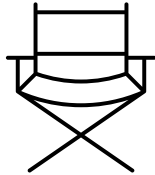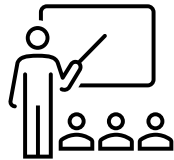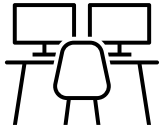# The nuts and bolts of implementing a skills learning trajectory

Implementing Information Literacy in the BSc Forest and Nature Conservation

13 November 2024, Gijs Elkhuizen and Leonie Kamminga
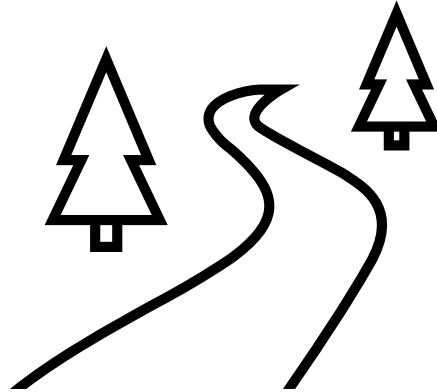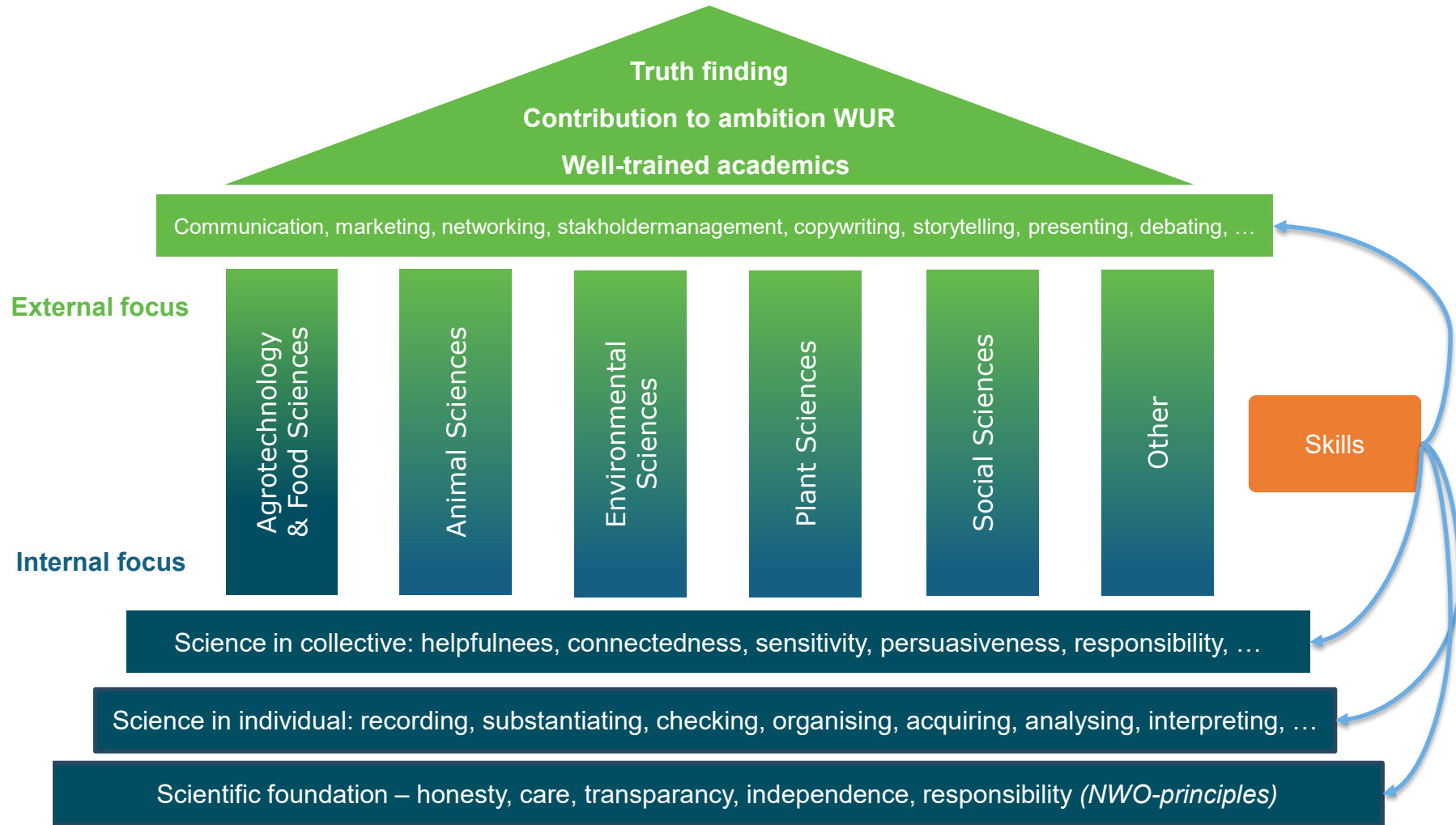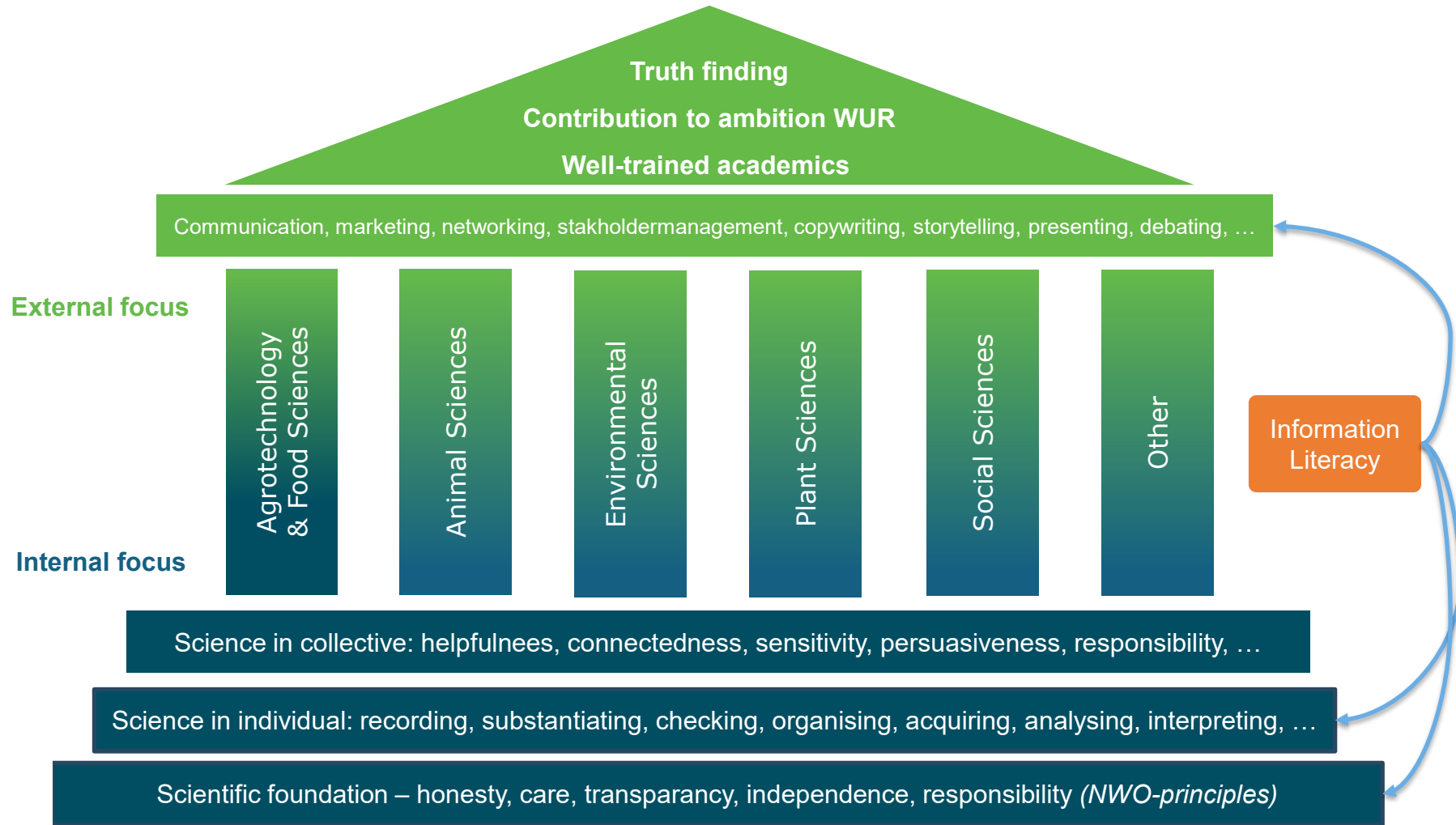
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Who are you? What do you expect?

