

TS2: Doctoral Project Management Ensuring Quality in Doctoral Supervision

HumanIC TS2 | March, 28th 2025

Agenda

- 10:00 – 10:10 Introduction & Objectives
- 10:10 – 10:30 Quality Standards at HRI, TU Berlin
- 10:30 – 11:00 Effective Supervision Strategies
- 11:00 – 11:20 Practical Implementation & Guideline Development
- 11:20 – 11:30 Conclusion & Wrap Up

Objectives

Initiate a discussion on what constitutes a **suitable standard** for awarding **doctoral degrees**



Effective Supervising Strategy



Outlook: Guideline for Practical Implementation

Quality Standard Doctoral Thesis at HRI, TU Berlin

Guiding Principle:

„The ability to independently develop research ideas, formulate hypotheses, plan and conduct experiments or studies, and generalize the results.“

Doctoral-worthy content (Engineering Sciences) means:

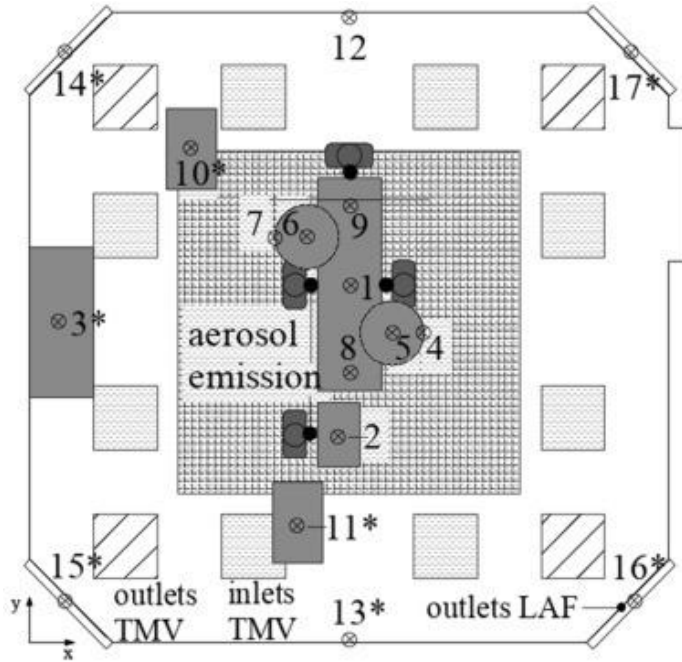
- Achieving universally valid insights
- Results must be relevant and applicable to practice

Difference between doctorate and general research:

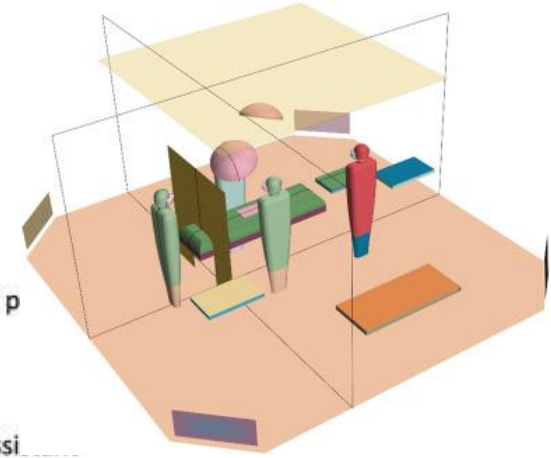
- General research: research questions, experiments, data evaluation – can be done by any engineer (M.Sc)
- Doctorate: Create new knowledge through new connections, correlations, functional relationships, and/or methods

Example EnEff: OP-Luft

Research Project Ventilation at Operating Theaters (3 years, 1.2 Mio. €)



- LAF field
- TMV outlet
- lamp
- velocity measuring p
- thermal manikin assi
- thermal manikin patient
- particle measuring probe
- instrument table



Gefördert durch:

