Curriculum Design Research

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Terminology

- Design research
- Development research
- Design-based research
- Formative research
- Design experiments
- …

Family with subtle differences

In common: Next to understanding the world, also changing it

Definition: Curriculum Design Research

= the systematic study of analyzing, designing and evaluating educational interventions in order to solve complex curriculum problems for which no ready-made solutions are available with three-fold aim:

1. **High-quality curricula** (educative programs and materials)
2. **Contribution to the knowledge base** (design principles)
3. **Professional development** (of those involved in the study)

1. High-quality curricula

- Relevant

  There is a need for it

  Its design is based on state-of-the-art (scientific) knowledge.

- Consistent

  The curriculum is ‘logically’ designed.

- Practical

  The curriculum is usable and feasible in the settings for which it has been designed.

- Effective

  Using the curriculum is resulting in desired outcomes.

2. Contributions to the knowledge base

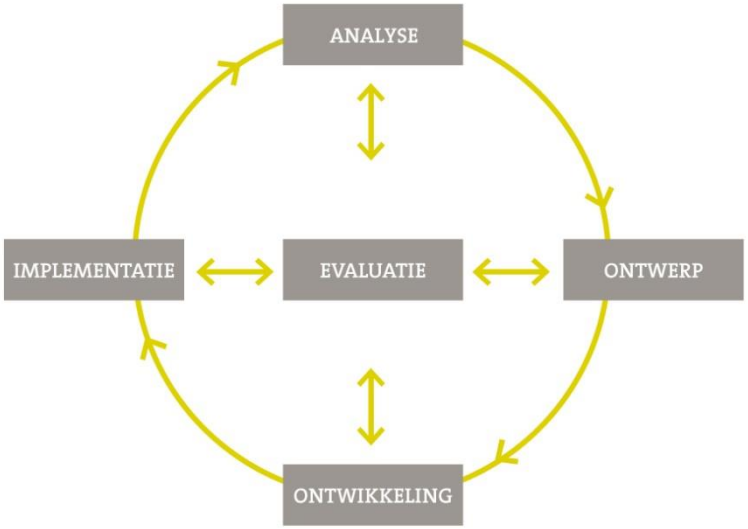
- Theoretical insights (what are working mechanisms?)
- Empirical underpinnings (what evidence do we have from practice?)
- Understanding of conditions for success (under what circumstances does the intervention (not) work?)
- Understanding of the design process (What steps do you take and who do you involve when designing these interventions?)

3. Professional development

- User-centered approach (learning by co-design):
  - Leads to intensive discussions about the requirements of the product
  - Provides better opportunities to negotiate and justify design ideas
  - Increases user-commitment and ownership of final deliverable
  - prevents developers from a tendency to 'design for themselves’
- Encourages future implementation (starting from day 1)
- Addresses many levels (systemic innovation)
- Involves many partners (broadening support and ownership)