Implement a skills learning trajectory

- Why
- What
- How
- Evaluation
- Conclusion
- Outlook

Truth finding

Contribution to ambition WUR

Well-trained academics

Communication, marketing, networking, stakholdermanagement, copywriting, storytelling, presenting, debating, …

External focus

Agrotechnology & Food Sciences

Animal Sciences

Environmental Sciences

Plant Sciences

Social Sciences

Other

Information Literacy

Internal focus

Science in collective: helpfulnees, connectedness, sensitivity, persuasiveness, responsibility, …

Science in individual: recording, substantiating, checking, organising, acquiring, analysing, interpreting, …

Scientific foundation – honesty, care, transparancy, independence, responsibility *(NWO-principles)*

Importance of skills

- Merging skills in the BSc programme

- Make skills explicit

- Let certain skills be taught by skill experts

- Important: combination skills and subject matter

Why

- Information Literacy is, like others, an essential academic skill

- Certain basic level for all BSc students

- 'Just-in-time' education for good learning experience

- Consciously skilled

- e-learning module

  - Why is it important to be information literate?

Time
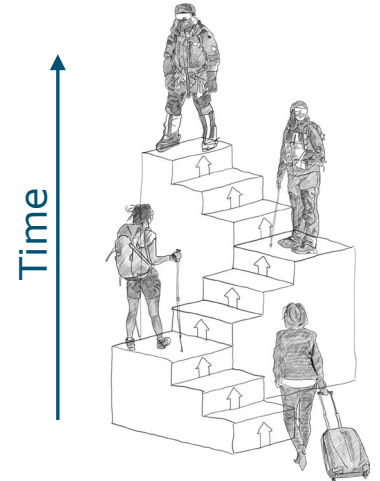
How

- Project 'Pilot modular learning trajectory information literacy in BBN'

- Followed project driven creation

- People/core teams involved

  - Arnold Bregt (commissioner)

  - Merel Middelman (project leader)

  - Gijs Elkhuizen

  - Students BBN

  - Team Education Support Library

  - Education and Learning Sciences

  - Education & Student Affairs
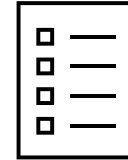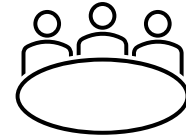
Theoretic background information literacy

Seven Pillars of Information Literacy — SCONUL

Information literacy landscape — Information literate person: Identify, Scope, Plan, Gather, Evaluate, Manage, Present

http://www.sconul.ac.uk/topics_issues/info_literacy/ — Society of College, National and University Libraries
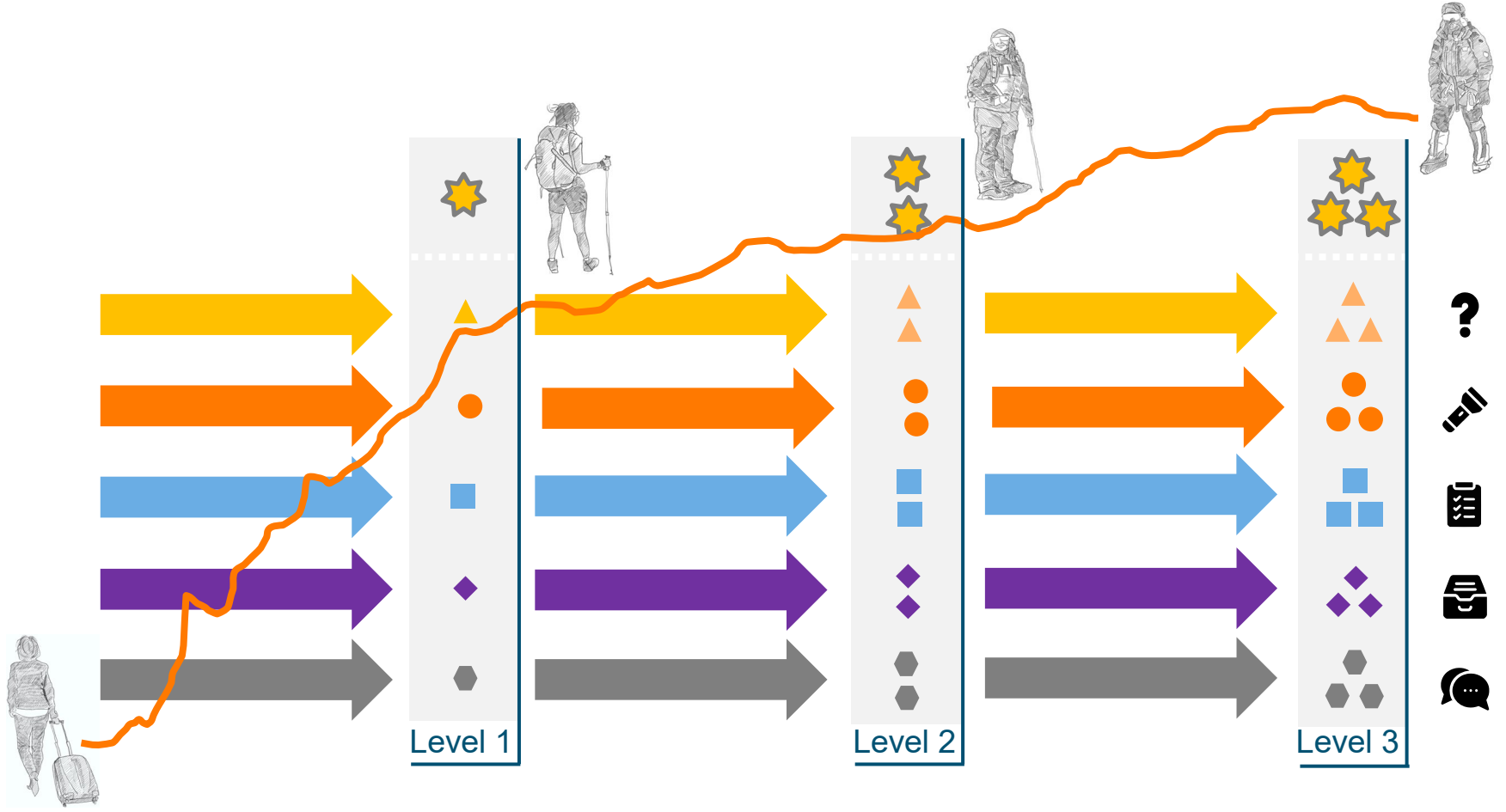
Information Literacy pillars at WUR

