EDUCATIONAL THEORY BUILDING LAB

Hermann Astleitner

Ao.Univ.-Prof. Mag. Dr.
Department of Educational Research – Digital Learning Research Group

PARIS LODRON UNIVERSITY SALZBURG

Description of a work unit, 2025

1. MISSION

The creative person in science

$$C_a = \sum_{i-1}^{N_p} \frac{c(n_i m_i)}{a_i}$$

where *Np* is equal to the number of published papers, *ni* is equal to the number of references for article "*i*," *mi* is equal to the number of citations for article "*i*," and *ai* is the number of authors on article "*i*." Finally, *c* is the probability that an article with *n* references and *m* citations will have a creativity of *c*.

Table 2
Definitions of Creativity Measures

Creativity measure	Operationalization of measure
Productivity (P_i)	Number of journal articles produced by scientists across their entire career was used as a predictor of productivity of a scientist.
Impact (C_i)	Total number of citations a scientist's work received over his or her entire career.
h-index	Number of papers authored by a scientist with citations each paper receives equal to or greater than *h*.
Soler's creativity index	Summing the total number of published papers, total number of citations that each paper receives, total number of references that the paper cites, and then dividing the result by the total number of authors.
Overall creativity score	Standardized and equal weighted sum of P_i, C_i, *h*-index, and creativity index

Grosul, M., & Feist, G. J. (2014). The creative person in science. *Psychology of Aesthetics, Creativity, and the Arts*, *8*(1), 30.

1. MISSION


Collegiality
Team working
People management
Supervision
Mentoring
Influence and leadership
Collaboration
Equality and diversity
Subject knowledge
Research methods: theoretical knowledge
Research methods: practical application
Information seeking
Information literacy and management
Languages
Academic literacy and numeracy
Working with others (D1)
Knowledge base (A1)
Communication methods
Communication media
Publication
Communication and dissemination (D2)
Cognitive abilities (A2)
Analysing
Synthesising
Critical thinking
Evaluating
Problem solving
Teaching
Public engagement
Enterprise
Policy
Society and culture
Global citizenship
Engagement and impact (D3)
Creativity (A3)
Inquiring mind
Intellectual insight
Innovation
Argument construction
Intellectual risk
Engagement, influence and impact
The knowledge and skills to work with others and ensure the wider impact of research
Domain D
Knowledge and intellectual abilities
The knowledge, intellectual abilities and techniques to do research
Domain A
Health and safety
Ethics, principles and sustainability
Legal requirements
IPR and copyright
Respect and confidentiality
Attribution and co-authorship
Appropriate practice
Professional conduct (C1)
Personal qualities (B1)
Enthusiasm
Perseverance
Integrity
Self-confidence
Self-reflection
Responsibility
Domain C
Research governance and organisation
The knowledge of the standards, requirements and professionalism to do research
Domain B
Personal effectiveness
The personal qualities and approach to be an effective researcher
Research strategy
Project planning and delivery
Risk management
Research management (C2)
Finance, funding and resources (C3)
Self-management (B2)
Professional and career development (B3)
Preparation and prioritisation
Commitment to research
Time management
Responsiveness to change
Work-life balance
Income and funding generation
Financial management
Infrastructure and resources
Career management
Continuing professional development
Responsiveness to opportunities
Networking
Reputation and esteem
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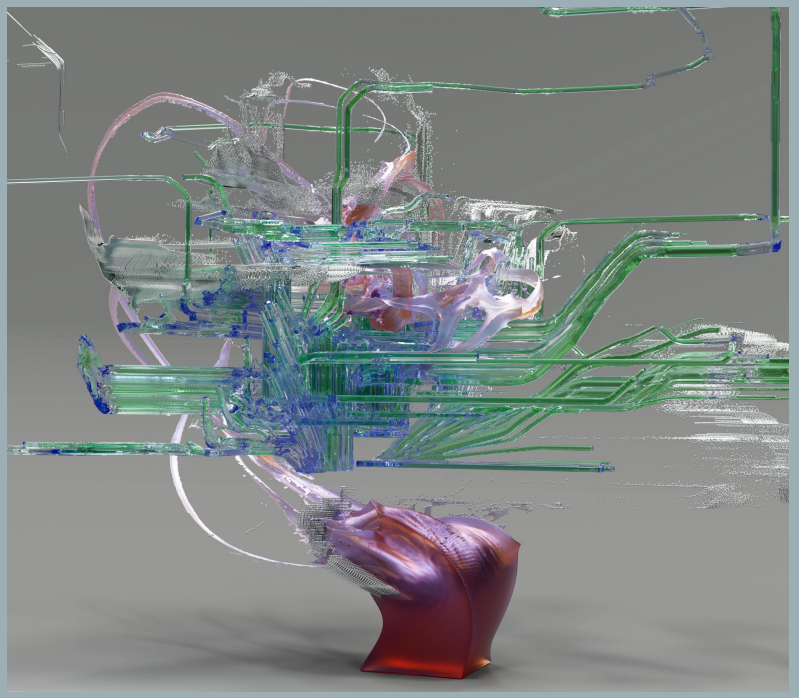
I. MISSION

