

Experiences of Teaching Systems Architecting

by *Gerrit Muller* University of South-Eastern Norway-NISE

e-mail: `gaudisite@gmail.com`

`www.gaudisite.nl`

Abstract

The experiences of four years teaching systems architecting are described. The duration of the course systems architecting is 5 days. The target audience consists of (potential) architects and stakeholders that cooperate intensely with the architect, such as project leaders, product managers, and group leaders. The course has been given 23 times in the period November 1999 to January 2004. The maximum number of participants is 16.

This paper discusses the course content and the course objectives, course materials, the course format, some course statistics, the expectations of the students up front and the evaluation at the end, the follow-up and the longer term results, the derived course for managers, the lack of visibility of system architects, and the broader education context that is required for a systems architecting curriculum.

Distribution

This article or presentation is written as part of the Gaudí project. The Gaudí project philosophy is to improve by obtaining frequent feedback. Frequent feedback is pursued by an open creation process. This document is published as intermediate or nearly mature version to get feedback. Further distribution is allowed as long as the document remains complete and unchanged.

September 6, 2020
status: finished
version: 0

logo
TBD

Course objectives

- Make participants aware of the non-technical context
- Provide insight in the role of the system architect
- Outward focused and constructive critical.
- Provide practical approaches
- Become more visible in the organization

Course Program

time	subject
day 1 Morning	Positioning the System Architecture Process, Product Creation Process
day 1 Afternoon	Role and Task of the System Architect
day 2 Morning	Requirements Capturing
day 2 Afternoon	System Architect Toolkit
day 3 Morning	Roadmapping
day 3 Afternoon	Product Families, generic developments
day 4 Morning	Documentation, reviewing and other supportive processes
day 4 Afternoon	The role of Software in complex products
day 5 Morning	Psycho Social side
day 5 Afternoon	Wrap up, Expectations, How to continue, Evaluation

All course material can be found at the Gaudí site

Gaudí main



[The Gaudí project](#)

[Reading Guide](#)

Books

[System Architecting](#) [modules](#)
.pdf ~1.6 MB

[Architectural Reasoning](#) [modules](#)
.pdf ~2.7 MB

[Supporting Processes](#) [modules](#)
.pdf ~0.2 MB

Book
Book
Report

Courses

[Course descriptions](#) [modules](#)
.pdf ~0.2 MB

[SARCH](#) [modules](#)
.pdf ~2 MB

[MSARCH](#) [modules](#)
.pdf ~1.1 MB

[ESA stakeholders](#) [modules](#)
.pdf ~1.4 MB

[OOTI requirements engineering](#) [modules](#)
.pdf ~0.5 MB

[Execution Architecture](#)

PhD Thesis



[Thesis](#)
.pdf ~3.1 MB

[modules](#)

Research

[Composable architectures](#) [modules](#)
.pdf ~1.5 MB

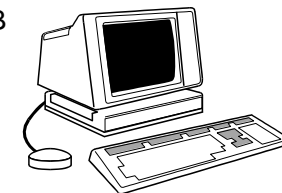
[Human measure](#) [modules](#)
.pdf ~2.5 MB