11. Information Literacy (version April 2023)
Search, find, evaluate, select, manage, and communicate scientific information.

	Attainment level 1	Attainment level 2	Attainment level 3
11.1 Orientation and preparation	Identify a need for information and describe, locate and access different sources for information with the aim to orientate on a topic. Determine the main keywords of a topic in preparation of a search.	Evaluate, document and select appropriate sources for information (e.g. bibliographic databases), with the aim to orientate on a topic and prepare for a systematic literature search. Formulate a research question for a literature search and determine the main keywords of this question in preparation of a search.	Apply levels 1 and 2 for a well-focused discipline-specific scientific project at BSc level, place own work in the relevant scientific context of the relevant scientific field.
11.2 Searching	Perform a search using basic search techniques (e.g. Booleans, field and phrase searching, wildcards) and use reference lists to find additional relevant information.	Perform a search in various databases and platforms using systematic search strategies and apply "following a thread" to effectively and efficiently find relevant information (e.g. scientific articles, data, patents) and to improve the search query.	Apply efficient and effective advanced systematic search strategies (e.g. using proximity operators, thesaurus, choice of databases and platform) to find relevant information.
11.3 Evaluation	Evaluate the search results critically and use a set of proper selection criteria to select the most appropriate information sources.	Evaluate the search results critically, relate it to the original search question, and revise the search process if needed.	Apply levels 1 and 2 plus advanced approaches to determine when to stop searching and to select the most appropriate information sources.
11.4 Management	Use basic techniques to store and organize information sources and explains how to keep track of the search process for later repetition and improvement.	Use relevant software to store and organize information sources and keep track of the search process for later repetition and improvement.	Apply levels 1 and 2, plus advanced techniques to keep track of the search process for later repetition and improvement (e.g. save search, set alert).
11.5 Communication	Cite information properly and consistently to avoid plagiarism and describe purposes for publishing in different information sources (e.g. academic journal, news article, blog post).	Apply level 1 plus describe the difference between plagiarism and copyright infringement. Describe the process of academic publishing.	Cite information properly and consistently in a defined citation style using relevant software (e.g. Endnote, Mendeley). Acquire, store, modify, use, cite and distribute different kinds of information (text, data, images, sounds, etc.) strategically, legally and ethically.

Level 1

Level 2

Level 3

Orientate and prepare ❓

Search ✏️

Evaluate 📋

Manage 🗄️

Communicate 💬

Visualisation learning trajectory Information Literacy, Edo-Jan Meijer, CC-BY-NC 4.0

Planning Bachelor (BSc) Bos- en Natuurbeheer

Het programma kan wijzigen. Er zijn geen rechten te ontlenen aan dit overzicht.

