NTNU | Norwegian University of Science and Technology

Process improvement in a large course

WMSEE, 21 May 2025

Torgeir Dingsøyr
Department of Computer Science

Introductory course in software engineering

- 7,5 ECTS - one of four courses in spring semester, 2nd year

- About 500 students, organised in 72 development teams. Students from 8 study programs.

- 30 teaching assistants (6 "senior", 24 "junior"), two professors, two adjunct lecturers

- Project work with over 500 meetings between teams and supervisor

- 144 demonstrations of products

- Feedback on over 1000 "deliverables", portfolio assessment

Course structure: 2021
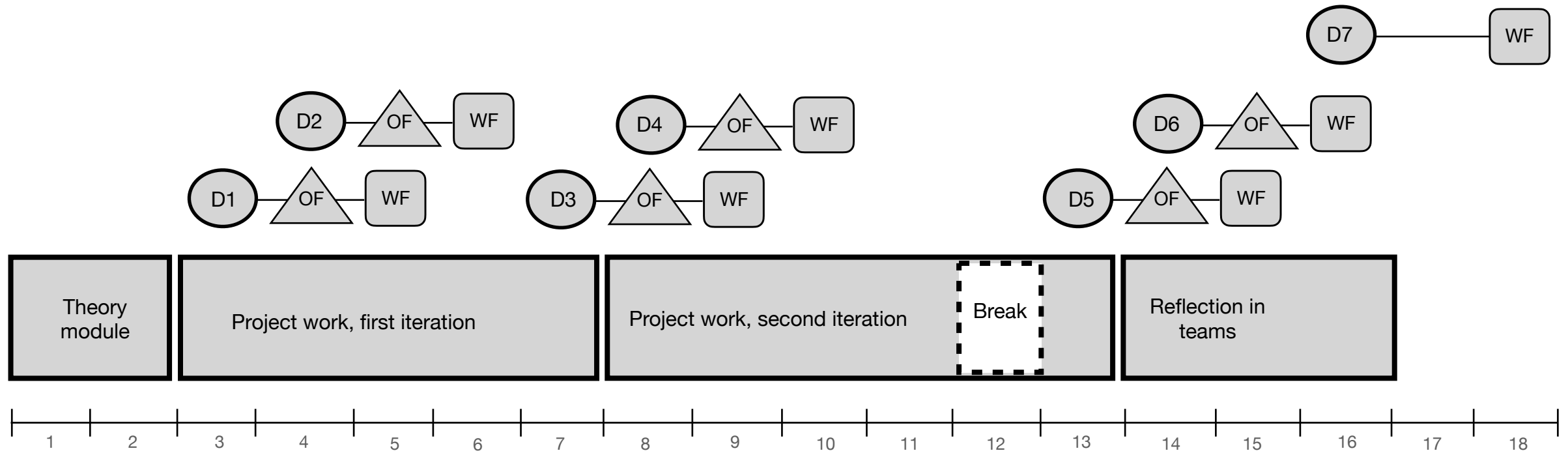
D1 - Team contract (pass / not pass)
D2 - Prestudy report (10%)
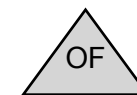D3 - Sprint review1 (10%)
D4 - Sprint retrospective1 (10%)
D5 - Sprint review2 (15%)

