

Architecting for Humans; How to Transfer Experience?

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

e-mail: `gaudisite@gmail.com`

`www.gaudisite.nl`

Abstract

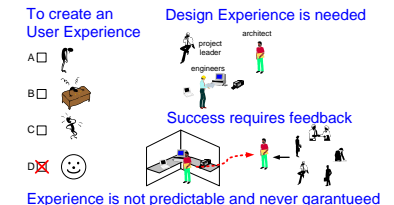
The ultimate goal of Product Creation is to create products which give the user a great experience. User experience is very intangible. Product engineering focuses on tangible requirements. Successful products require both sound engineering as well as creative design. The question is how to obtain a workforce, which is capable of both activities?

The education of successful engineers is limited to engineering methods. Additional skills are acquired by experience. Unfortunately experience cannot be transferred from one engineer to the next. Such a transfer is approximated by active personal development.

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 5, 2020
status: finished
version: 1.3



Did you ever program a VCR or PVR?

A



depressed

B



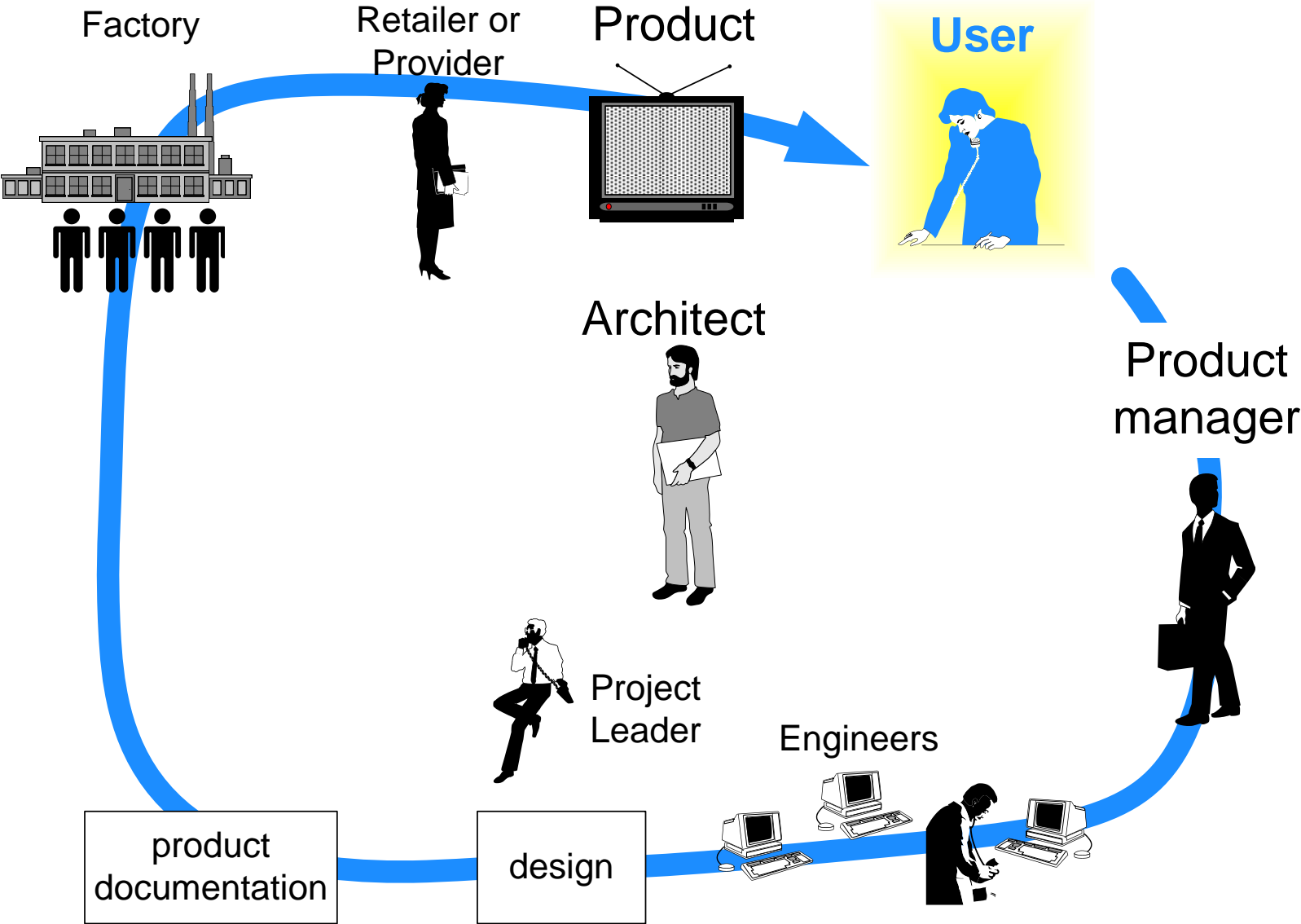
desperate

C

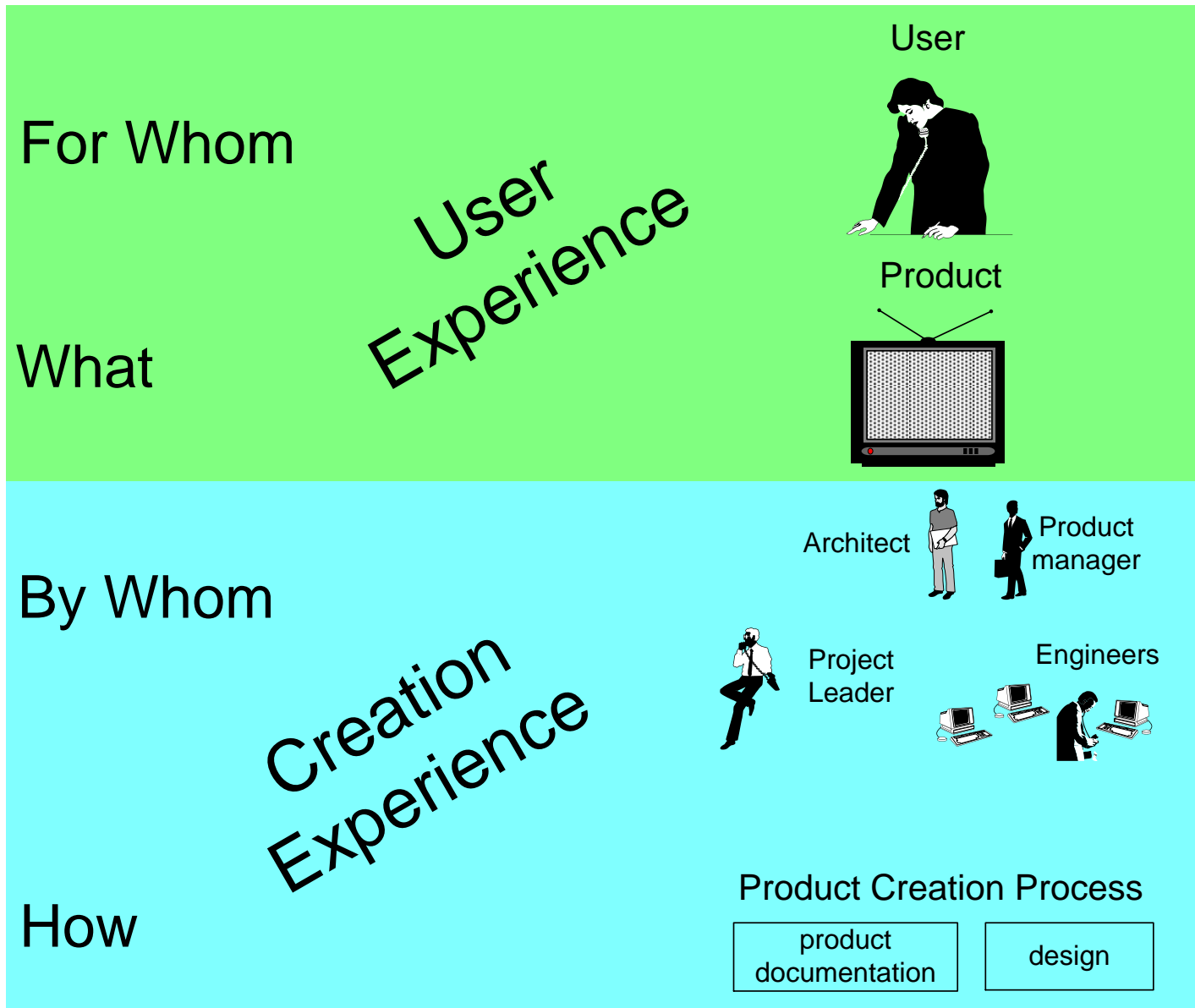


hysteric

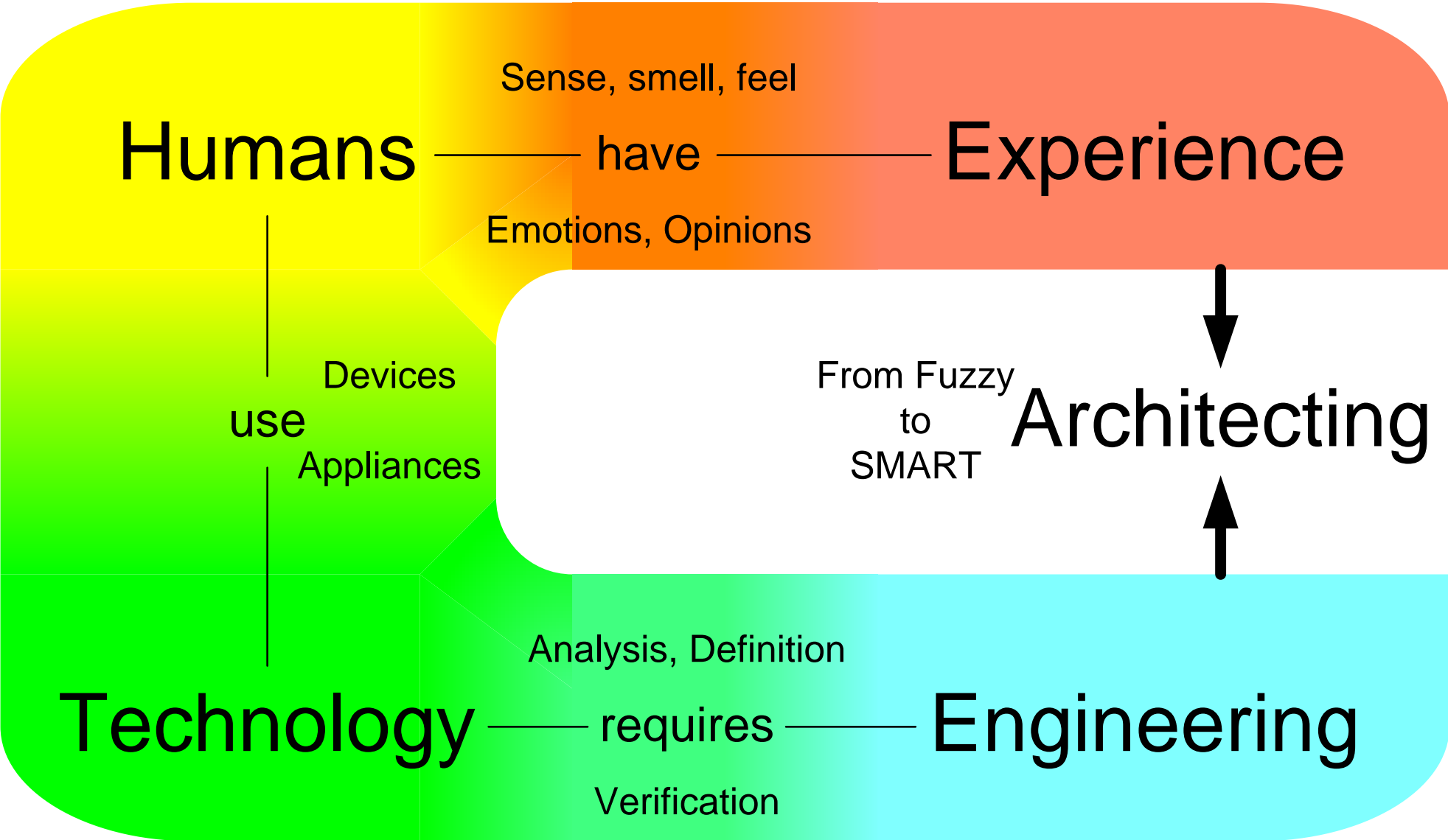
Product Creation Cycle



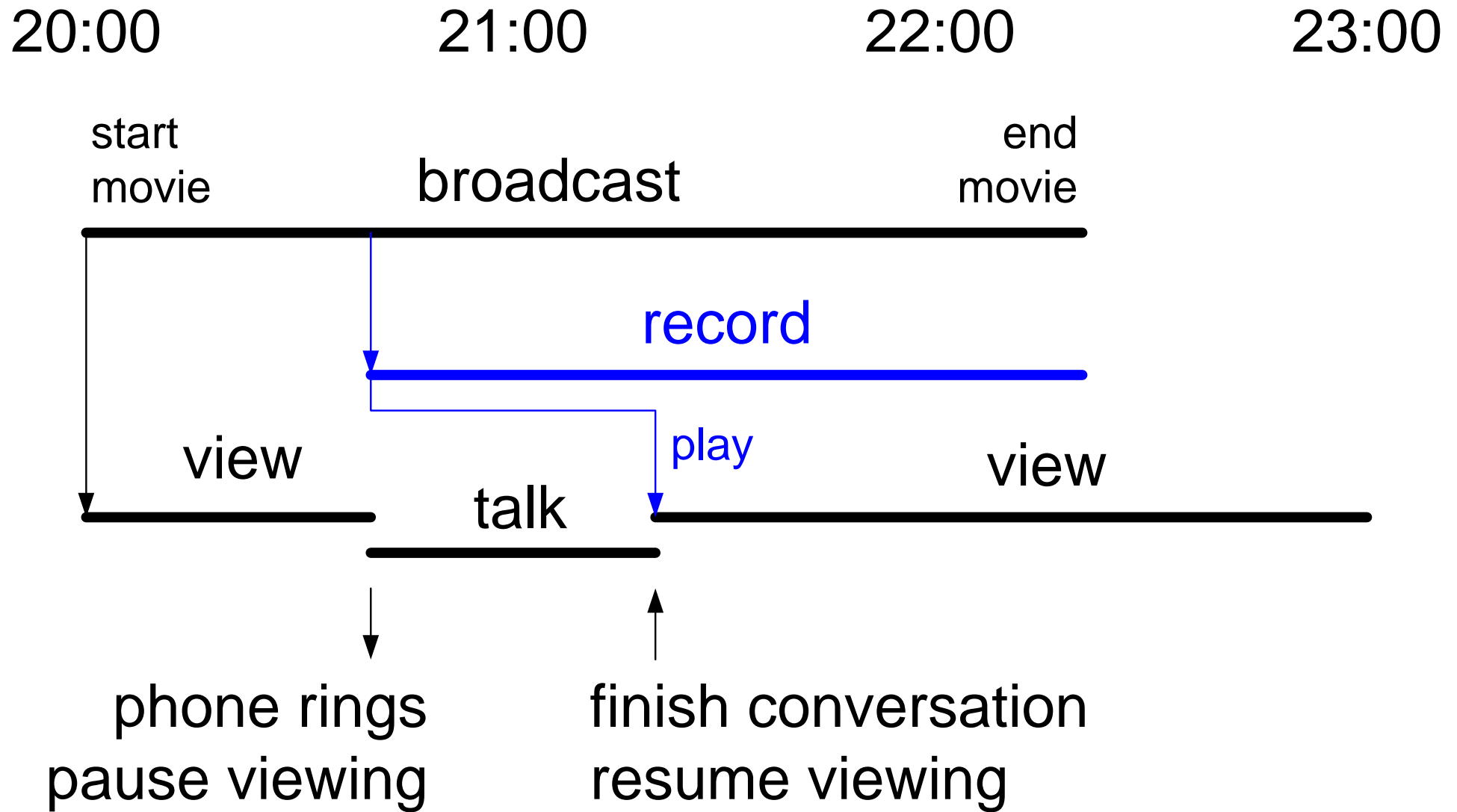
2 Levels of Experience