PAST — OLD THEORY

TODAY & FUTURE — NEW THEORY



1. MISSION

EDUCATIONAL THEORY BUILDING LAB = Conducting a Long-Term Research Program

[] RESEARCH ON THE METHODS OF THEORY BUILDING

[] DEVELOPMENT OF THEORIES

[] TEST OF THEORIES

[] TEACHING and THIRD MISSION

- BACHELOR: THESIS
- MASTER: THEORY DEVELOPMENT AND TESTING, THESIS
- DOCTORAL PROGRAM: THESIS
- TEACHER EDUCATION/SCHOOL DEVELOPMENT: Lux, CH, AT

2. HISTORY

1992: Modelling motivational processes

1996: Hypermedia-based learning

2000: Designing emotionally sound instruction

2007: Task-based learning

2012: Theory of love

2018: Multidimensional engagement in learning

2020: Theories in applied contexts

2022: Affective personality development

2026: Digital learning theories

3. INSPIRATION FROM RESEARCHERS

John M. Keller (Florida-State-University, USA)

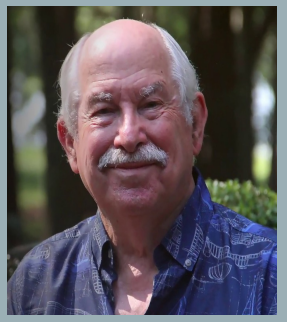
Detlev Leutner (Universität Duisburg, Germany)

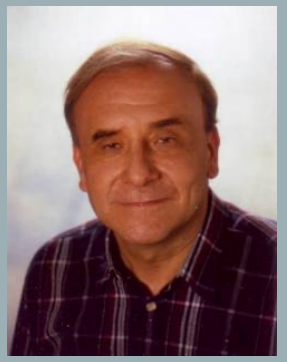
Hans-Jörg Herber (Paris-Lodron Universität Salzburg, Austria)

Jean-Luc Patry (Paris-Lodron Universität Salzburg, Austria)

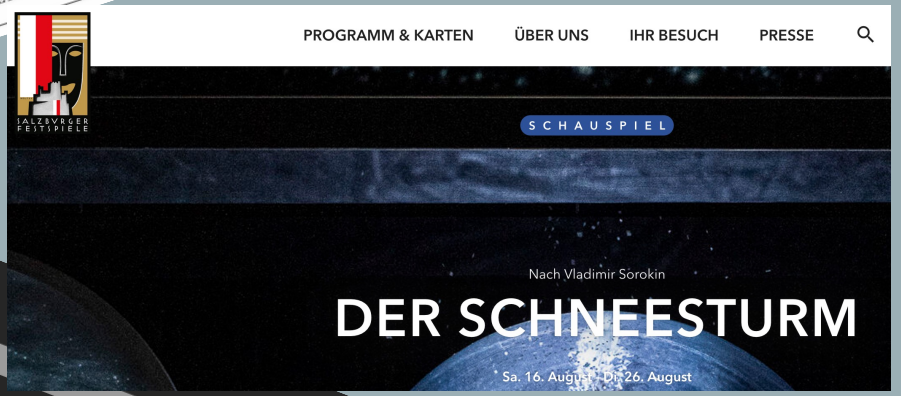
Erich H. Witte (Universität Hamburg, Deutschland)