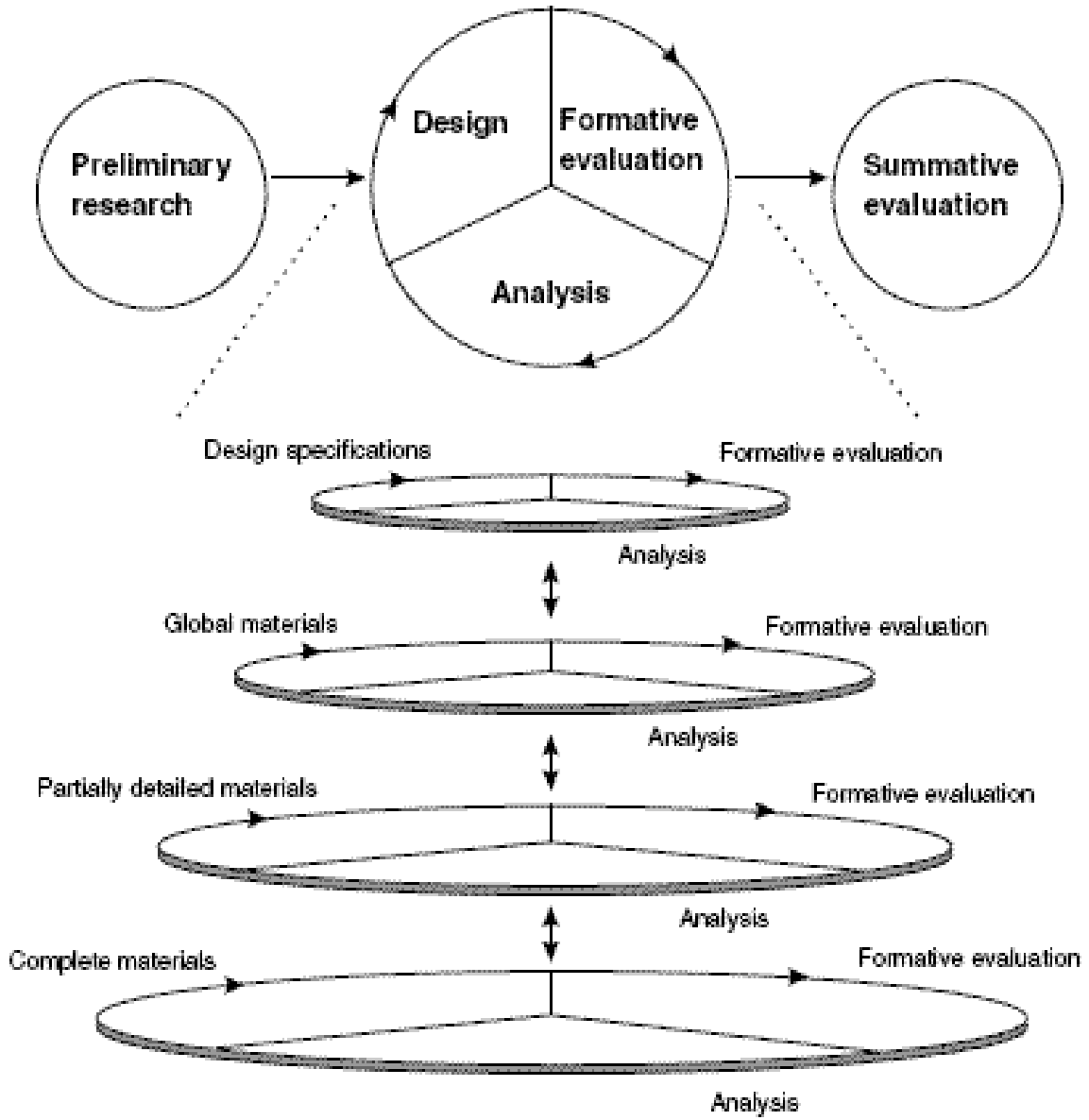
How to reach these results…

- High degree of iteration
- Each cycle represents the evolution of intentions of the final deliverable



- Formative evaluation of prototypes is crucial
  - Leads to revision suggestions and adaptation of the intervention
  - Gives insight in the potentials and dynamics of the intervention
  - Gives insight in desirable (and undesirable) characteristics of the intervention and conditions of the context-of-use

During the carousel: Methods
How to reach the aims of curriculum design research



(Nieveen, 1997)

Formative evaluation methods

- Screening
  - members of the design research team check the design with a checklist containing required characteristics of the product
- Focus group (expert appraisal)
  - a group of experts (for instance, subject matter experts, instructional design experts, teachers) react on a prototype of the product
- Walkthrough
  - the design research team and representatives of the target group simulate the use of the product
- Micro-evaluation
  - a small group of the target users use parts of the product outside its normal user setting
- Try-out
  - the target group uses the product in practice