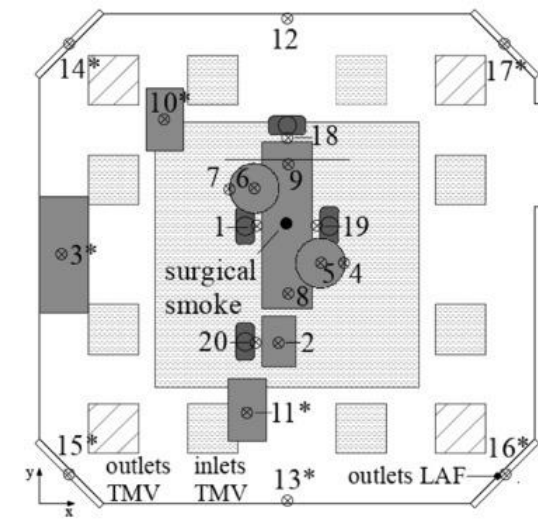


aufgrund eines Beschlusses des Deutschen Bundestages

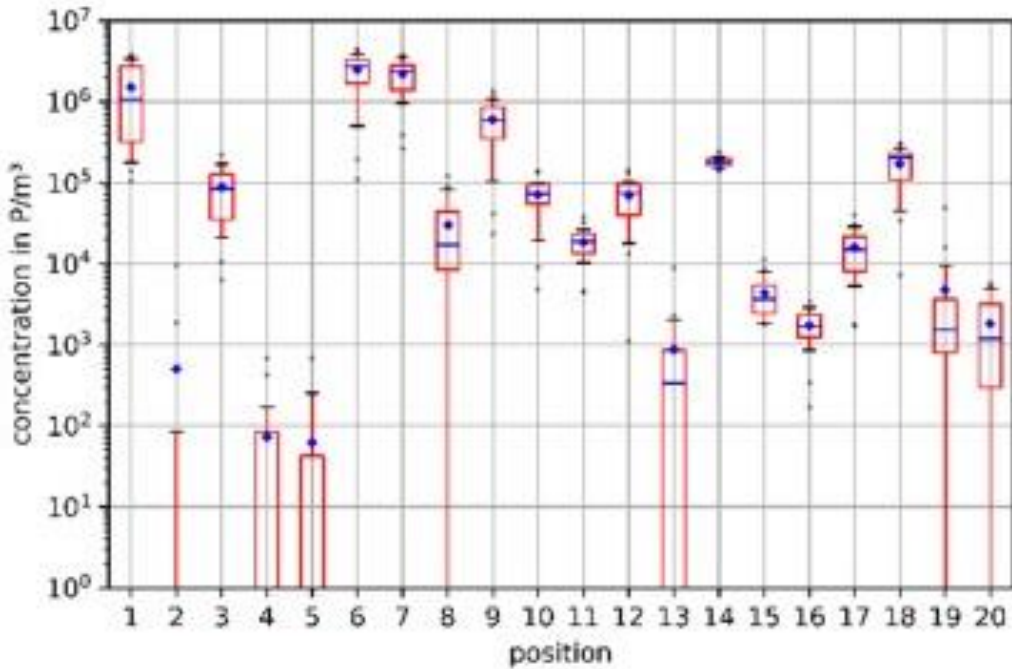
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Example EnEff: OP-Luft

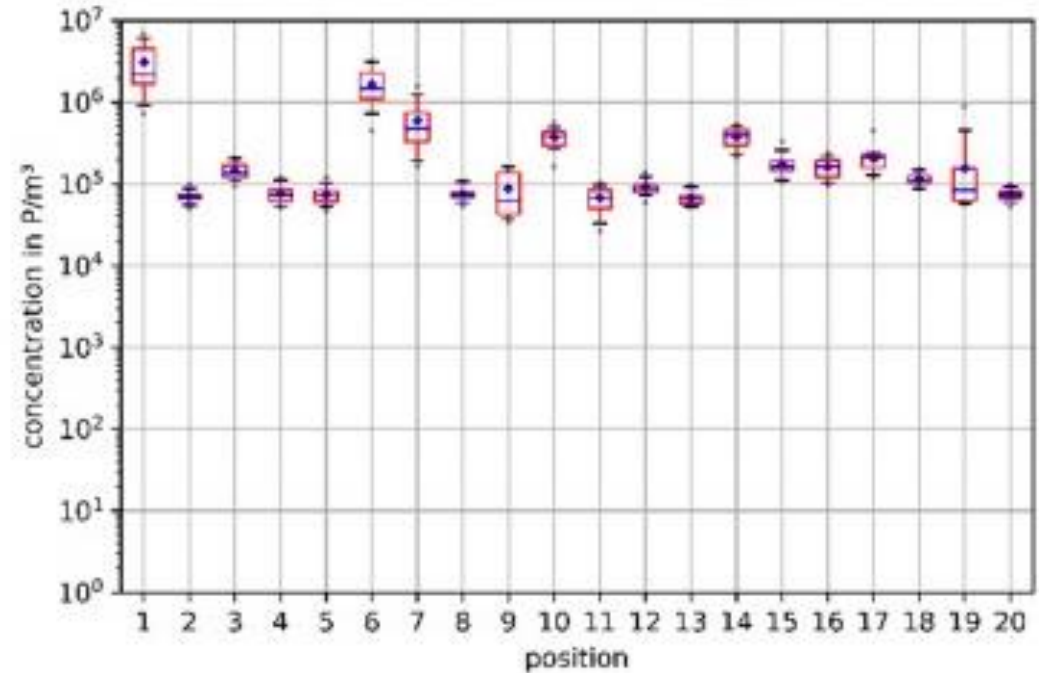
Research Project Ventilation at Operating Theaters