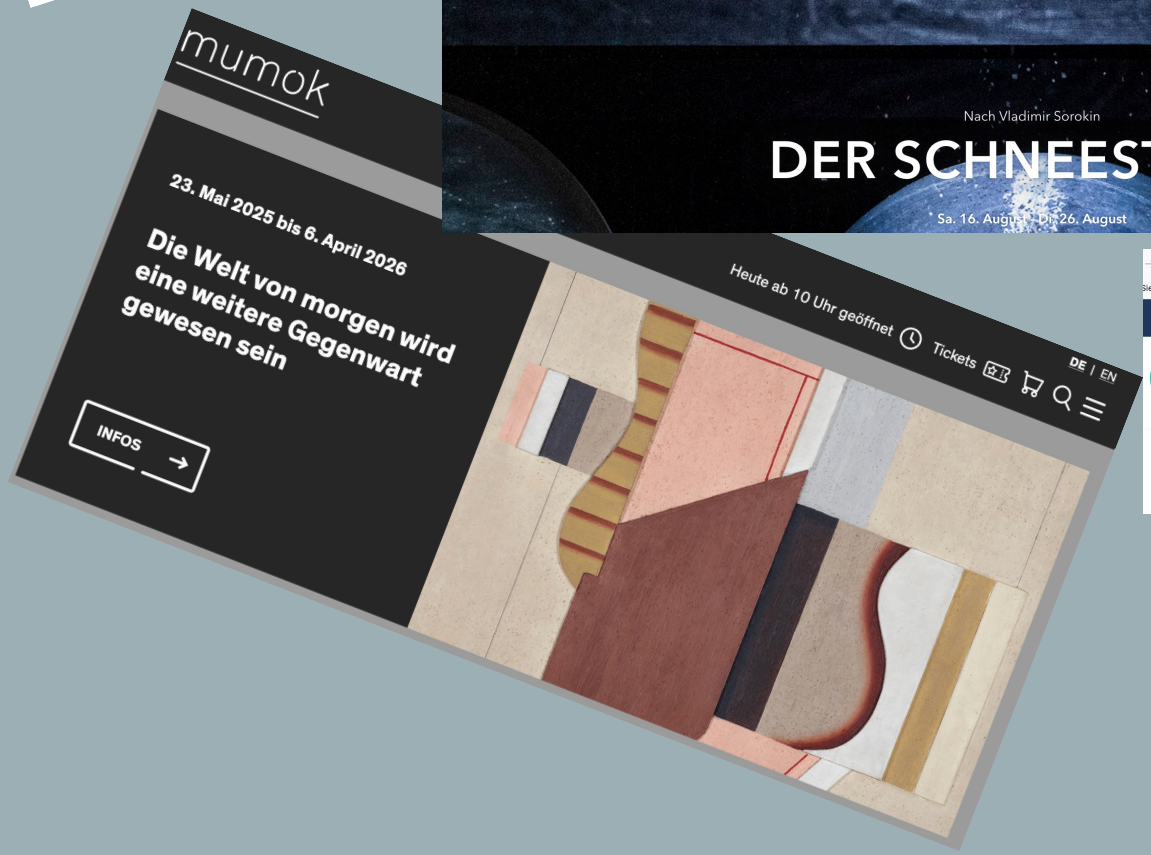
Tanja Auer (Paris-Lodron Universität Salzburg, Österreich)

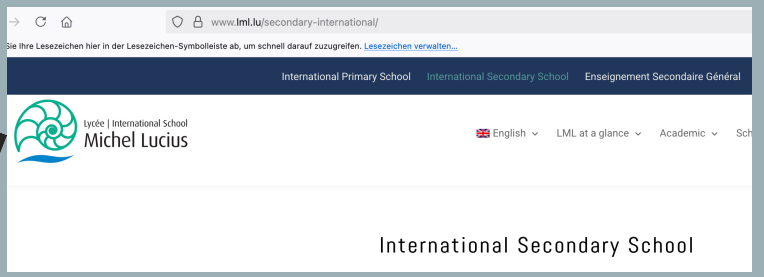




3. INSPIRATION: WHAT ELSE?







4. PROGRAM

BASIC METHODS

- How can one develop scientific theories?
- Which criteria and methods do we have for this?
- What are scientific, applied, and personal theories?

SPECIFIC DEVELOPMENTS

- Which areas have already been examined?
- Which subject areas are innovative and important?
- Which kind of theory do we need?
- Where can one publish theories?

5. PRODUCTS
5.1. METHODS OF THEORY BUILDING

BASIC

ADVANCED

APPLIED RESEARCH

5. PRODUCTS
5.1. METHODS OF THEORY BUILDING

Table 1

Differences between Basic Research, Applied Research, and Practice (based on: Astleitner, 2018, p. 149)

Dimensions	Basic Research	Applied Research	Practice
Theory	Scientific theory	Technological theory, program theory	Subjective, implicit theory
Intervention	Experiment	Quasi-experiment, design-experiment	Case study
Significance	Statistical significance	Practical significance	Success
Validity	Validity of measurement and design	Usefulness	Problem solving
Measurement	Testing	Checking	Estimating
Explanation	Causality	Plausibility	Trial-and-error

https://www.waxmann.com/buecher/Intervention-Research-in-Educational-Practice

5. PRODUCTS
5.1. METHODS OF THEORY BUILDING

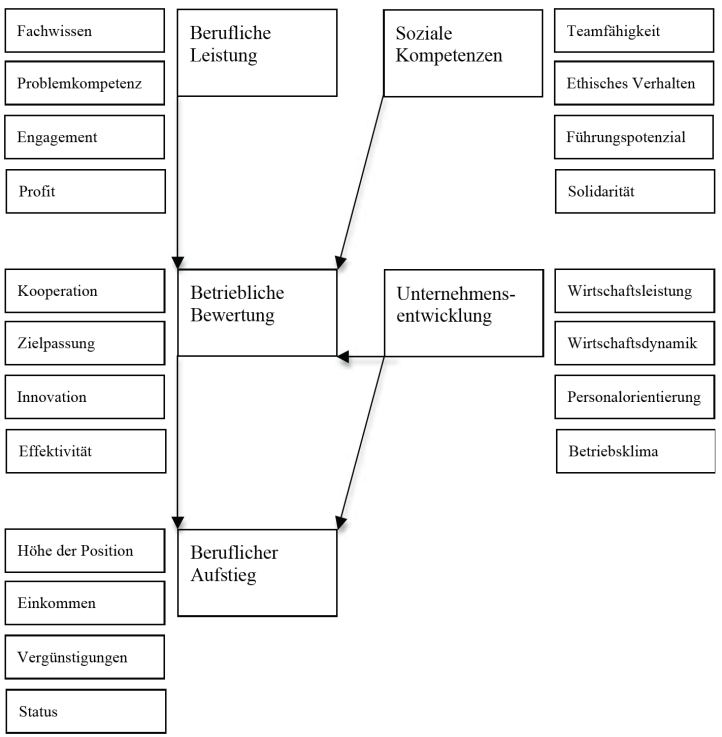


Abbildung 19: Ein Strukturgleichungsmodell illustriert am Beispiel der Vorhersage von beruflichem Aufstieg