		Period 1	Period 2	Period 3	Re-exams A	Period 4	Period 5	Re-exams B	Period 6	Re-exams C
	#week	8	8	4	1	4	8	1	8	2
BSc 1	MO	PEN-10503 Ecology I / PEN-20503 Ecology II	* MAT-14803 Mathematics 1 / * MAT-15303 Statistics 1 / MAT-14903 Mathematics 2	HWM-10303 Water 1		FNP-24806 People's contributions to Forest & Nature Conservation	FEM-10306 Ecology of Forests		BIS-10306 Biodiversity of The Netherlands	PEN-10806 Forest and Nature Conservation I: Introductory Field Course
	AF	FEM-11306 Introduction to Forest and Nature Conservation	FNP-11806 Forest, Nature, Society	MAT-15403 Statistics 2			SGL-13806 Introduction to Geology, Soils and Landscapes			
BSc 2	MO	PAP-20806 Public Administration And Environmental Law / FEM-22306 Forest Resources	GRS-10306 Introduction Geo-Information Science	FNP-24306 Governance for Forest, Nature and Biodiversity		FNP-21306 Management of Forest and Nature Organisations	** YRM-21306 Research Methodology for Human Environment Interactions / ** MAT-20306 Advanced Statistics		PEN-22303 Ecology of Communities, Ecosystems and Landscapes: Field Excursion	FEM-20909 Forest and Nature Conservation II – Management Planning and Tools
	AF	GEO-20406 Human Geography: Theory and Practice / PEN-22806 Habitat Analysis for Ecologists	** CPT-22306 Communicating for Sustainability and Responsible Innovation / ** PAP-21306 Global Institutions for Sustainable Development / EZO-21803 Basic Principles of Vertebrate Zoology / WEC-20803 Applied Animal Ecology	PPH10306 Biology of Plants			FNP-23303 Forest & Nature Conservation Planning: Theories, Tools and Practices / PEN-21803 Ecology of Communities, Ecosystems and Landscapes: Theory / *** YFN-20301 Self Assessment for Forest and Nature Conservation students			
BSc 3	MO	Minor/Free Electives 30 ECTS				FNP-32806 Science and Expertise in Nature and Environment	ENR-20306 Environmental Economics and Environmental Policy / WEC-20306 Climate Change Ecology / PEN-80812 BSc Thesis Forest and Nature Conservation		PEN-80812 BSc Thesis Forest and Nature Conservation	FNP-30306 Strategic Planning in Forest and Nature Conservation
	AF									

13

Planning Bachelor (BSc) Bos- en Natuurbeheer

Het programma kan wijzigen. Er zijn geen rechten te ontlenen aan dit overzicht.

		Period 1	Period 2		Period 3	Re-exams A	Period 4	Period 5		Re-exams B	Period 6		Re-exams C
	#week	8	8		4	1	4	8		1	8		2
BSc 1	MO	PEN-10503 Ecology I / PEN-20503 Ecology II	* MAT-14803 Mathematics 1 / * MAT-15303 Statistics 1	MAT-14903 Mathematics 2	HWM-10303 Water 1		FNP-24806 People's contributions to Forest & Nature Conservation	FEM-10306 Ecology of Forests			BIS-10306 Biodiversity of The Netherlands	PEN-10806 Forest and Nature Conservation I: Introductory Field Course	
	AF	FEM-11306 Introduction to Forest and Nature Conservation	FNP-11806 Forest, Nature, Society		MAT-15403 Statistics 2			SGL-13806 Introduction to Geology, Soils and Landscapes					
BSc 2	MO	PAP-20806 Public Administration And Environmental Law / FEM-22306 Forest Resources	GRS-10306 Introduction Geo-Information Science		FNP-24306 Governance for Forest, Nature and Biodiversity		FNP-21306 Management of Forest and Nature Organisations	** YRM-21306 Research Methodology for Human Environment Interactions / ** MAT-20306 Advanced Statistics			PEN-22303 Ecology of Communities, Ecosystems and Landscapes: Field Excursion	FEM-20909 Forest and Nature Conservation II – Management Planning and Tools	
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								*** YFN-20301 Self Assessment for Forest and Nature Conservation students					
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	AF							PEN-80812 BSc Thesis Forest and Nature Conservation					