M4: Volume Flow: 11060 m³/h, LAF, source: patient

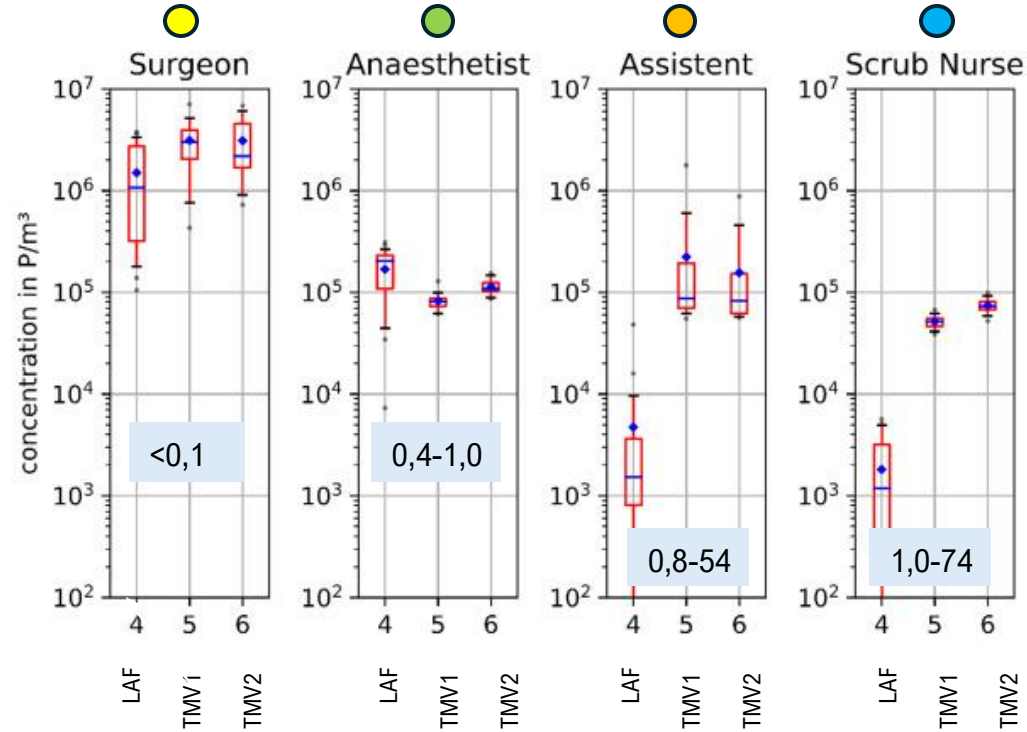
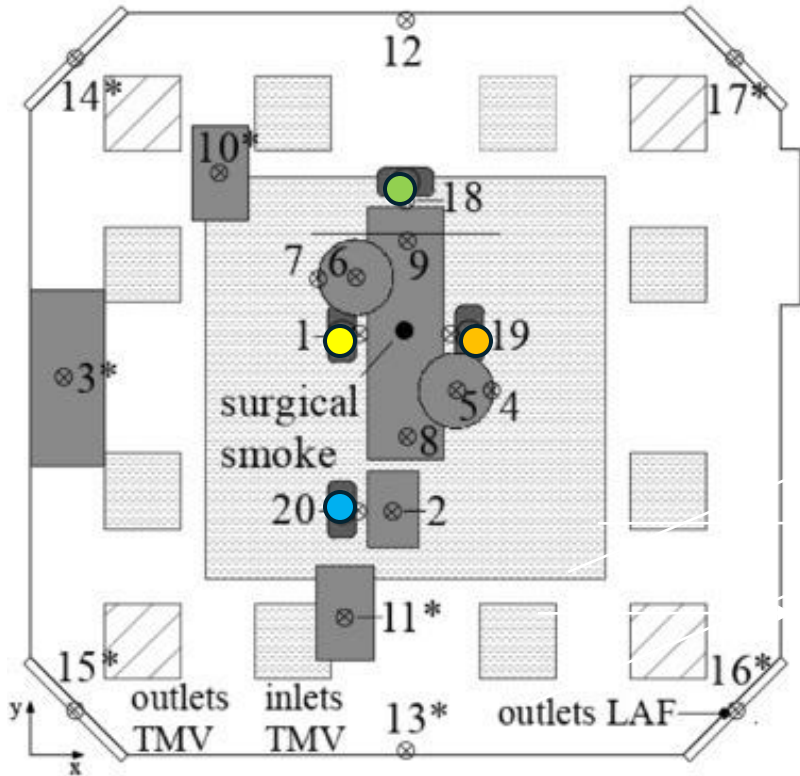