Theories for structural equation modeling

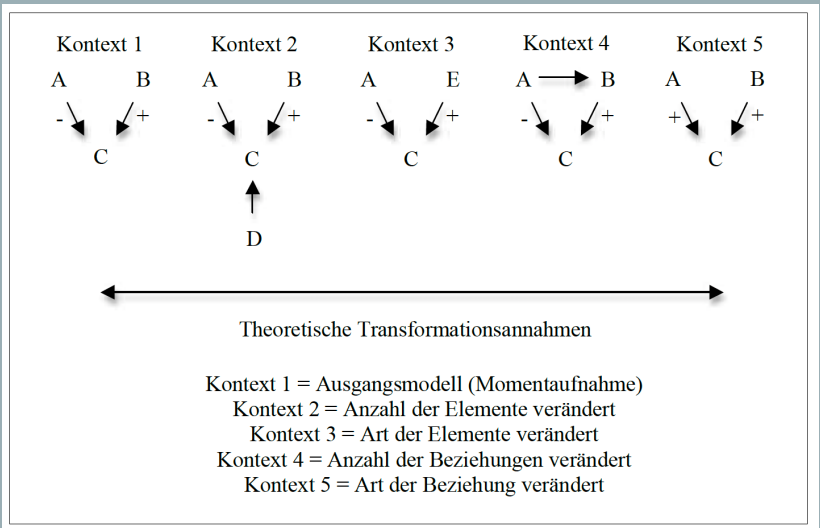


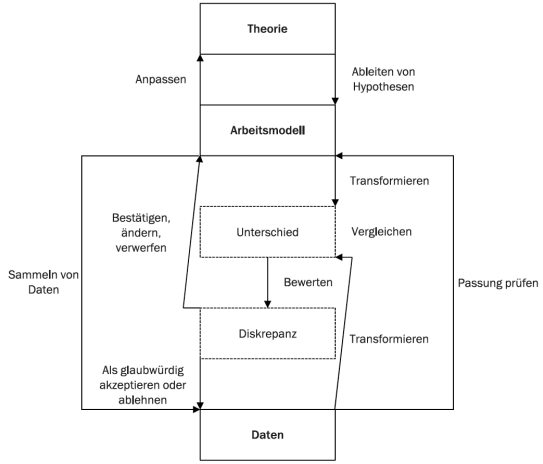
Abbildung 20: Theorien als Moment- und Sequenzaufnahmen: Beispielhafte Veränderungen

Contextual effects on theories

https://www.utb.de/doi/book/10.36198/9783838534619

5. PRODUCTS
5.1. METHODS OF THEORY BUILDING

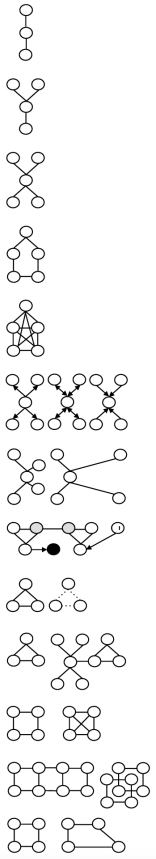
Abbildung 7: Kognitive Prozesse bei der methodenbasierten Theorieentwicklung (in Anlehnung an: Grolemund und Wickham, 2014, S. 194; eigene Übersetzung und veränderte Darstellung)



https://www.beltz.de/fachmedien/soziologie/produkte/details/37495-spezielle-verfahren-sozialwissenschaftlicher-theorieentwicklung.html

Cognitive processes during theory building

Abbildung 13: Beispiele von Elementen und Beziehungen in Netzwerk-Theorien



Kette: Ein Knoten folgt einem nächsten, es gibt keine Verzweigungen. Beispiel: Autoritäre Befehlsstruktur in einem Betrieb.

Ypsilon: Unterschiedliche Knoten werden zusammengeführt und laufen dann in einem Knoten weiter. Beispiel: Unterschiedliche Schulabschlüsse führen zum Zugang zu einem Bachelor- und dann Masterstudium.

Rad (Hub): Nicht verbundene Knoten werden durch einen Knoten miteinander verbunden. Beispiel: Eine Stabstelle, bei der die Informationen aus unterschiedlichen Institutionen zusammenlaufen.

Ring: Jeder Knoten hat direkte oder indirekte Verbindungen zu allen Knoten. Beispiel: Eine Peergruppe mit engen und weniger engen Freunden und Freundinnen.