Level 1

Level 2

Level 3

3. Information Literacy

	Attainment level 1	Attainment level 2	Attainment level 3
	The information literate student:	The information literate student:	The information literate student:
3.1 Orientate and prepare	- Recognizes a need for information. - Recognizes and describes characteristics of information sources. - Names the finding aids Google, Google Scholar, Scopus, WUR Library Search and describes their pros and cons. - Formulates the topic clearly and identifies the main themes (concepts). - Recognizes the type of information source from a reference. - Locates and accesses library sources and full texts.	- Identifies and documents the information need for a **defined task**. - Identifies appropriate information sources for a **defined task**. - Names available finding aids, such as **multidisciplinary and subject-specific databases**. - Formulates a **research question** for a literature search and identifies for each concept correct **search terms**. - Selects appropriate types of information sources for a **defined task**. - Selects a few appropriate (multidisciplinary and subject-specific) finding aids.	- Identifies and documents the information need for a **scientific project**, such as a BSc thesis - Identifies appropriate information sources for a **scientific project**, such as a BSc thesis - Compares the usefulness of different finding aids **in the discipline**. - Formulates a **well-focused** research question for a literature search and identifies for each concept correct search terms. - Selects appropriate types of information sources for a **scientific project**. - Selects **and substantiates several** appropriate (multidisciplinary and subject-specific) finding aids.
3.2 Search	- Performs basic searches using Boolean operators, field searching, phrase searching and wildcards. - Uses reference lists to find additional information sources and search terms.	- Constructs a search query in a systematic way with **key concepts and search terms** using Boolean operators, field searching, phrase searching and wildcards. Performs this search correctly in **various databases and platforms**. - Uses reference lists, **"cited by" and related documents** to find additional information sources and search terms.	- Constructs a search query in a systematic way with key concepts and search terms using Boolean operators, field searching, phrase searching and wildcards and if appropriate **proximity operators or a thesaurus**. Performs this search correctly in various databases and platforms.
3.3 Evaluate	- Evaluates the search results critically. - Evaluates information sources using various criteria (e.g. suitability, authority, purpose, currency, and accuracy) and selects the most appropriate ones.	- Relates the search results to the original research question and **revises** the search if necessary.	- Relates the search results to the original research question and revises the search if necessary. Estimates **precision and recall** to determine when to stop searching. - Evaluates information sources using various criteria (e.g. suitability, authority, purpose, currency, and accuracy). Uses **citation metrics** as an evaluative technique. Selects the most appropriate sources.
3.4 Manage	- Stores and organizes information sources systematically using basic techniques. - Keeps track of the search process to be able to repeat and improve the search.	- Stores and organizes information sources systematically using **citation management software** such as EndNote or Mendeley. - Keeps track of the search process, **including search queries**, to be able to repeat and improve the search.	- Stores and organizes information sources systematically using citation management software. Develops and uses a transparent **system for managing data and files**. - Keeps track of the search process, including search queries, to be able to repeat and improve the search. Knows how to **save searches** and to **set up alerts** in various search systems.
3.5 Communicate	- Indicates when and where to cite a source and identifies which publication details are required in a reference list. - Avoids plagiarism by citing correctly (e.g. quoting, paraphrasing, summarizing). - Describes in which information sources people publish for a specific purpose.	- Cites and refers to information sources using a self-chosen or required **citation style**. - Avoids plagiarism by citing correctly (e.g. quoting, paraphrasing, summarizing). **Explains the** difference between **plagiarism and copyright infringement**. - Describes the process of **academic publishing**.	- Cites and refers to information sources in a self-chosen or required citation style using **citation management software**. - **Acquires, stores, modifies, and distributes text, data, images, and sounds, legally**.

Learning activities per contact moment - What

- Keep in mind
  - Learning trajectory
  - Constructive alignment
- Assessment
  - Formative
  - Summative assessment
- Toolbox
- Discuss with course coordinator

Time

Edo-Jan Meijer, CC-BY-NC-SA
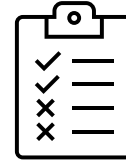
Learning outcomes