M6: Volume Flow: 2064 m³/h, TMV, source: patient



Example EnEff: OP-Luft

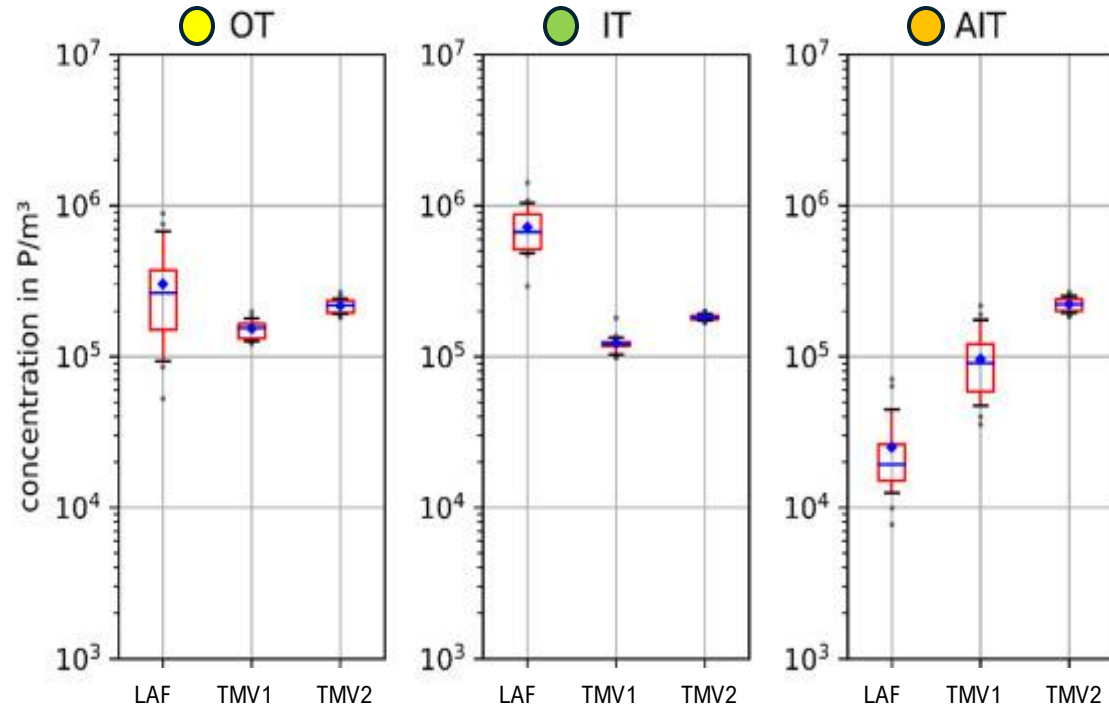
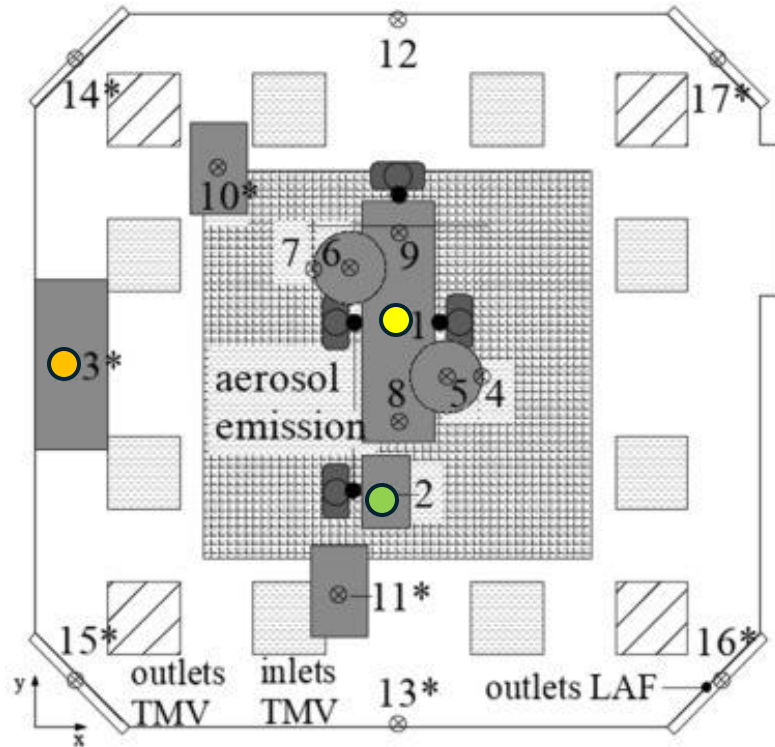
Research Project Ventilation at Operating Theaters



$$LAQI = \frac{c_{s,ex}}{c_{s,p}}$$

Example EnEff: OP-Luft

Research Project Ventilation at Operating Theaters



		LAF	TMV1	TMV2
	flow rate m ³ /h	11.000	4.000	2.000
LAQI	OT	0,7	1,1	1,0
	IT	0,5	1,0	1,0
	AIT	4,1	1,0	1,0

$$LAQI = \frac{c_{s,ex}}{c_{s,P}}$$

Example EnEff: OP-Luft

Research Project Ventilation at Operating Theaters (3 years, 1.2 Mio. €)

Output of the Project

There is no universal ventilation system that is optimal regarding both energy use and contamination control.

The individual influencing factors are identified, e.g. OP-Lamps (geometry & position)

.....

However, universally applicable correlations are lacking, such as

- contamination probability as a function of lamp geometry
- contamination probability dependent on movement speed through door, air volume balance, and temperature differences
- ...



PhD Topics (doctoral-worthy content)

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Difference between doctorate and general research:

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How do you handle it ?
What are your quality standards ?

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Effective Supervision Strategy