Geschlossene Gemeinschaft: Jeder Knoten ist mit jedem anderen verbunden, ohne Außenbeziehungen. Beispiel: Eine isolierte Familie mit engen Beziehungen.

Sender-Empfänger: Knoten stellen aktive (sendende) und/oder passive (empfangende) Beziehungen zu anderen Knoten her. Beispiel: Die Nutzung von elektronischer Kommunikation (Email).

Distanz: Knoten liegen näher oder entfernter zu anderen Knoten. Beispiel: Verwandtschaftsverhältnisse.

Verbindungs- und externe Knoten: (Graue) Knoten stellen Verbindungen zwischen Netzwerken her oder befinden sich außerhalb von Netzwerken (schwarz, schraffiert). Beispiel: Diplomaten und Außenseiter.

Stärke: Zwischen Knoten bestehen intensive/häufige Beziehungen oder schwache/seltene Beziehungen. Beispiel: Teamarbeit mit starker oder schwacher Kooperationsbereitschaft.

Größe: Knoten können Bestandteil von großen oder kleinen Netzwerken sein. Beispiel: Gruppen in sozialen Netzwerken.

Dichte: Knoten sind mit wenigen oder vielen anderen Knoten verbunden. Beispiel: Diagnose- und Therapiestationen in Krankenhäusern.

Clustering: Knoten sind zu Gruppen von Knoten (Trauben, Schwärmen) zusammengefasst. Beispiel: Politische oder ökonomische Vereinigungen.

Strukturierung: Knoten sind nach einem Organisationsprinzip miteinander verbunden. Beispiel: Bevölkerungsstrukturen.

Types of Relationships in Networks

Tabelle 4: Theorieentwicklungsprozesse von einer wissenschaftlichen Theorie zu einer praktischen Handlung

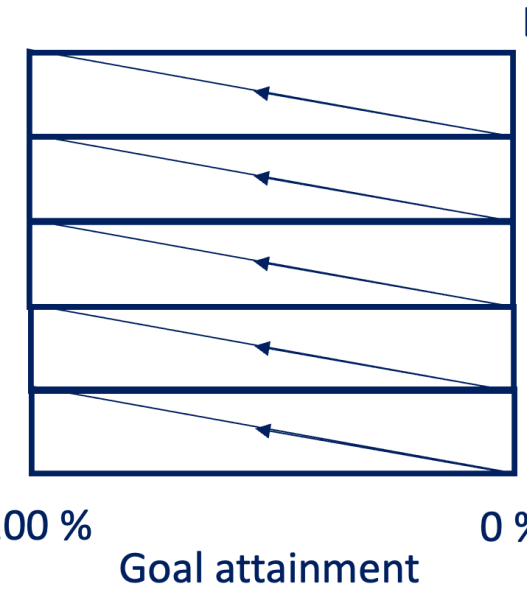
Theorietypen	Quellen	Beispiele	Beispielhafte Aussagen
Theorieentwicklung I: Entwicklung einer wissenschaftlichen Theorie zu einem Phänomenbereich.			
Wissenschaftliche Theorie	Forschung	Organisationstheorie	Vertrauen erhöht den Erfolg bei Kooperationen von Lehrpersonen.
Theorieentwicklung II: Veränderung der wissenschaftlichen Theorie mit den Zielen der Kontextualisierung und Problemfokussierung.			
Programmtheorie	Forschung und Praxis	Organisationstheorie angepasst an Kontext und Problem	Der Erfolg bei Kooperationen hängt in Schule X davon ab, ob Vertrauen zwischen Schulleitung, Eltern und Lehrpersonen gegeben ist.
Theorieentwicklung III: Rekonstruktion einer impliziten persönlichen Theorie zum Phänomenbereich.			
Subjektive Theorie	Individuelles Praxismodell	Eigene Ansichten über gute Kooperation	Ob ich mit jemandem kooperieren will, hängt davon ab, ob ich die betreffenden Personen sympathisch finde.
Theorieentwicklung IV: Integration von wissenschaftlicher Theorie, Programmtheorie und subjektiver Theorie zu technologischen Aussagen bzw. einem Handlungskatalog für eine Problemlösung in der Form: „Um Problem X zu lösen, tue Y (oder Z nicht)“.			
Technologische Theorie	Handlungskonzept	Auf Kooperation bezogene Handlungspläne	Um Vertrauen in der Schule X aufzubauen, kann mit einiger Aussicht auf Erfolg bei einem Treffen der Schulleitung, der Eltern und der Lehrpersonen ein „Vertrauensspiel“ durchgeführt werden.
Theorieprüfung: Durchführung von empirischen Untersuchungen um Aussagen über die Wirksamkeit der Umsetzung von Theorien formulieren zu können.			
Praktische Handlungskompetenz und -performanz	Realisation im Alltag	Verhalten in Kooperationen	Ein „Vertrauensspiel“ wird effektiv und effizient durchgeführt.