Bridging the gap between Experience and Engineering



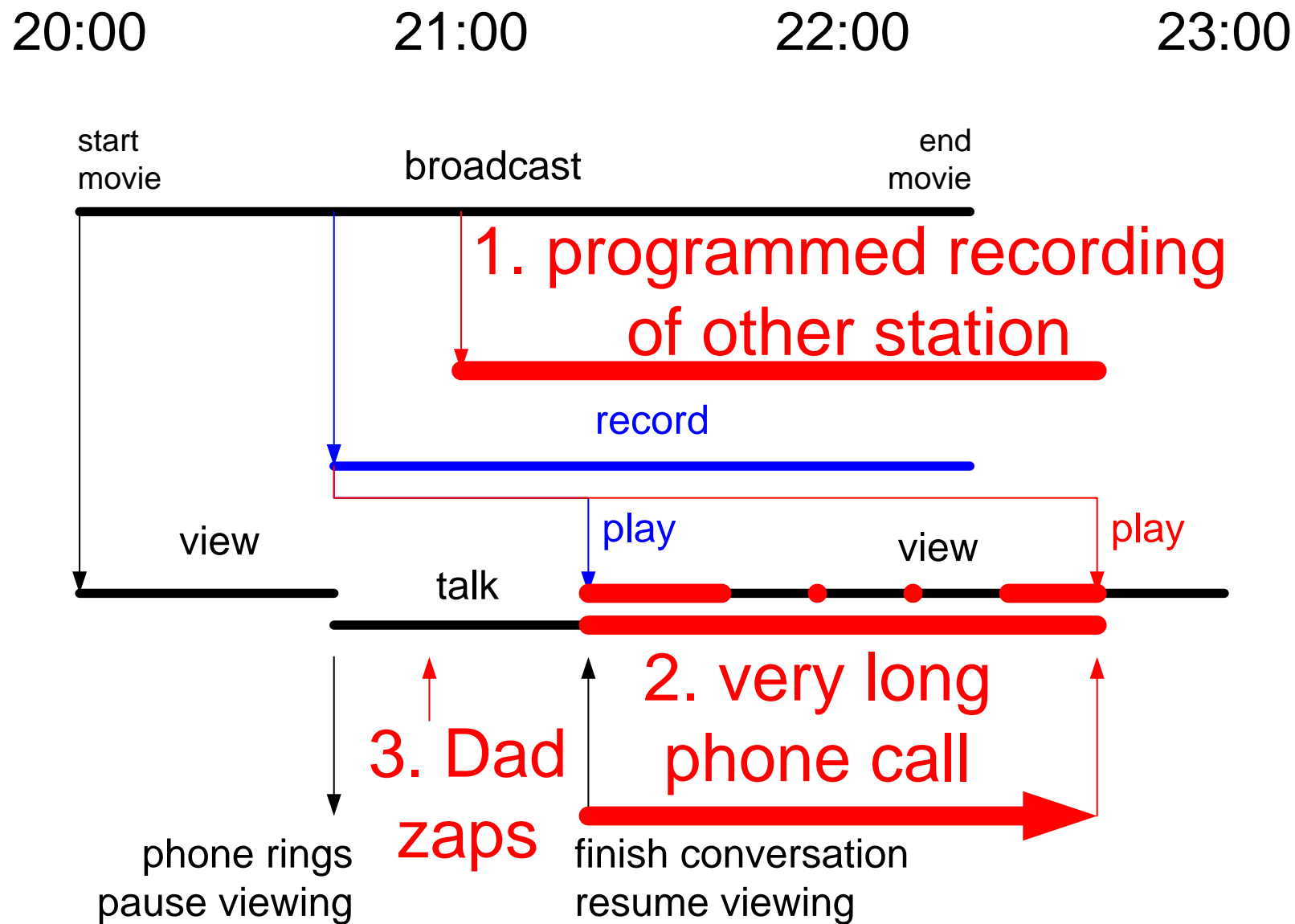
Example Time Shift recording



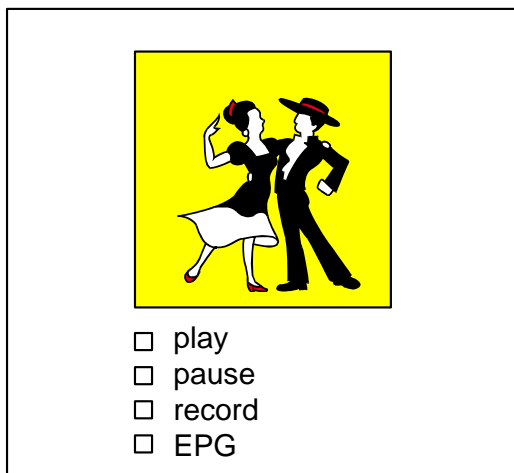
Construction limits intrude in Experience

- number of tuners
- number of simultaneous streams (recording and playing)
- amount of available storage
- management strategy of storage space

What if?



Visual Basic Prototype:
enables "experiencing"