We All Know & Have Experiences

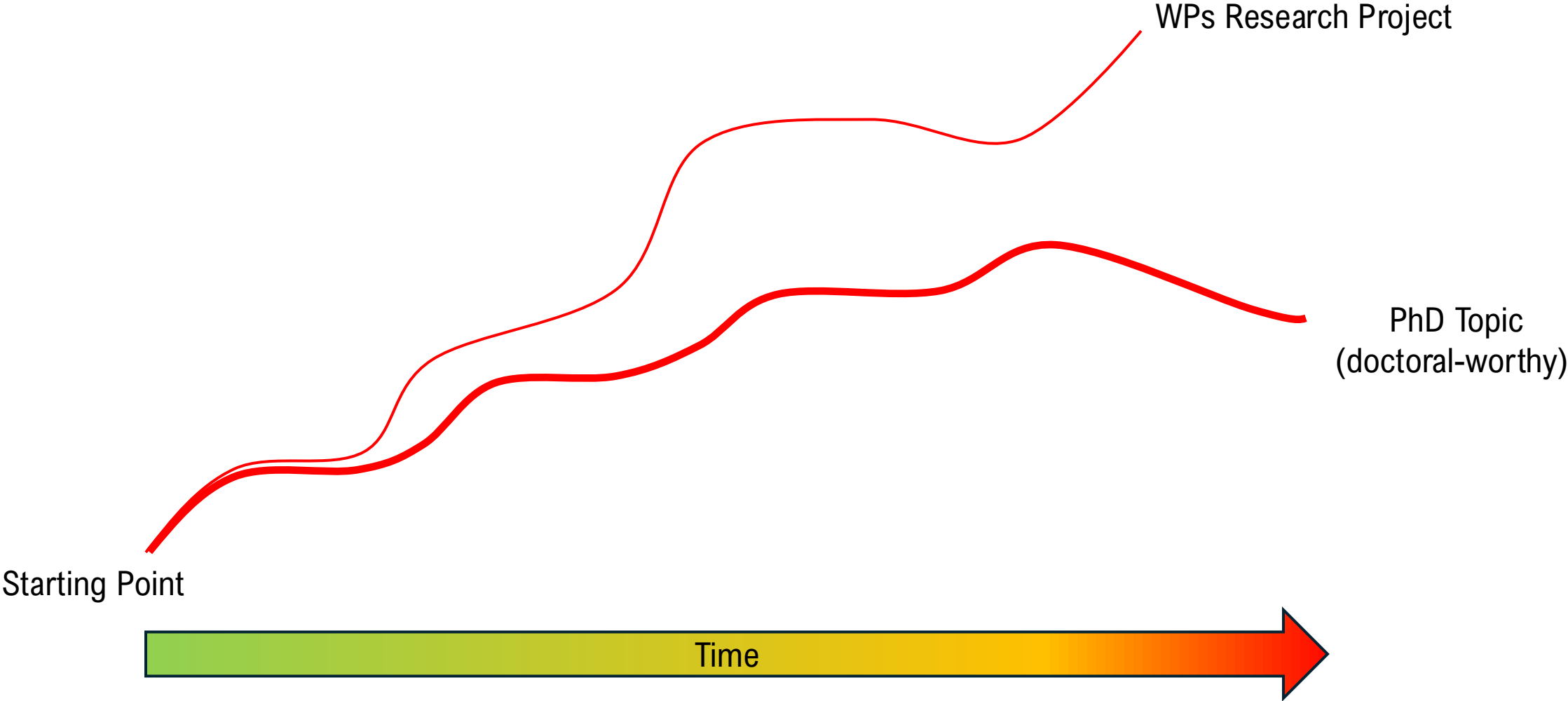
- ✓ Project Management
- ✓ Time Management

	2025		2026				2027				
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
WP1: Data preparation, interfaces, and exchange											
WP1.1 Identification and prioritization of datasets and data items		M1.1									
WP1.2 Definition of software interfaces and data formats			M1.2								
WP1.3 Administrative preparations for ethical approval and data protection				M1.3							
WP1.4 Preparation of datasets including aggregation and anonymization					M1.4						M1.6
WP1.5 Data sharing, consultancy, and validation									M1.5		
WP2: Movement-based ABMs for within nursing homes transmission											
WP2.1 Harmonization of agents' properties between models					M2.1						
WP2.2 Implementation of extended NPIs for nursing homes										M2.3	
WP2.3 Parametrization and simulation in nursing homes								M2.2			
WP3 Process-based ABMs for within hospital transmission											
WP3.1 Intra-hospital model development and harmonization across models					M3.1						
WP3.2 Implementation of hospital-based NPIs										M3.3	
WP3.3 Parametrization and simulation in hospitals								M3.2			
WP4: Aerosol-driven transmission dynamics											
WP4.1: Harmonization of agents' features among models				M4.1							
WP 4.2: CFD simulations for aerosol dynamics and statistical analyses							M4.2				M4.4