D6 - Sprint retrospective2 (15%)
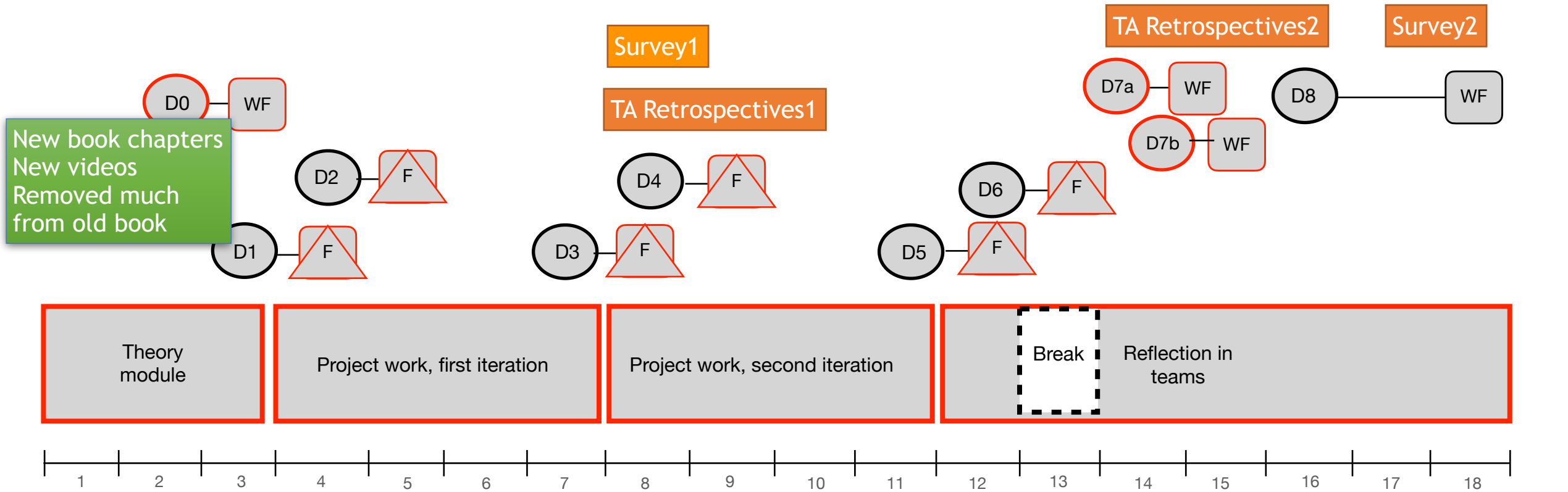D7 - Team reflection report (40%)

Deliverable

Oral feedback

Written feedback

Challenges 2021

- **Large variation in familiarity with the curriculum**

- **Large variation in effort within the groups**

- **A lot of effort put into product development, less effort into learning the curriculum material**

- Perceived variation in feedback on assignments

- Perceived high workload for teaching assistants

- Desire for more training in the technology stack

- Potential in using peer assessment to a greater extent

- Challenge with physical facilities when conducting activities without a pandemic

Course structure: 2022

New book chapters
New videos
Removed much from old book

Survey1

TA Retrospectives1

TA Retrospectives2

Survey2

D0 — WF

D2 — F
D1 — F

D4 — F
D3 — F

D6 — F
D5 — F

D7a — WF
D7b — WF

D8 — WF

| Theory module | Project work, first iteration | Project work, second iteration | Break | Reflection in teams |

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

D0 - Theory test (pass / not pass)
D1 - Team contract (pass / not pass)
D2 - Prestudy report (5%)
D3 - Sprint review1 (5%)
D4 - Sprint retrospective1 (5%)

D5 - Sprint review2 (5%)
D6 - Sprint retrospective2 (5%)
D7a - Individual reflection (30%)
D7b - Peer assessment (5%)
D8 - Team reflection report (40%)

Deliverable

OF — Oral feedback

F — Oral+ written feedback

WF — Written feedback

Feedback from students and teaching assistants

Impact of change

Time spent on theory module

2021: 8.3 x 2 = 16.6
2022: 10.8 x 3 = 32.4

Almost doubled!

Gjennomsnitt	2021	2022	2023	2024	Snitt
Teorimodul	8,3	10,8	9,4	7,9	9,1
Iterasjon1	11,5	14,2	14,9	13,0	13,4
Iterasjon2	13,7	13,9	14,5	13,3	13,8
Refleksjonsmodul	15,7	13,4	13,0	13,5	13,9
Alle deler	12,3	13,1	12,9	11,9	12,6
Sum	189,7	225,4	223,6	209,7	212,1

Use of learning resources

		Artikkel	Bok	Podcast	Video
2021	Score	3,2	4,1	2,6	3,3
2022	Score	3,1	3,8	2,6	3,4
	Snitt	3,1	3,9	2,6	3,3
	Forskjell	-0,1	-0,4	0,0	0,1
2021	% ikke brukt	27,4	2,5	65,1	53,1
2022	% ikke brukt	24,7	12,0	49,3	39,0
	Snitt	26,1	7,2	57,2	46,0
	Forskjell	-2,6	9,5	-15,8	-14,0

Learning outcome

	2021	2022	2023	2024	Average	Change 2021-2022
Average grades	4,2	3,9	3,7	3,8	3,9	-0,3
"I have learned much about SE"	3,8	3,9	3,7	3,8	3,8	0,1
Candidates	501	515	460	505	495,3	14,0
Failed	8	1	4	2	3,8	-7,0
Percentage	1,60 %	0,19 %	0,87 %	0,40 %	0,76 %	-1,40 %