Case studies

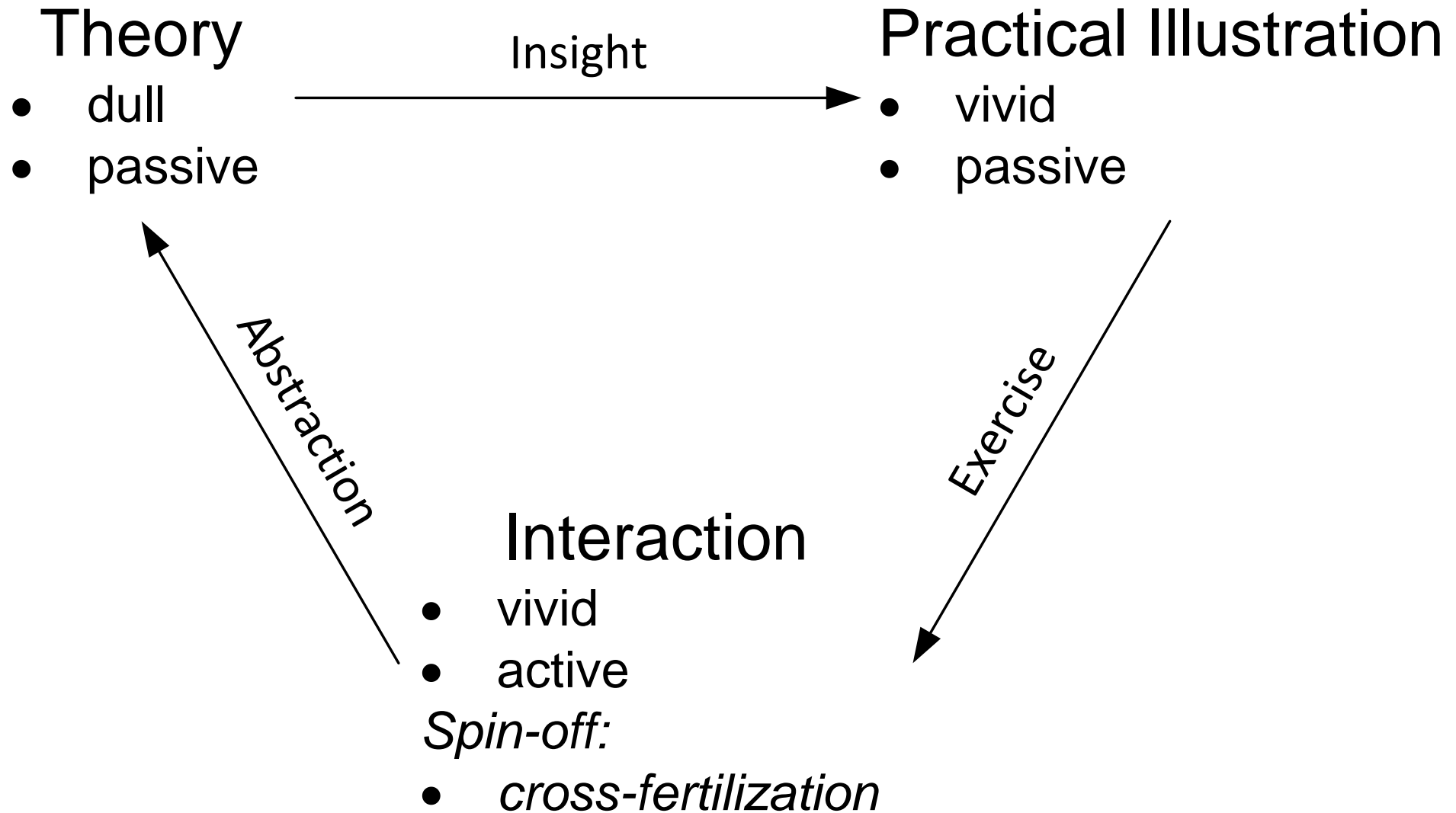
[Medical Imaging](#) [modules](#)
.pdf ~0.3 MB

[EasyVision](#)

[Waferstepper](#)



Interleaving of Theory, Interaction and Illustrations



general	16	
special	7	Medical Systems, Semiconductors, and Consumer Electronics
total	23	in 50 months, average 15 participants per course

Participants

- experienced designers
- subsystem architects
- mono-disciplinary architects, f.i. software architects
- researchers
- project leaders
- group leaders
- system architect

Fulfilled expectations

- insight in the architecting process
- insight in the architect role
- insight in the architect prerequisites
- means to capture requirements
- means to make roadmaps

Expectation that have not been met

- to learn system design methods
- to learn architecture styles or patterns
- to get advise on specific tools

Concerns

- How to apply the lessons in my environment?
- Distance between theory and practice
- Do we have the right architecture?

Outcome of the formalized evaluation

		special		regular	
		Mean	Sd	Mean	Sd
1	In my case, the objectives of the course have been:	4,0	0,7	4,1	0,8
2	All the important subjects are offered in the course.	4,0	0,8	4,0	0,8
3	The contents of the course had sufficient depth.	3,9	0,9	3,8	0,9
4	The level of the course combined well with my foreknowledge of this subject.	3,4	0,7	3,3	0,7
5	I have learnt many new things during the course.	3,7	1,0	3,9	1,0
6	The way of learning and working in the course was:	4,1	0,9	4,1	0,8
7	The various subjects in the course linked-up well.	4,1	0,8	4,1	0,8
8	The contents of the course were well-supported by the written material.	3,9	1,0	4,0	0,9
9	The exercises during the meetings combined well with the subject-matter.	4,3	0,7	4,2	0,8
10	The feedback on the exercises was:			4,1	0,7
11	The practical exercises were considered as useful:	4,1	0,8	4,0	0,8
12	What I have learnt in the course, I can use in actual practice.	4,2	0,7	4,1	0,8

Questionnaire March 2004

1. In what year did you follow the course?
2. What are in retrospect your most important learning points?
3. What subjects, methods or tools from the course did you apply in practice?
4. Do you have any new suggestions for the course?
5. Do you have suggestions for the yearly follow-up system architecting event?
6. Do you have interest in a 1 week course zooming in on more specific system design methods, based on my PhD thesis.
7. Any other feedback?

