

Mapping Competency Categories in Dutch Bachelor's Computer Science Curricula

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KEY FINDING The selected competency categories are broadly visible but unevenly documented — documentary visibility ≠ developmental intensity.

01 Why it matters & the question

CS graduates need **more than technical knowledge** — yet early-career developers feel underprepared for the broader competencies, and Dutch programmes (NVAO) must align goals, curriculum & assessment.

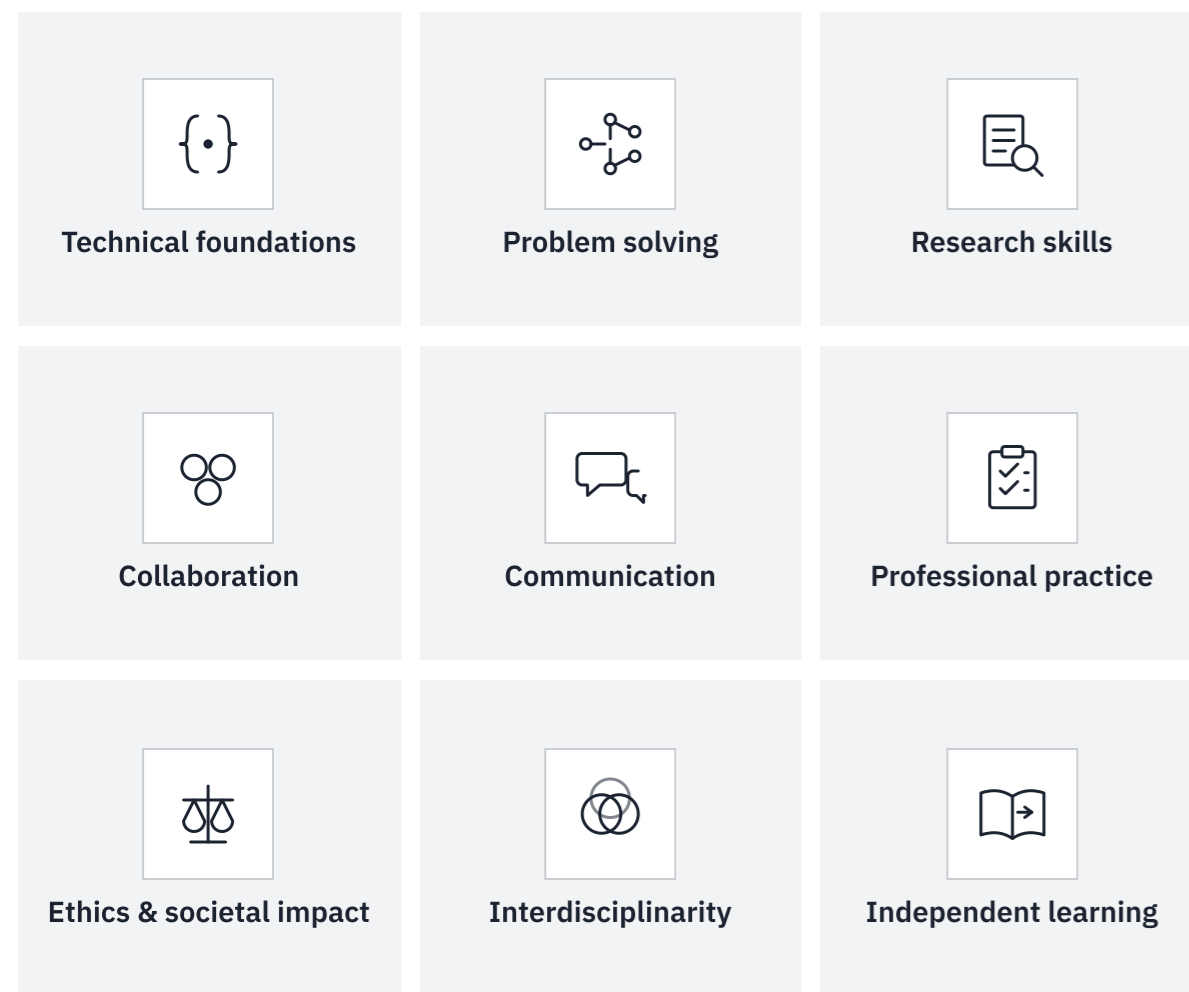
RESEARCH QUESTION

How are selected competency categories represented across **programme goals (L1)**, **curriculum structure (L2)**, and **assessment practices (L3)**?

- sQ1 – Which competency categories appear in programme-level goals of Dutch BSc CS programmes?
- sQ2 – How are these competency categories reflected in curriculum structure?

02 Analytical framework

CS2023 · NVAO · PRIOR WORK



03 Methodology – Document-based Curriculum Mapping



04 Results – Broad visibility, uneven documentary strength

CROSS-PROGRAMME VISIBILITY SUMMARY (OF 3)

COMPETENCY CATEGORY	L1 GOALS			L2 STRUCT.			L3 ASSESS.		
	E	I	N	E	I	N	E	I	N
Technical foundations	3	0	0	3	0	0	2	1	0
Problem solving	3	0	0	3	0	0	2	1	0
Research skills	3	0	0	3	0	0	2	1	0
Collaboration	1	1	1	3	0	0	3	0	0
Communication	3	0	0	3	0	0	3	0	0
Professional practice	1	1	1	3	0	0	1	2	0
Ethics & societal impact	3	0	0	3	0	0	1	2	0
Interdisciplinarity	2	0	1	3	0	0	1	2	0
Independent learning	3	0	0	3	0	0	2	1	0

■ EXPLICIT (E) ■ IMPLICIT (I) □ NOT VISIBLE (N)

CURRICULUM-STRUCTURE FREQUENCY BY PROGRAMME (%)

Competency Category	TU Delft (%)	TU/e (%)	NVAO (%)
Technical foundations	100	95	87
Problem solving	60	30	31
Research skills	9	5	16
Collaboration	23	14	16
Communication	11	14	20
Professional practice	11	11	11
Ethics & societal impact	20	33	16
Interdisciplinarity	9	35	4
Independent learning	14	5	13

- Explicit at curriculum-structure level in all three programmes. **9/9**
- Technical foundations explicit in curriculum entries. **87–100%**
- Mean explicit evidence drops from L2 to L3. **20–29% → 2–9%**
- Only **collaboration & communication** explicit at assessment in all programmes. **2/9**

05 Limitations

- 3 programmes, one year, **public docs only** — not generalizable, different documentation practices.
- **Deductive** categories shape the frequency results.
- **Single coder** — implicit coding involves judgement.
- Shows how competencies are **written**, not taught or learned.

06 Conclusion

Broad cross-level traceability, uneven intensity — presence across levels is not systematic development.

- 6 / 9 explicit in **all programme goals**; 9/9 explicit in **curriculum structure**
- Evidence **thins toward assessment**; only collaboration & communication stay explicit at L3
- **Technical core** dominates; broader competencies stay sparse.
- Read alignment by **frequency & strength**, not presence alone.