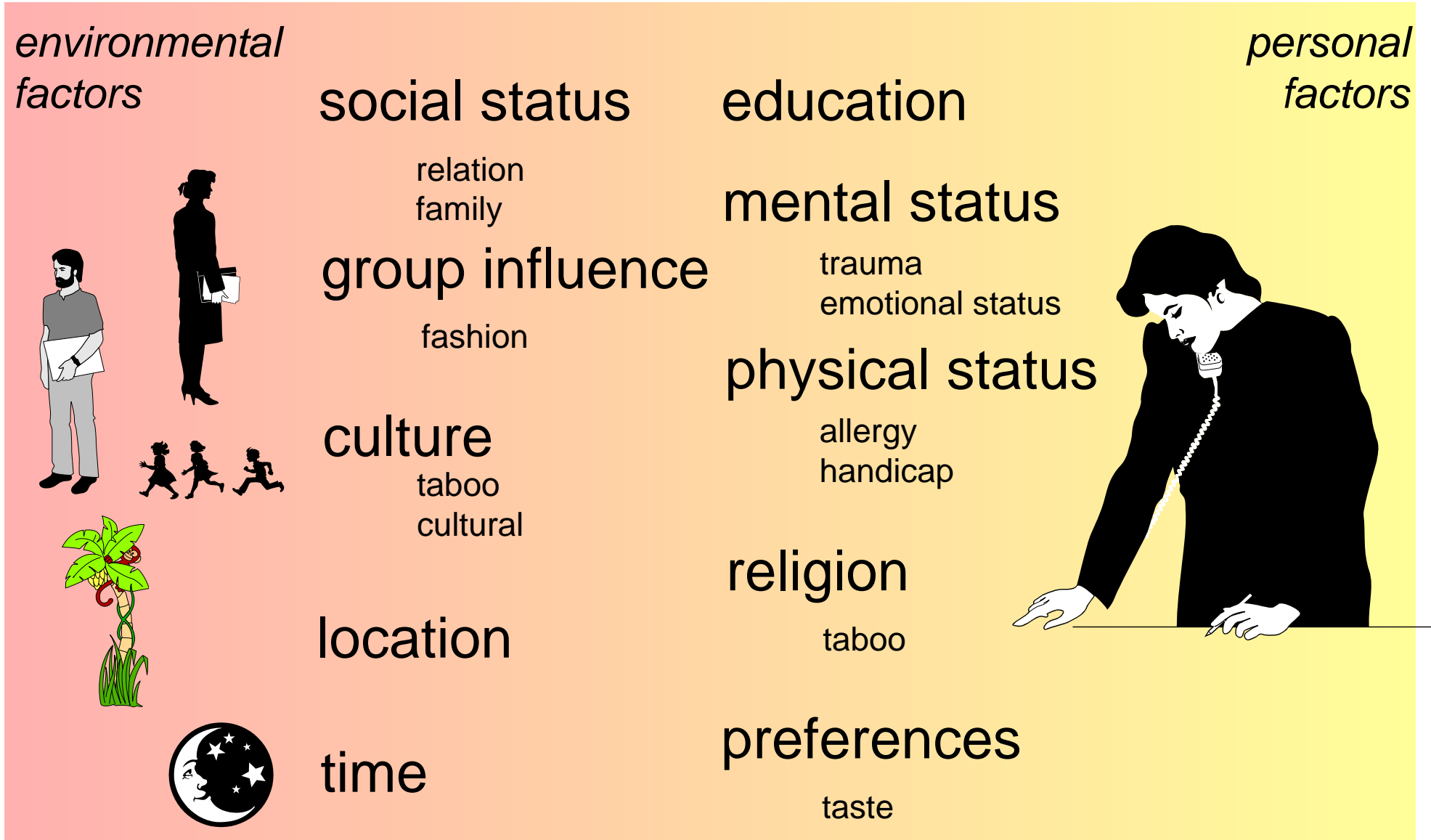


Requirements specification
Many tables, mostly addressing details

- 2.1.1 Real-time data requirements
- 2.1.2 Implementation detail
- 2.1.3 Non-real time data requirements

1.1 Software Requirements	
1.1.1 Real-time data requirements	<p>1.1.1.1 Access to the non-real-time data must be done in such a way that it does not interfere with the real-time data</p> <p>1.1.1.2 There must be no disruptions in output of video signal during the operation of VCR</p> <p>1.1.1.3 Responsiveness for non real-time data is less than 150ms (the time for writing a block on HDD) for 2KB of non-video data</p>
1.1.2 Implementation detail	<p>1.1.2.1 Management of HDD content must only be possible through the TOC in order to prevent unauthorized access to content of HDD</p> <p>1.1.2.2 Visual feedback is provided to the user via On-Screen Display</p> <p>1.1.2.3 User input is provided via the RC</p>
1.1.3 Non-real time data requirements	<p>1.1.3.1 User must be able to pause and unpaue a title, played from HDD, while (s)he is watching it</p> <p>1.1.3.2 User can jump forward and backward in a title, from HDD, during watching of this title</p> <p>1.1.3.3 Names of titles should be derived from the information from the EPG (name of the program to be recorded, time and date of registration)</p>

Factors influencing the User Experience



How to "SMART"en Experience?

- define
- measure
- predict
- verify

Infinite Experience Space

People	Number of People on earth	$O(10^9)$
		*
Time	Human lifespan in seconds	$O(10^9)$
		*
Location	Square meters of planet earth	$O(10^{14})$
		*
...

Size of experience space

∞

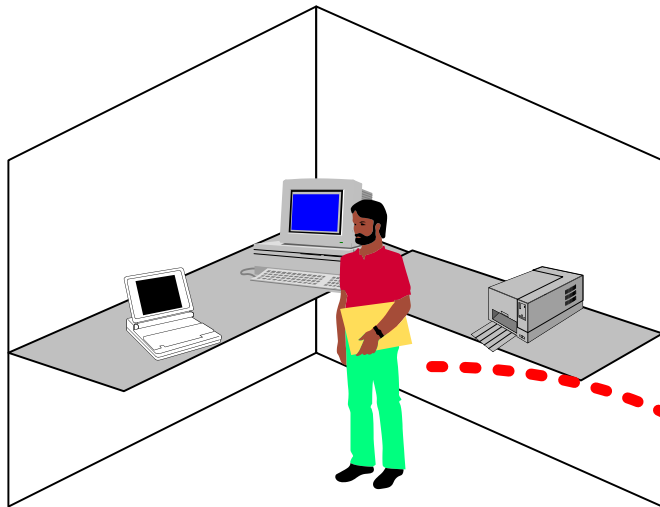
It is not that bad :-)

Many nice and successful products exist!

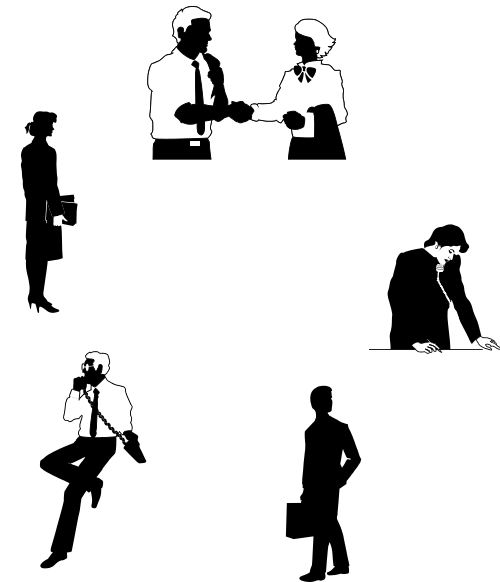
Key Success Factor: Feedback

Obtain feedback from real users:

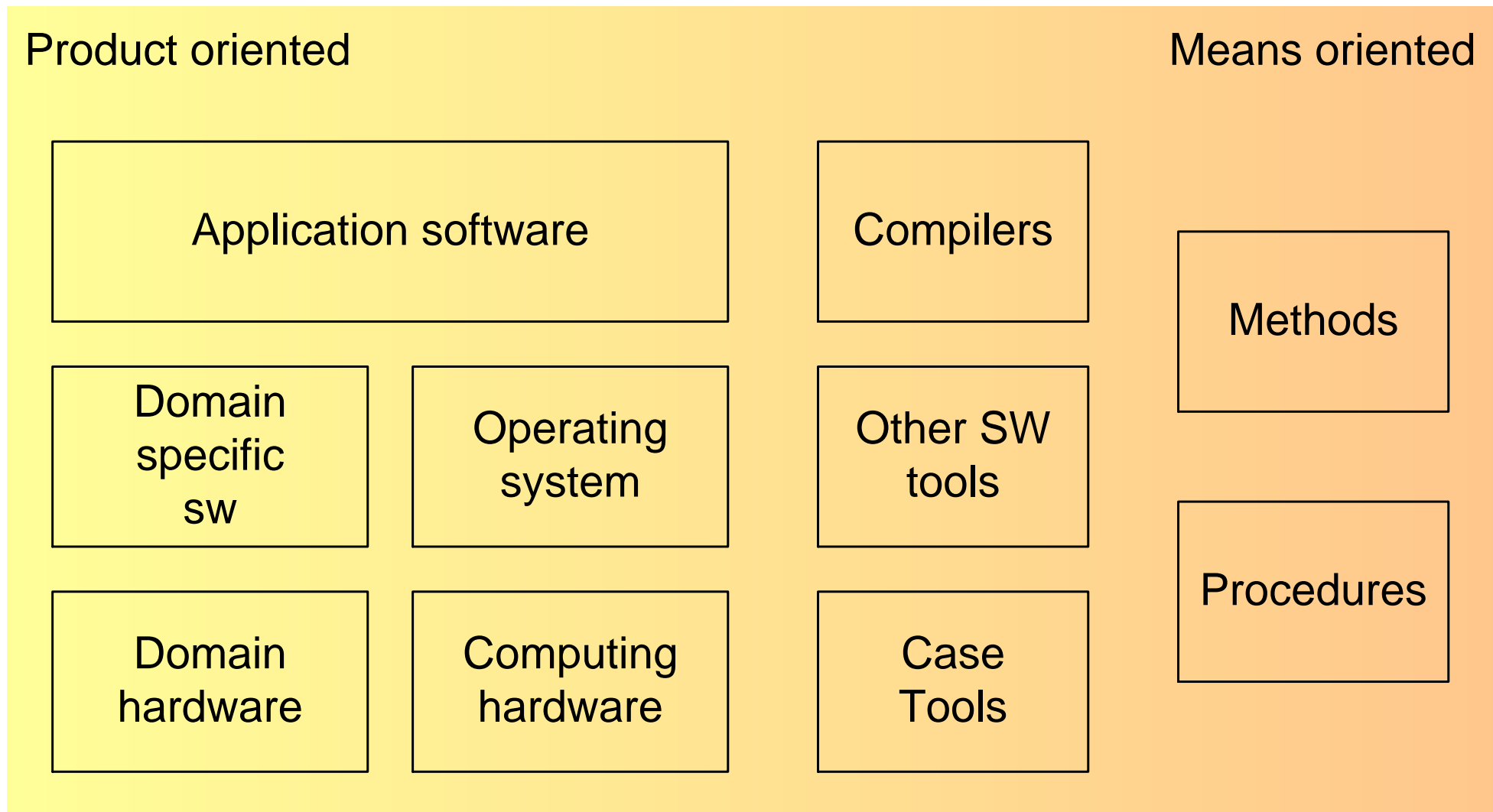
- Observe
- (Dare to) Listen
- Experiment
- Use short development cycles



Don't stay in the development lab



The world of the construction



Engineers are educated in construction disciplines

- Programming languages
- Operating systems
- Algorithms
- Data structures
- Formal specification and verification techniques
- Analysis, simulation techniques

Product Creation is much more than Engineering

Product Creation = Engineering + Creativity

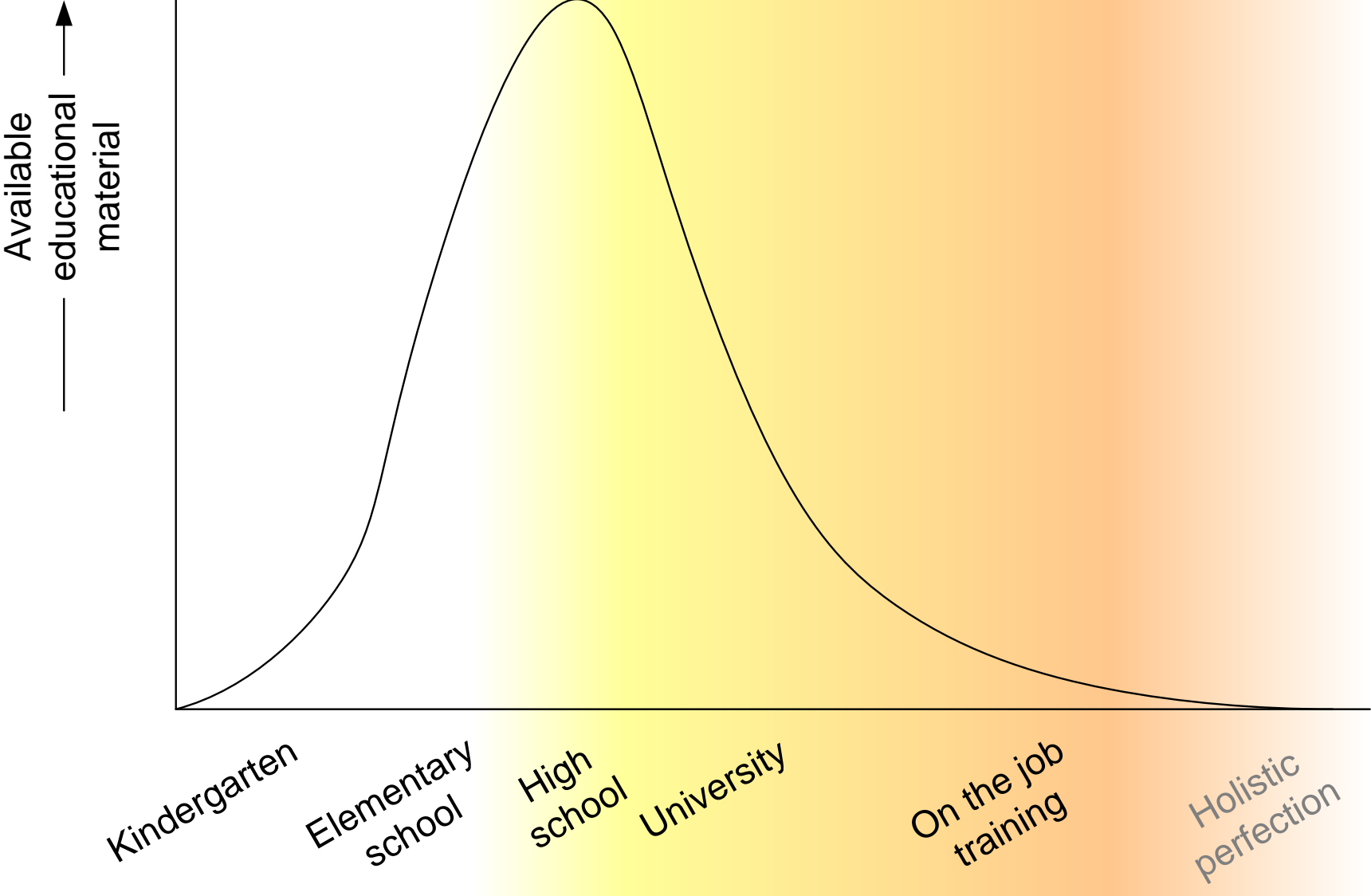
Known:

- Facts
- Notations
- Methods
- Tools
- Patterns

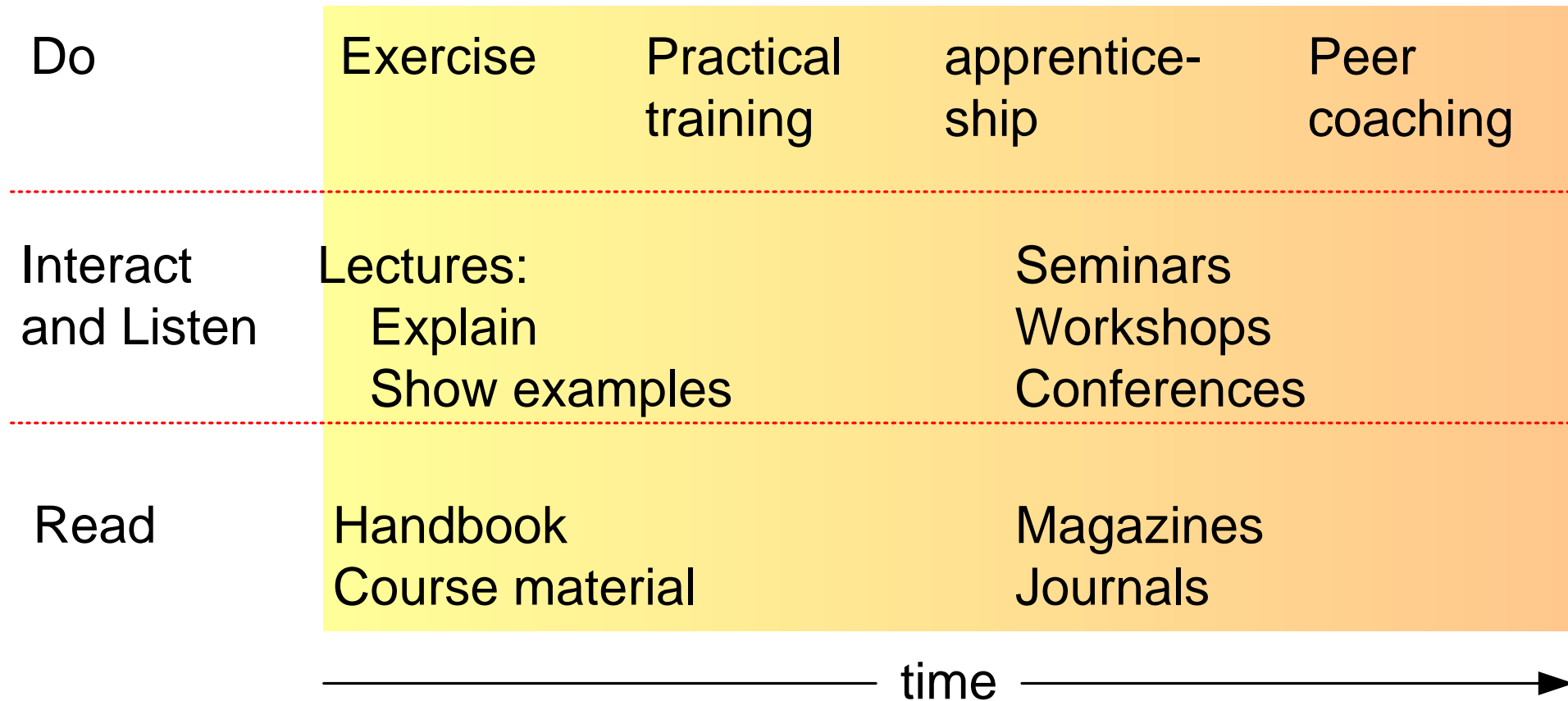
- Intuition
- Observation
- Trial and error
- Lateral thinking
- Collection of references