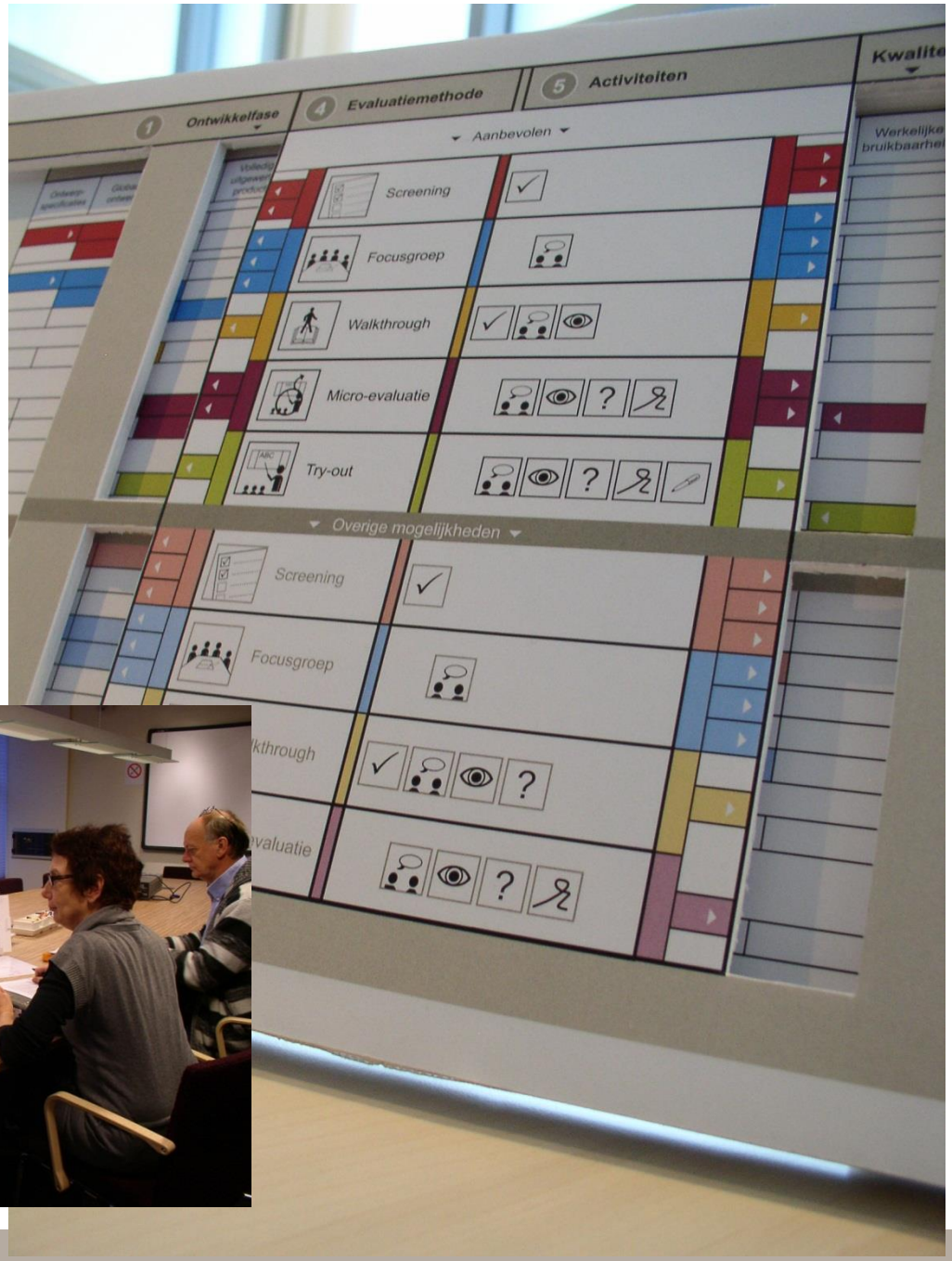
Selecting evaluation methods

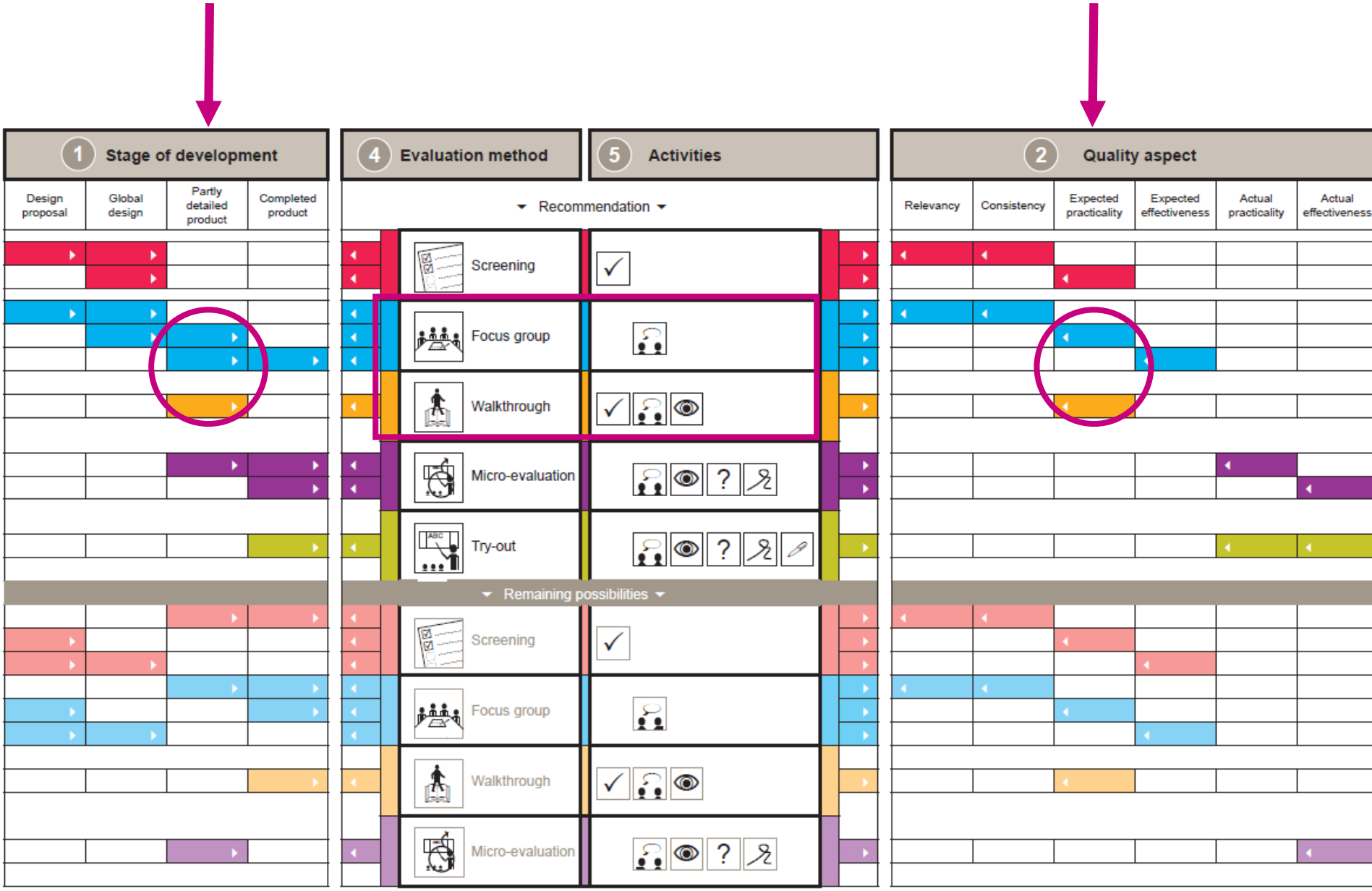
QUALITY / DESIGN → STAGES		Design proposal	Global design	Partly detailed product	Completed product	Implemented product
Relevance		**Screening Focus group**	**Screening Focus group**	**Screening Focus group**	**Screening Focus group**	
Consistency		**Screening Focus group**	**Screening Focus group**	**Screening Focus group**	**Screening Focus group**	
Practicality	*Expected*	**Screening Focus group**	**Screening Focus group**	**Focus group Walk through**	**Focus group Walk through**	
	Actual			**Micro-evaluation**	**Micro-evaluation Try-out**	
Effectiveness	*Expected*	**Screening Focus group**	**Screening Focus group**	**Focus group**	**Focus group**	
	Actual			**Micro-evaluation**	**Micro-evaluation Try-out**	**Survey (quasi-) experiment**

…and evaluation activities

Evaluation method	Possible activities for the gathering of information
Screening	• Using a checklist
Focus group	• Interviewing