But here: Not classical Research Project ! ➡ PhD ➡ 1st Priority

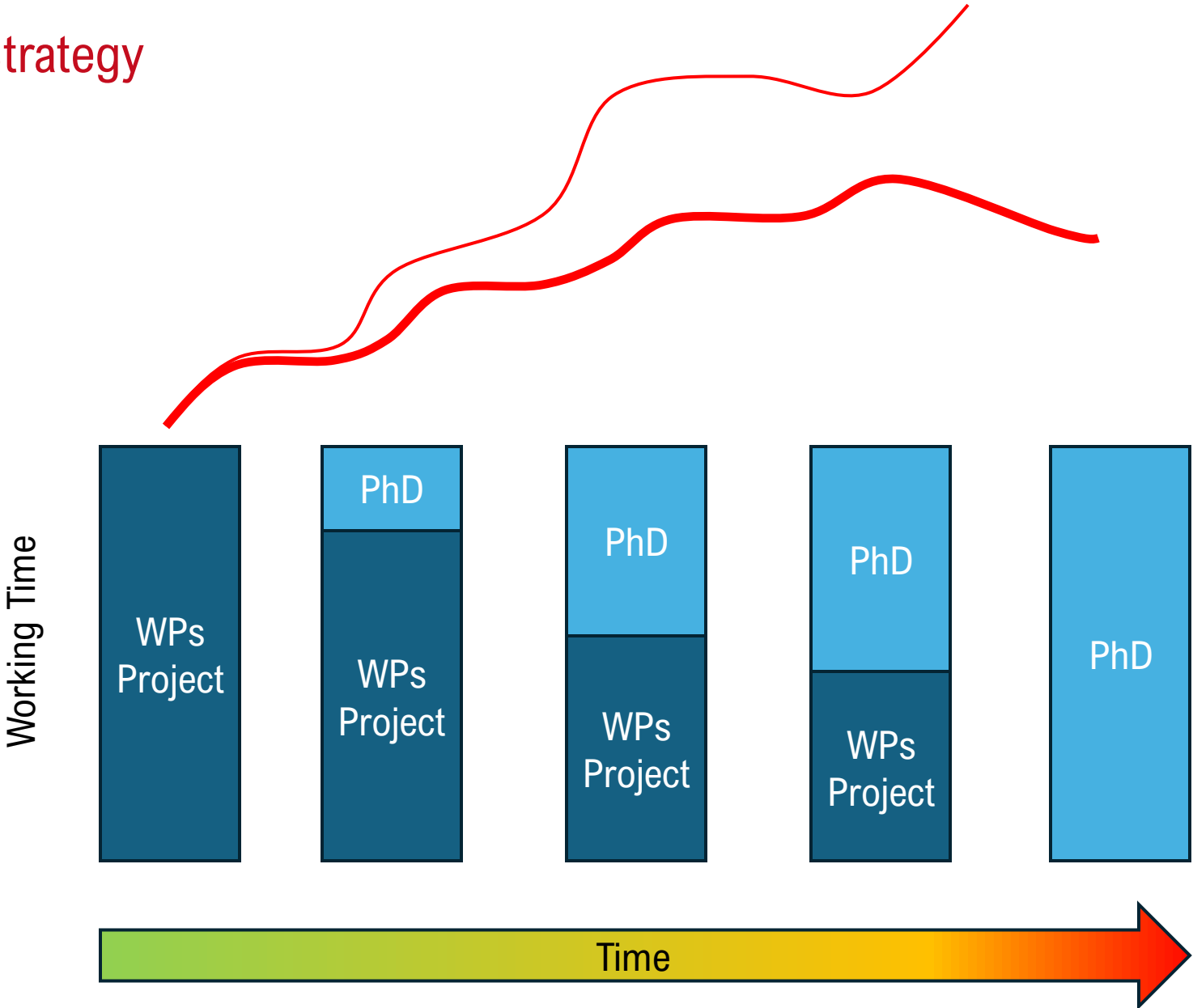
Effective Supervision Strategy

Red Lines



Effective Supervision Strategy

Red Lines



Eisenhower Principle

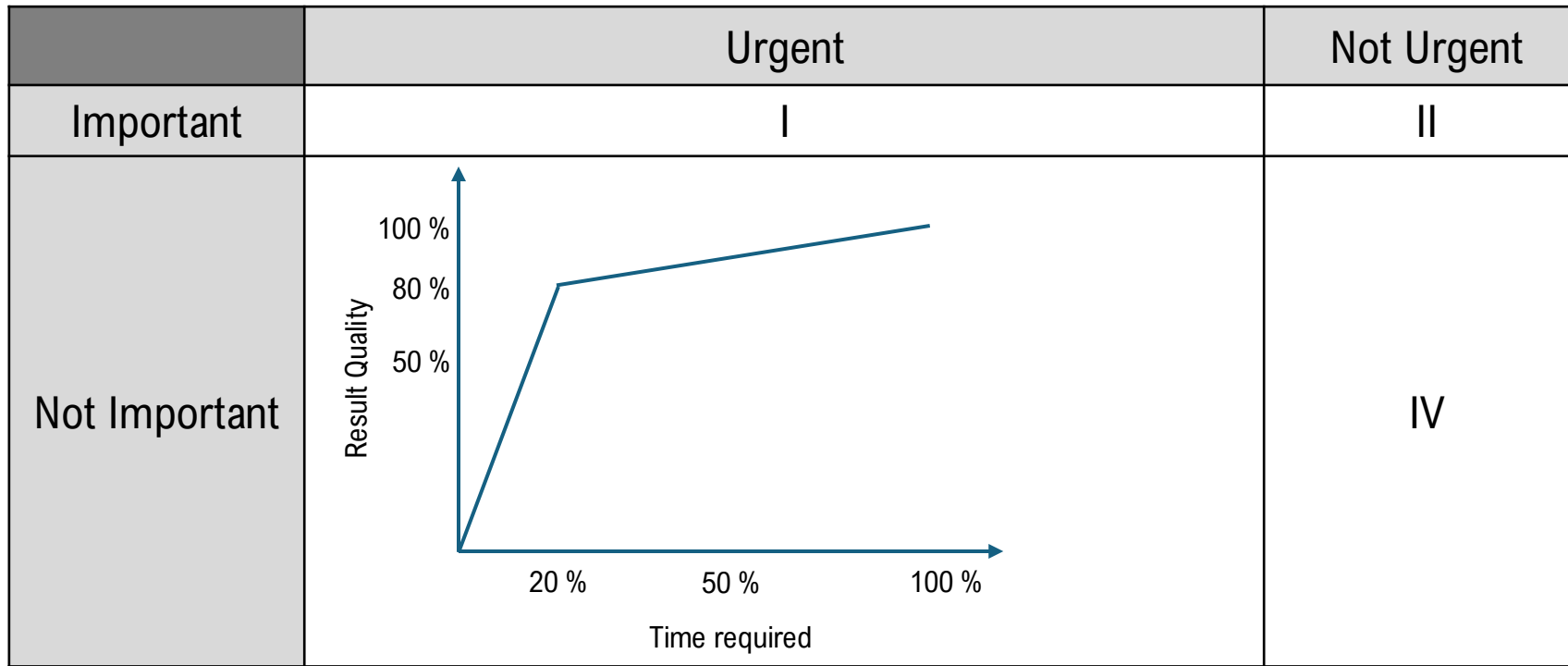
Stay on the Red Line

	Urgent	Not Urgent
Important	I	II
Not Important	III	IV

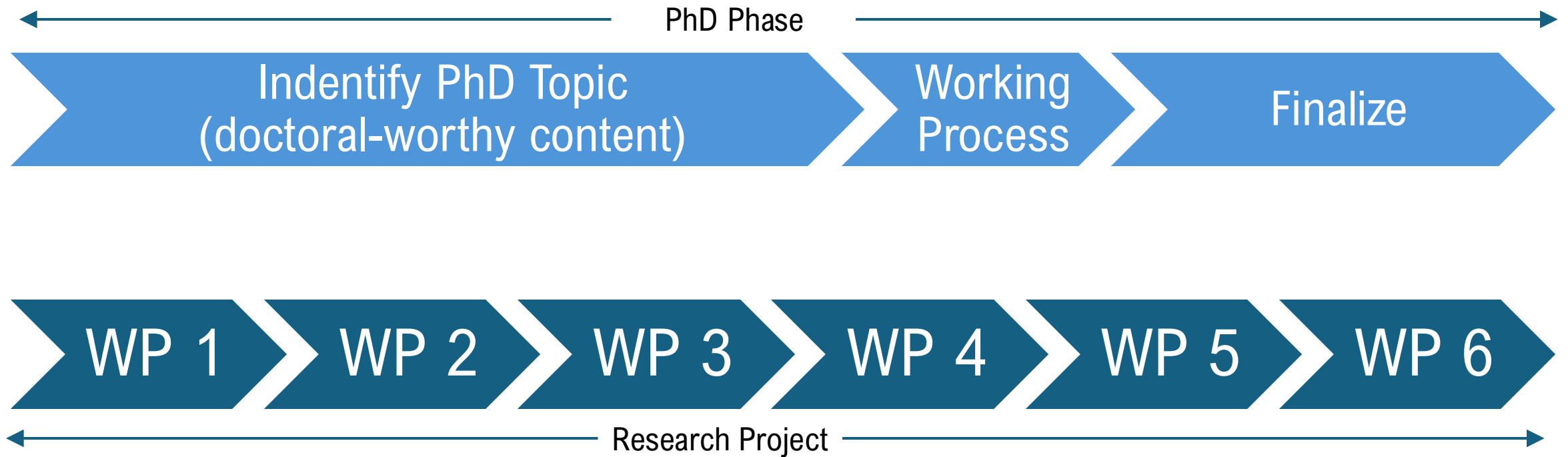
Eisenhower & Pareto 20 / 80