From theory to practice

5. PRODUCTS
5.1. METHODS OF THEORY BUILDING

DEVELOPMENT-SUPPORT-THEORIES

Hierarchically-organized developmental model **PLUS** **Adaptive level-based support strategies**



A-Strategies

B-Strategies

C-Strategies

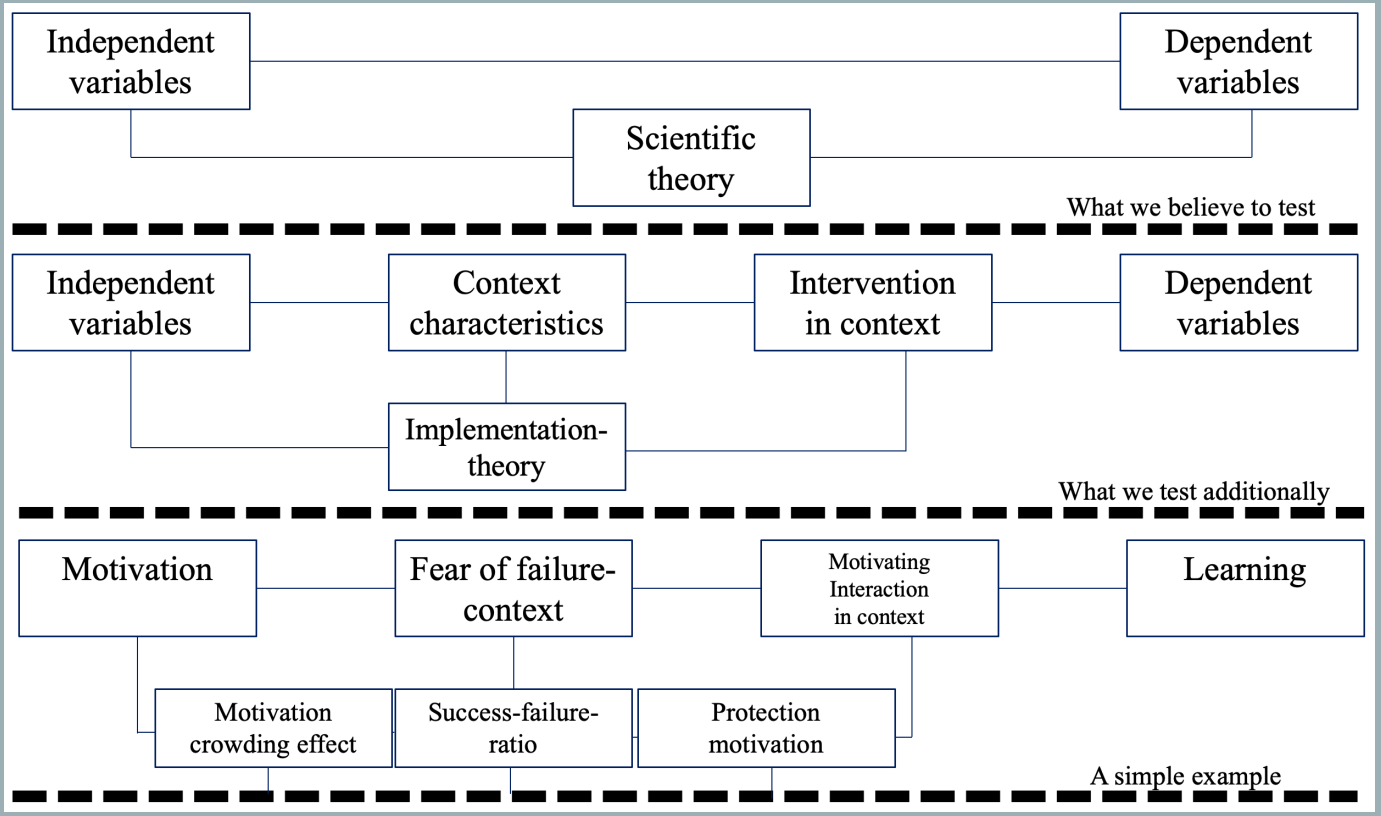
D-Strategies

E-Strategies

https://www.beltz.de/fachmedien/soziologie/produkte/details/37495-spezielle-verfahren-sozialwissenschaftlicher-theorieentwicklung.html

5. PRODUCTS
5.1. METHODS OF THEORY BUILDING

IMPLEMENTATION-THEORIES



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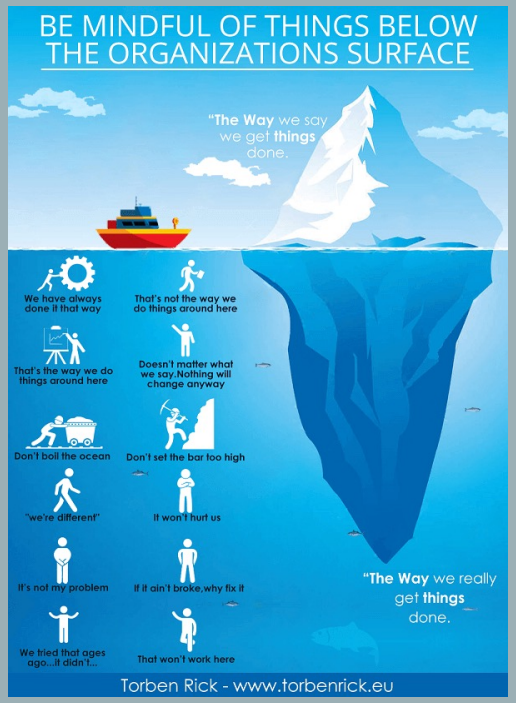
5. PRODUCTS
5.1. METHODS OF THEORY BUILDING