Walkthrough	• Using a checklist • Interviewing • Observing
Micro-evaluation	• Observing • Interviewing • Administering a questionnaire • Testing or requesting a learning report
Try-out	• Observing • Interviewing • Administering a questionnaire • Testing or requesting a learning report • Requesting logbooks

‘Evaluation Matchboard’





Explanation: On one horizontal row, combine a stage of development (1) with a quality aspect (2) and find an evaluation method (4) with relevant activities (5)

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Nieveen, N., Folmer, E., & Vliegen, S. (2012). *Evaluation Matchboard*. Enschede, the Netherlands: SLO.

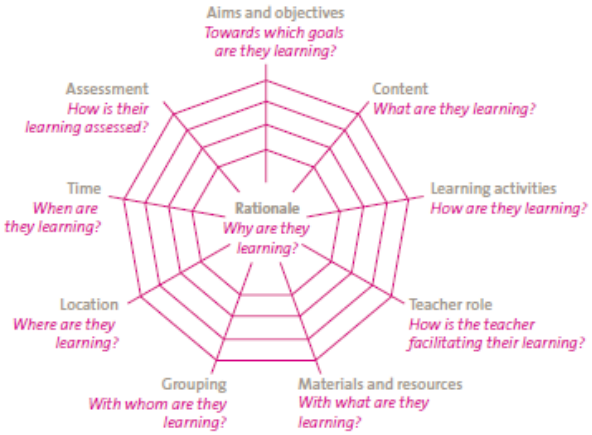
1 Stage of development

- **Design proposal**
  General idea of the product.
- **Global design**
  First elaboration of the product.
- **Partly detailed product**
  Parts of the product have been specified and could be used by the target group.
- **Completed product**
  The product is ready for use in practice.