Learning activities
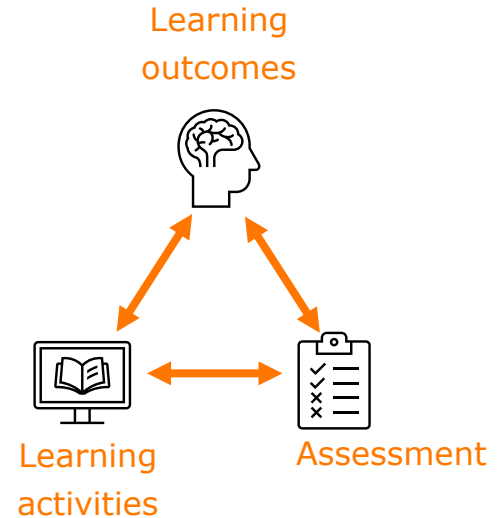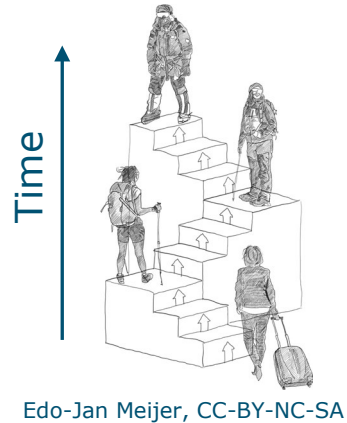
Assessment

Constructive alignment, based on Biggs (1999)

Define assessment strategy

- Formative or summative assessment

- First formative, practice with skill

- Summative assessment at level 1, 2, 3

Examples of learning methods

- [e-learning modules](#)
    - Self study, often the basis of IL education
- Flip the classroom
- Lectures
- Practicals
    - Wooclap
    - Pen and paper
- Classes: interactive, discussion
- Peer feedback
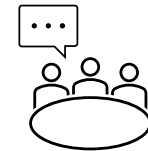
Assignment linked to Wooclap - pairs

Which search terms can you find for each concept?

1 Policy	2 Society	3 Rewilding
policy	Society	natuur
government	Politics	Reclaiming
Regulation	Municipalities	Rewild*
Strategy	People	wildernis
Humanity	community	rewilding
Regulation	Culture	natuurlijk herstel

Battle 2-4-8-all, vote

The final search queries (selection)

❤ 12

(policy OR manag* OR program OR administration OR guideline OR government OR law OR scheme) AND (society OR association OR culture OR demography OR civilization) AND (rewild* OR "nature restor*" OR "natural regeneration" OR "reintroduction of animals" OR afforestation)

✕

❤ 7

(Societ* OR People OR Civili?ation OR Commun* OR Public* OR Human*) AND (Policy OR Strategy OR Guideline OR Approach Or Scheme) AND Rewild*

✕

Examples of assessment

- Self assessment

- Readiness assurance test (RAT)
  - Individual (ans)
  - Team (scratch cards)
  - Earn bonus points

- Search assignment
  - Graded with analytical rubric
    - Level 1
    - Level 2

Example rubric level 2 – Manage & Communicate

The results						Total 100
Reference manager software	Does not use one of the reference management software mentioned	Uses Mendeley or EndNote, but does not have a sufficient amount of references in the screenshot, or the screenshot is missing groups and full-text attachments.	Uses Mendeley or EndNote, but the screenshot is missing groups or full-text attachments.	Uses Mendeley or EndNote completely correctly.		15
In-text citations and copyright	Does not use a specific citation style or makes mistakes in all in-text citations, or the text contains plagiarism or copyright infringement.	Uses another citation style correctly or uses the given citation style with many different mistakes in style or placement of the citations, or the text does not contain a quote/image.	Uses the selected reference style with one mistake, or a few minor style/copyright mistakes.	Uses the selected citation style correctly and places in-text citations correctly, and the text contains a quote.		30
Referencelist - relevancy	None, or virtually none, of the references are relevant for the research question or gives an incomplete reference list.	Up to one-third of the references are relevant for the research question.	Approximately one-third to two-third of the references are relevant for the research question.	More than two-third of the references are relevant for the research question.		20
Referencelist - style	Uses no specific citation style and/or important bibliographic data (doi, author, year, etc.) is consistently missing in the reference list.	Uses the selected citation style with many mistakes or another citation style with one or zero mistakes.	Uses the selected citation style with some different mistakes.	Uses the selected citation style completely correctly and consistently.		30
Peer review and publishing	Makes more than 5 mistakes in the peer review/publishing questions or does not answer one or more questions.	Makes 2-5 mistakes in the peer review/publishing questions.		Completes the peer review/publishing questions completely correctly or with 1 error.		5

How to keep track of progress

- Brightspace
  - A hassle to get it 🚫
  - Developed to add other skills
  - Tick boxes in list does not work
  - Gradebook does work
- Now: Skills Academy for students on Brightspace
- BSc Skills Learning materials on Brightspace