Stay on the PhD Track

- Define Important Objectives (related to PhD): e.g. Hypotheses / Research Questions
- Define Tasks and Schedule (important & project-related)



Three Phases to Success



Help to Focus & Stay on the Track

What can/should we do ?



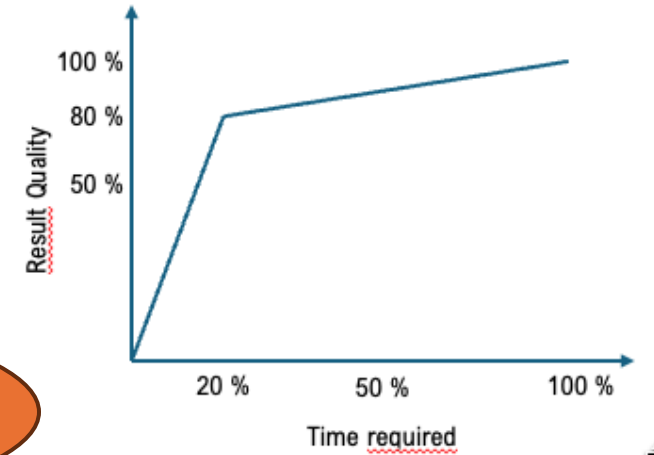
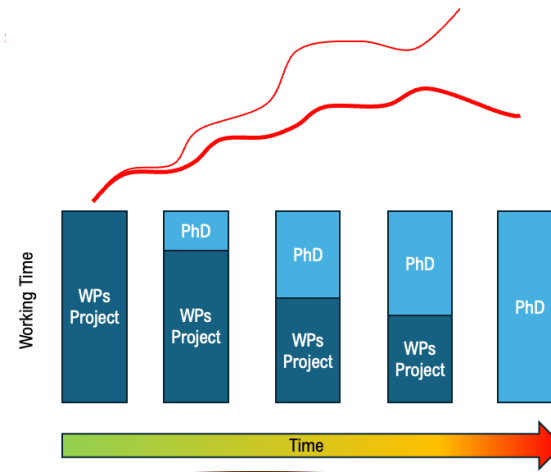
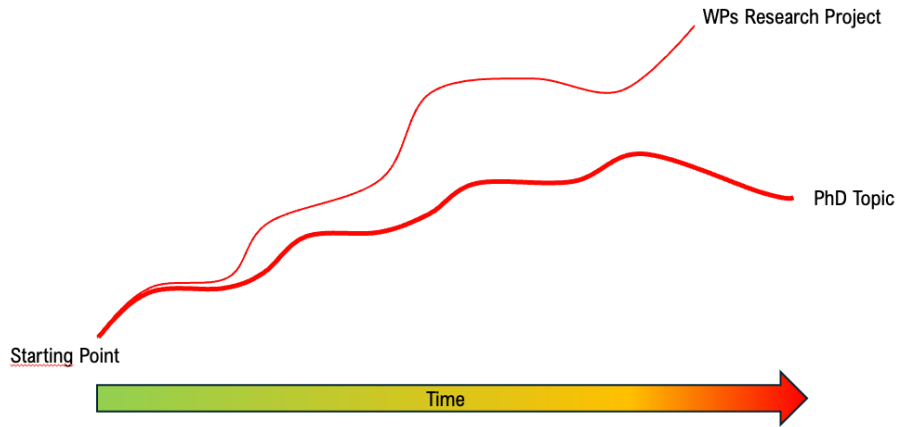
Help to focus on