2 Quality aspects

- **Relevance**
  There is a need for the product and its design is based on state-of-the-art (scientific) knowledge.
- **Consistency**
  The product is 'logically' designed.
- **Expected practicality**
  The product is expected to be usable in the settings for which it has been designed.
- **Expected effectiveness**
  Using the product is expected to result in desired outcomes.
- **Actual practicality**
  The product is usable in the settings for which it has been designed.
- **Actual effectiveness**
  Using the product results in desired outcomes.

3 Curricular components



4 Evaluation method

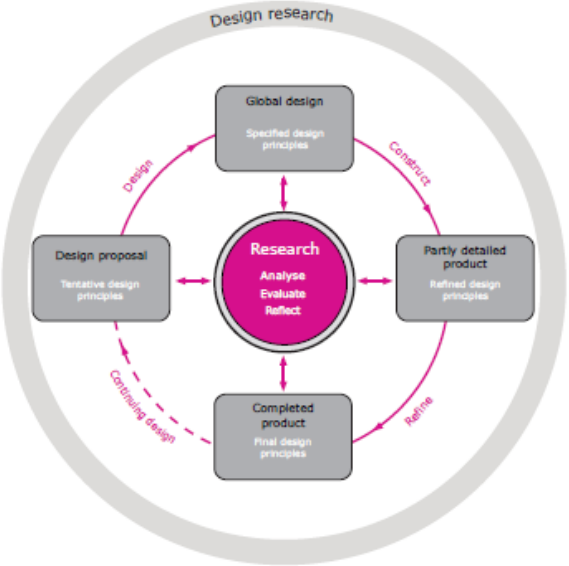
- **Screening**
  
  Members of the design research team check the design with a checklist containing required characteristics of the product.
- **Focus group**
  
  A group of respondents reacts on a prototype of the product.
- **Walkthrough**
  
  The design research team and representatives of the target group simulate the use of the product.
- **Micro-evaluation**
  
  A small group of target users use parts of the product outside its normal user setting.
- **Try-out**
  

  The target group uses the product in practice.