Education ↔ Experience

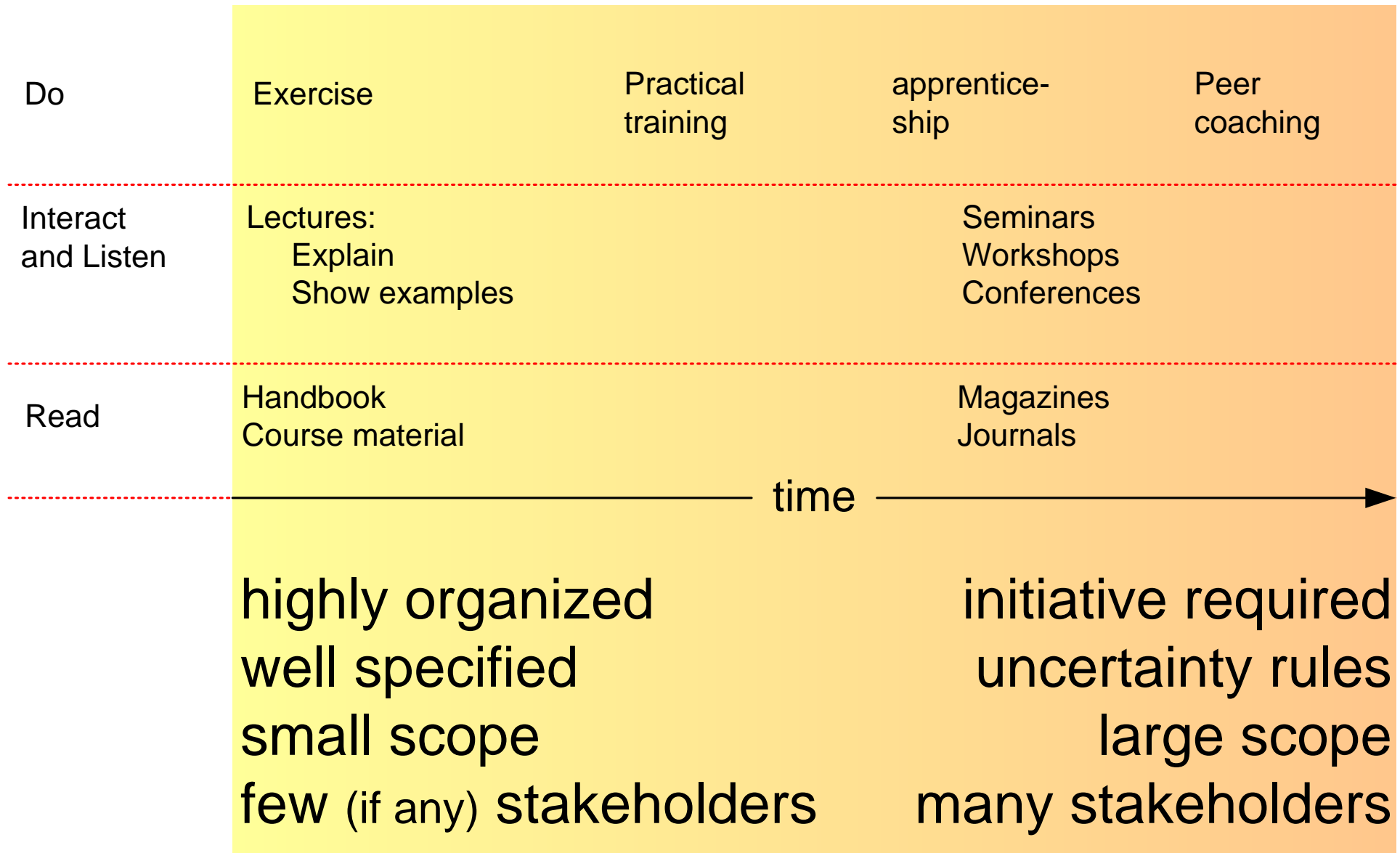
Educational Material per education stage



Changing Education model in time







Increasing Initiative required



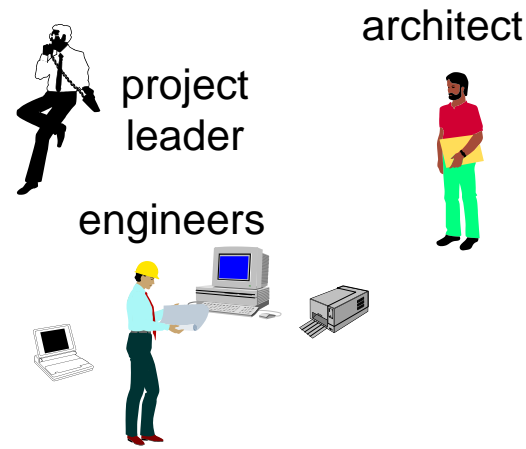
Prerequisites for continuous successful product creation

- Awareness of engineers of human aspects
- Active personal development drive of engineers
- Awareness of managers of education models
- Active motivation by managers

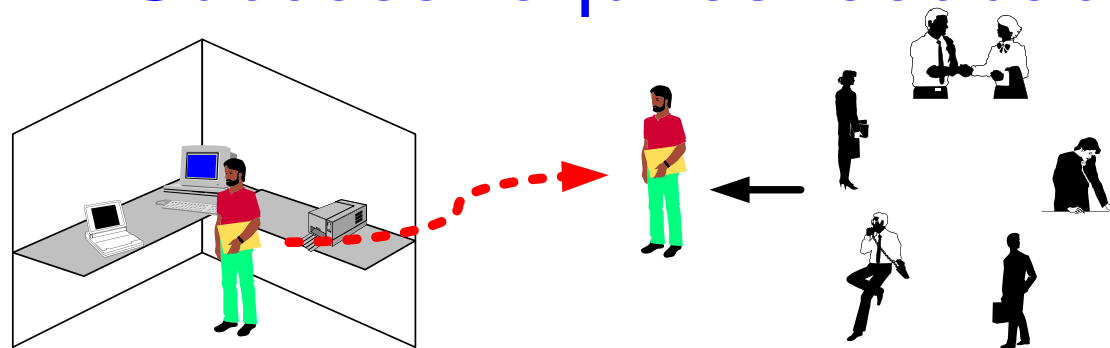
To create an User Experience

- A 
- B 
- C 
- D 

Design Experience is needed



Success requires feedback



Experience is not predictable and never guaranteed

Design experience is not transferable education is no substitute



Regular education =
Transfer of Engineering methods
+ Training

Transfer is approximated by personal development

Personal Development =
On the job training
+ feedback
+ continuous personal education