Questionnaire statistics

- sent to 345 SARCH participants
- 40 filled in forms
- 21 participants could not longer be reached
- The average time between following the course and filling in the questionnaire was $2 \frac{1}{2}$ years

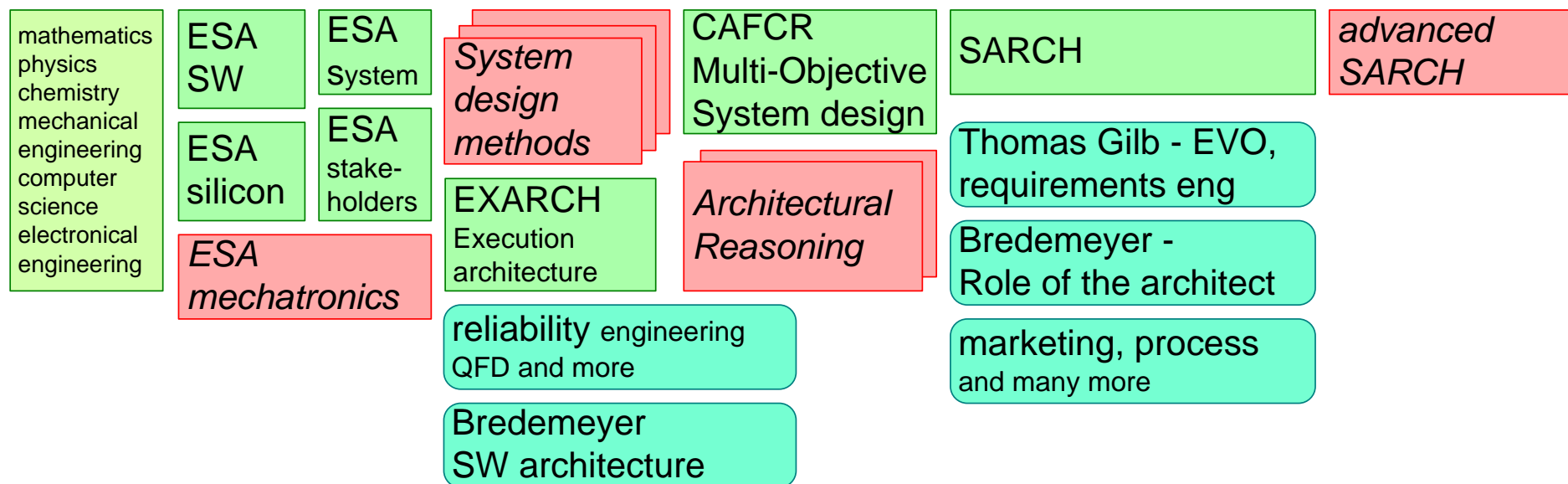
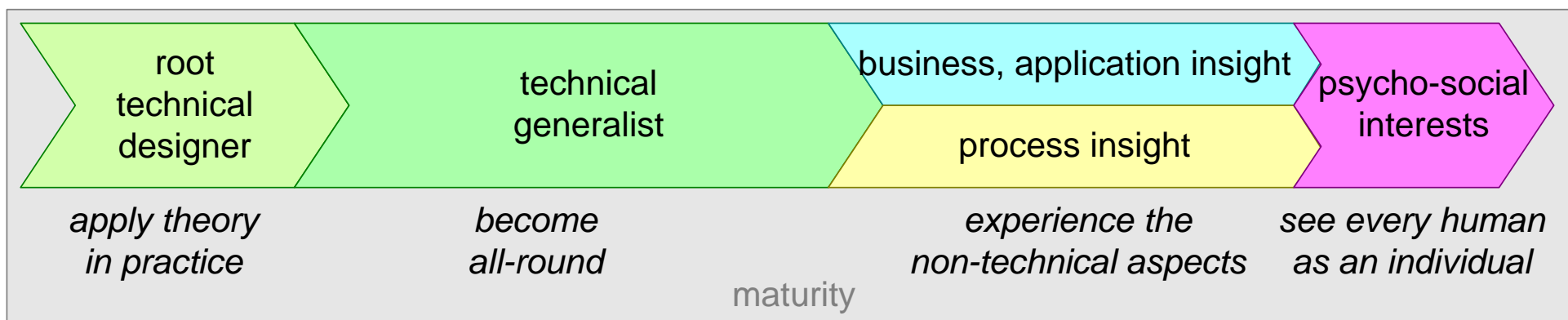
The most important learning points

- Role of the System Architect (9 times),
- Roadmapping (7 times)
- Broad Scope of the Architect (7 times)
- The Use of Multiple Viewpoints (5 times)
- Requirements (5 times)
- Generic Developments (4 times)
- Key Drivers (3 times).

The subjects applied in practice

- Roadmapping (12 times)
- Role of the System Architect (4 times)
- The Use of Multiple Viewpoints (4 times)
- Requirements (3 times)
- Stakeholders (3 times)
- Key Drivers (3 times).

Curriculum for System Architects



legend



ESA: Embedded Systems Architecting
 EVO: Evolutionary Project Management
 QFD: Quality Function Deployment