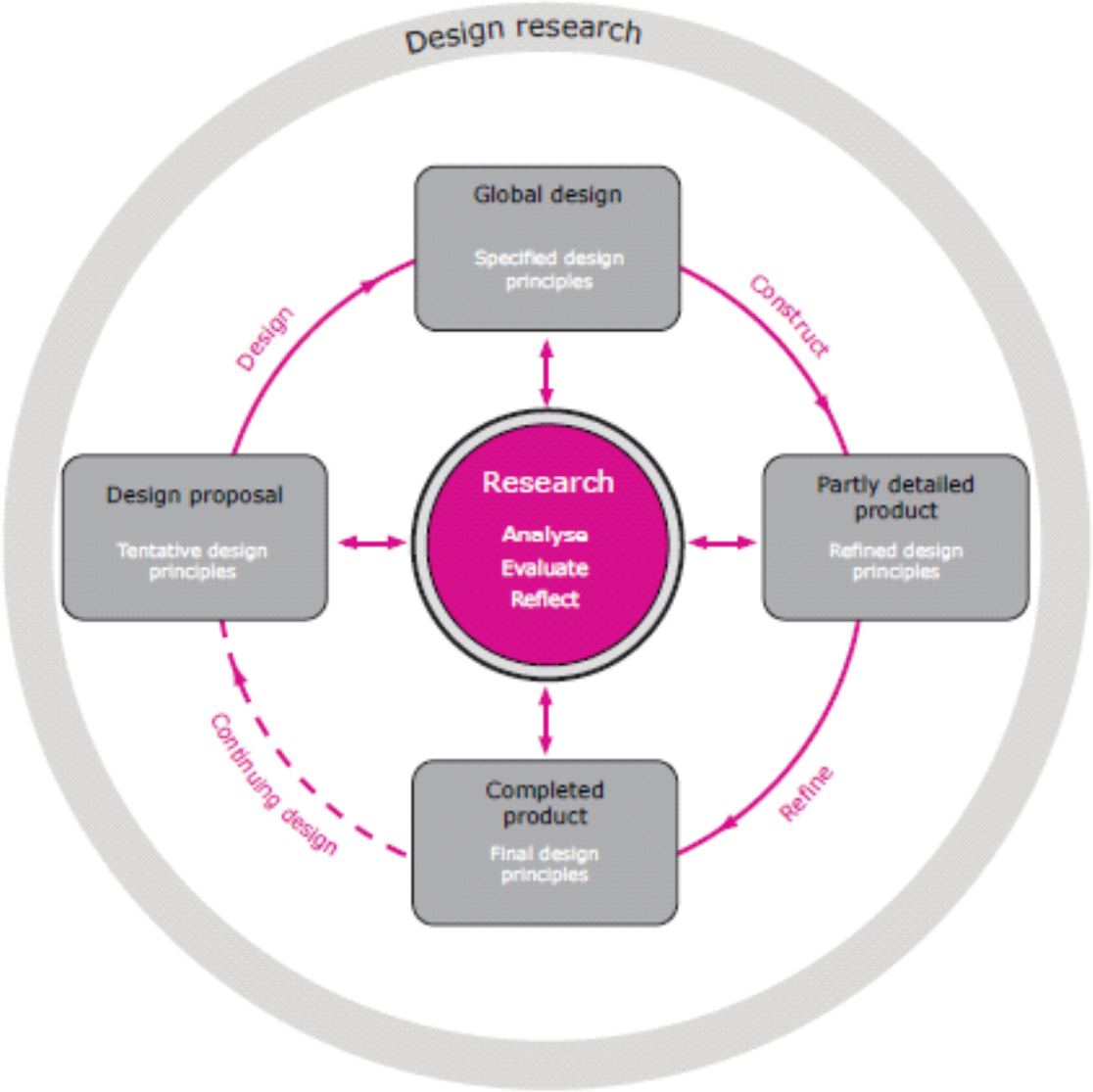
5 Activities

- **Using a checklist**
  
  Using a checklist with required characteristics of the product.
- **Interviewing**
  
  Asking respondents questions verbally.
- **Observing**
  
  Noticing what happens in practice and how respondents act.
- **Administering a questionnaire**
  
  Respondents answer questions on a paper-based or digital questionnaire.
- **Testing or requesting a report**
  
  Respondents make a test or draw up a learning report.
- **Requesting logbooks**
  
  Respondents write down their actions and reflections during a certain period.

Design research



Successive approximation of high-quality **products** AND **design principles**



Design principles

heuristic format:

If *you want to design intervention X [for purpose/function Y in context Z]*

then *you are best advised to*

- *give that intervention the characteristics* C_1, C_2,…, C_m [substantive emphasis]
- *and to do that via procedures* P_1, P_2, …, P_n [procedural emphasis]

because *of*

- *theoretical arguments* T_1, T_2, …, T_p
- *and empirical arguments* E_1, E_2, …, E_q

Functions of design principles

- Research perspective

  → principles show the contribution of design research to the existing knowledge base with information on how the intervention works in practice, the effects of using the intervention and explanation of the working mechanisms.

- Educational designers

  → principles carry rich information on how to design similar interventions for similar settings.

- Future users

  → principles provide information needed for selecting and applying interventions in the specific target situation and provide insights in the required implementation conditions.

- Policy makers

  → principles assist in making research-based decisions for solving complex educational problems.

Further readings

- www.leerplanevaluatie.slo.nl/English → 2-minute clip + Evaluation matchboard

- Plomp, T. & Nieveen, N. (2013). (Eds.). *Educational design research: Introduction and illustrative cases*. Enschede: SLO. → pdf
- Plomp, T., Nieveen, N., Nonato, E., & Matta, A. (2018). *Pesquisa-aplicação em educação: Uma introdução.* ABED: São Paulo, Brasil. www.abed.org.br/arquivos/Pesquisa-Aplicacao.pdf
- Wang, Q.Y., Plomp, T, Nieveen, N., Zhu, Z.T., & Gu, X.Q. (2017). Educational Design Research: Theories and Cases. Shanghai: Press of East China Normal University.
  王其云，祝智庭，顾小清，《教育设计研究：理论与案例》，华东师范大学出版社.

- Akker, J. van den, Gravemeijer, K., McKenney, S., & Nieveen, N. (2006). (Eds). *Educational design research*. London: Routledge.