimulate evaluation and dissemination already in the proposal phase, this leads to deeper innovation.
- Ask for more theoretical and empirical underpinning of the innovations planned.
- Create opportunities for bottom-up initiatives for educational innovations as well (free space for wild ideas).
- Check availability of similar innovations or available data before starting the innovation.
- Connect innovations to other related projects, link a PhD or Postdoc, or Master Thesis students to it, to increase innovation capacity.
- Make sure there is support provided during the proposal writing process.

Recommendations

Implementation Phase: general

- Plan-in sufficient moments for reflection during the project.
- Bring innovators with similar projects together, they can inspire and learn from each other.
- Be careful with the implementation of isolated online elements in a traditional course but choose an integrated approach.

Recommendations

Implementation phase: Tools

- When using tools, plan multiple cycles.
- Do not underestimate the development of a new tool. The tool should only be implemented if proven robust. Tool development implies a trajectory of years and good cooperation with the developers is essential.
- The tool should be tested on a minor scale first, and after that in bigger courses and programmes.
- Commercial use of developed tools by external parties is a point of attention.

Recommendations

Dissemination and Evaluation phase

- Stimulate critical further development of innovations in design labs supported by educational designers.
- Stimulate systematic evaluation and dissemination of educational innovations.
- Create opportunities for collaboration and exchange across teachers.
- Allow for “brilliant” failures, teachers appreciate experimenting with their practices and they learn from it.
- Include research evaluation activities, to understand more substantially the effects of the innovation