Brightspace – Skills for BBN students

Gradebook Brightspace

- Overview of what has been done

- Choose what students see

- Students that skip a year

Evaluation pilot learning trajectory IL in BBN

- Education Learning Sciences
    - Perry den Brok
    - Linda Jans
- Evaluation strategy
    - Students, course evaluation + end-of-year survey + interview
    - Course coordinators, interview
    - Teachers information literacy, interview
    - Programme director, interview
    - Thesis coordinators, interview
    - Thesis supervisors, survey

Example question evaluation

Insight in own progress (3,2)

0 10 20 30 40 50 60 70 80 90 100

■ Helemaal geen inzicht ■ ■ ■ ■ Volledig inzicht
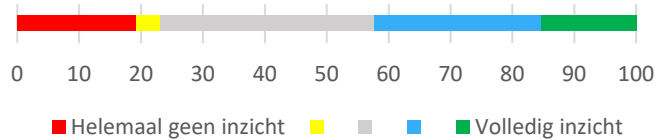
Insight in own IL level improved by:

Category	Value
Information about learning trajectory and...	6
Making the short self-assessment	8
Feedback from or conservations with students	8
Feedback from teachers	19
Obtaining an edubadge or not	5
Assessment of the made assignments	22
Making the assignments	25

0 5 10 15 20 25 30

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28
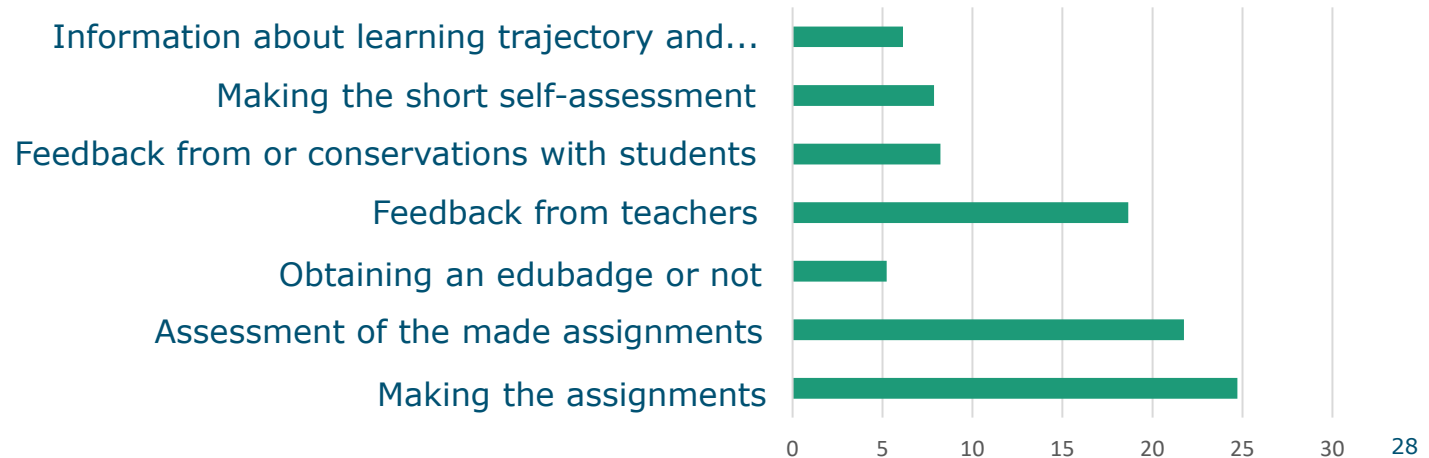
Conclusion

What worked well:

- Visualisation of the trajectory => consciously competent

- Integration in curriculum

- Skills in context

- Generic teaching modules based on learning goal matrix
    - Easy to adapt to different contexts

Conclusion

Challenges:

- Workload, study load and finances

- Perception that skills are extra in a course, when they are already present

- IV and other BSc skills

- Grade registration=> skill vs course

- Communication

Think and decide on all defined skills

Academic English · Argumentation & Reasoning · Collaboration · Feedback · Presenting · Writing · Entrepreneurial Skills · Reflection · Researching · Information Literacy · Diversity & Inclusivity · Personal Leadership · Data · Ethics & Dilemmas · Philosophy of Science · Social Embeddedness

(Check) implementation information literacy

- Information literacy in study programmes – WUR

- Information literacy - WUR

Outlook

- Intake form

- Workflow

- Conscious on what level which learning materials and assessment

- Generic if possible

- Lift administrative and teaching burden lecturers

  - Better end products

  - Skilled students

Questions

leonie.kamminga@wur.nl

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