- Finding research gap
 - Overview of state of research
 - Begin with studies
- Planning a structured test procedure/experiment/investigation
 - Step by step
- Formulate hypotheses & research questions

Help to focus on

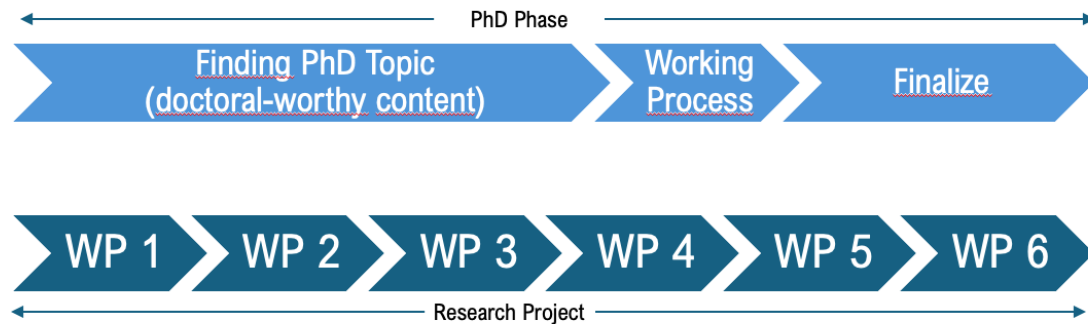
- Doctoral-worthy content
- Begin to apply Pareto to PhD

Effective Supervision Strategy



What are your thoughts ?

	Urgent	Not Urgent
Important	I	II
Not Important	III	IV



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Practical Implementation & Guideline Development



Supervisor Guide for PhD Candidates

Phases of the PhD

1. Identifying a Suitable PhD Topic

- Intensive supervision required.
- Clarification of goals and clear separation from regular research projects.

2. Planning and Conducting Studies

- Independent work with regular, but less intense supervision.
- Support in effective organization and time management.

3. Generalizing Results and Finding New Relationships

- Renewed intensive and close supervision required.
- Promotion of critical thinking and creative processes to identify new correlations and functional relationships.

Practical Implementation & Guideline Development

Supervision Focus

Phase 1 – Finding the Topic

- Clarify that not every task within a regular research project is relevant for the PhD.
- Openly address potential conflicts between project work and PhD progress; clearly set priorities: the PhD always takes precedence.

Phase 2 – Planning and Execution

- Ensure candidates learn effective time and task management (e.g., Eisenhower Principle).
- Focus primarily on Quadrant II tasks (important but not urgent).
- Apply the Pareto Principle (80/20 rule) consistently for project tasks not relevant to the PhD.

Phase 3 – Generalizing Results

- Provide close guidance in developing new ideas and relationships.
- Actively support candidates in extracting general conclusions that go beyond individual studies.

Management Principles

Pareto Principle

- Consistently question tasks: Which 20% of activities produce 80% of the relevant outcomes?
- Aim: Secure time resources for PhD progress.

Eisenhower Principle

- Sort all tasks according to urgency and importance.
- Clearly prioritize Quadrant II (important but not urgent).
- Consistently eliminate tasks that are neither urgent nor important.

Should we create and jointly develop a short, clear guide that contains the basics?

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Conclusion & Wrap Up

We all have a lot of experiences in project management.

General Challenge: Competition between project and graduation progress.

With very close support at times, we can successfully master the challenge.

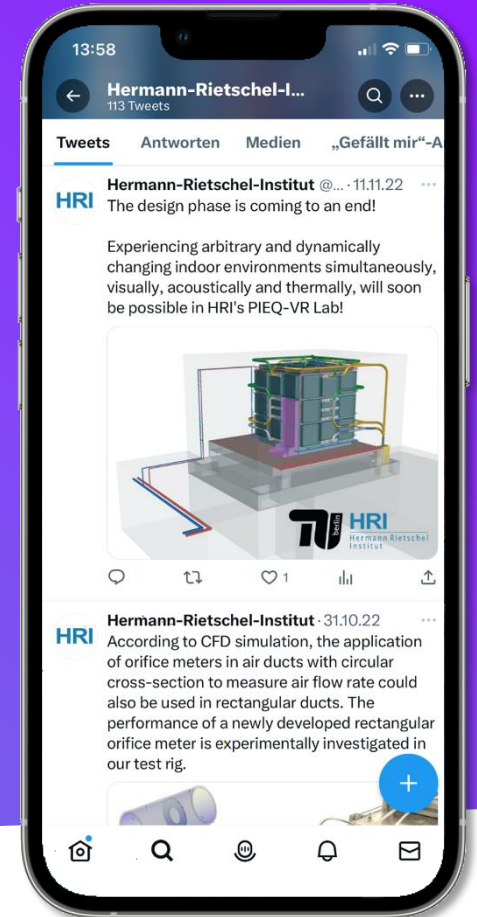
Well known principles can be very helpful.

Updates on current research projects?

Visit our Website!



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