DARK-SIDE-THEORIES



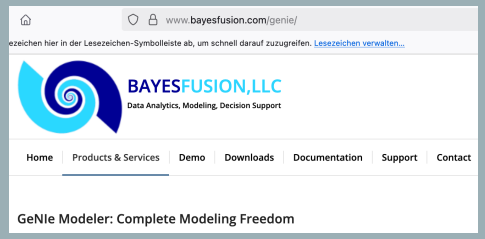
https://www.beltz.de/fachmedien/soziologie/produkte/details/37495-spezielle-verfahren-sozialwissenschaftlicher-theorieentwicklung.html

Integrating Trust and Distrust: Alternative Social Realities

High Trust **Characterized by:** **Hope** **Faith** **Con dence** **Assurance** **Initiative**	High value congruence Interdependence promoted Opportunities pursued New initiatives BRIGHT (4)	Trust but verify Relationships highly segmented and bounded Opportunities pursued and downside risks/vulnerabilities continually monitored
Low Trust **Characterized by:** **No Hope** **No Faith** **No Confidence** **Passivity** **Hesitance**	Casual acquaintances Limited interdependence Bounded, "arms-length" transactions Professional courtesy (1)	Undesirable eventualities expected and feared Harmful motives assumed Interdependence managed Preemption. Best offense is a good defense Paranoia (3) DARK
	Low Distrust **Characterized by:** **No Fear** **Absence of Skepticism** **Absence of Cynicism** **Low Monitoring** **Nonvigilance**	**High Distrust** **Characterized by:** **Fear** **Skepticism** **Cynicism** **Wariness and Watchfulness** **Vigilance**

Lewicki, R. J., Tomlinson, E. C., & Gillespie, N. (2006). Models of interpersonal trust development: Theoretical approaches, empirical evidence, and future directions. *Journal of management*, *32*(6), 991-1022

5. PRODUCTS
5.1. METHODS OF THEORY BUILDING



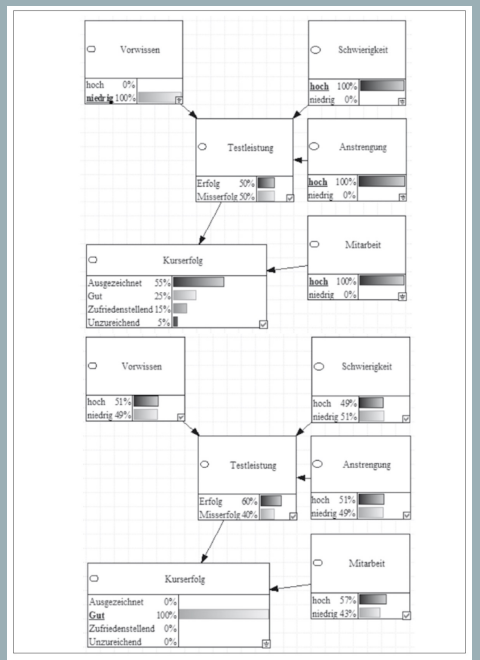


Abbildung 22: Bayes'sches Netzwerke als Entscheidungshilfe bei der Theoriebildung – Ergebnisse einer beispielhaften Analyse mit GeNIe

Software for theory building

Artificial Intelligence and Theory Building

Work-in-Progress

https://www.utb.de/doi/book/10.36198/9783838534619

5. PRODUCTS
5.2. SOME THEORIES: Instructional Design

Primary emotions	Instructional strategies	Examples
Fear reduction	F1 Ensure success in learning	Use well-proven motivational and cognitive instructional strategies
	F2 Accept mistakes as opportunities for learning	Let student talk about their failures, their expectations, the reasons for errors, etc.
	F3 Induce relaxation	Apply muscle relaxation, visual imagery, autogenics, or meditation
	F4 Be critical, but sustain a positive perspective	Train students in critical thinking, but also point out the beauty of things
Envy reduction	E1 Encourage comparison with autobiographical and criterion reference points instead of social standards	Show students their individual learning history
	E2 Install consistent and transparent evaluating and grading	Inform students in detail about guidelines for grading
	E3 Inspire a sense of authenticity and openness	Install "personal information boards" telling others who you are
	E4 Avoid unequal distributed privileges among students	Grant all students or no student access to private matters
Anger reduction	A1 Stimulate the control of anger	Show students how to reduce anger through counting backward
	A2 Show multiple views of things	Demonstrate how one problem can be solved through different operations
	A3 Let anger be expressed in a constructive way	Do not accept escaping when interpersonal problem solving is necessary
	A4 Do not show and accept any form of violence	Avoid threatening gestures
Sympathy increase	S1 Intensify relationships	Get students to know other students' friends and families
	S2 Install sensitive interactions	Reduce students' sulking and increase their asking for help
	S3 Establish cooperative learning structures	Use group investigations for cooperation
	S4 Implement peer helping programs	Let students adopt children in need
Pleasure increase	P1 Enhance well-being	Illustrate students a probabilistic view of the future
	P2 Establish open learning opportunities	Use self-instructional learning materials
	P3 Use humor	Produce funny comics with students
	P4 Install play-like activities	Use simulation-based instructional games

Figure 2. FEASP-strategies and examples – overview.

https://doi.org/10.1023/A:1003893915778

5. PRODUCTS
5.2. SOME THEORIES: Instructional Design

https://files.eric.ed.gov/fulltext/EJ1188334.pdf

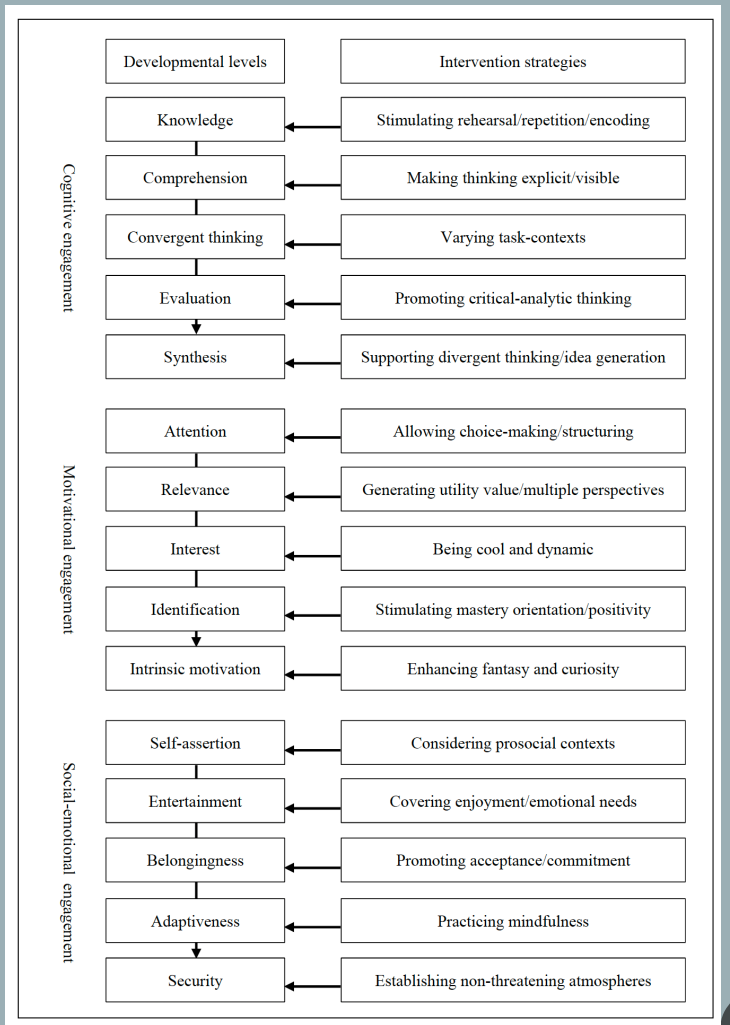


Fig. 2: A multidimensional and level-based developmental approach on student engagement (based on Astleitner, 2018b, p. 13, modified).

5. PRODUCTS
5.2. SOME THEORIES: Instructional Design

Table 1. A Model on Goal Areas for Fostering Resilience

Goal areas	Educational Goals
Control	(1) Emotional regulation (2) Commitment (3) Adaptability
Problem Solving	(4) Error analysis and prevention (5) Innovation (6) Network building and cooperation
Personal Growth	(7) Well-being (8) Ego-development (9) Positive future perspective

https://files.eric.ed.gov/fulltext/EJ1363126.pdf

A Multidimensional Package Intervention on Digital Detox

Learning area	Goal	Instructional Strategies (to be tested in future research)
Active Use	Decrease	(1) **Application limits with alerts and earnings** when limits are met. (2) Building up **alternative activities**.
Upward Social Comparison	Decrease	(3) **Individual or criterion reference norm orientation** instead of social reference standards. (4) **Orientation toward cultivation** and not evaluation of relationships.
Fear of Missing out	Decrease	(5) **Technical countermeasures**: Auto-reply, Set status, Auto views. (6) **Social countermeasures**: Self-talk, self-esteem improvement, expectation management, anxiety control.

https://www.earli.org/events/earli2025#section-programme

5. PRODUCTS
5.2. SOME THEORIES: Human Development

Table 1

A Human Developmental Model on Fostering Love (based on: Astleitner & Baumgartner, 2015)

Developmental Steps	Support Strategies
Awareness	(1) Establishing knowledge-based interactions (2) Acquiring emotional intelligence (3) Allowing positive bias
Acceptance	(4) Expressing high meaning (5) Searching for similarities and complementarities (6) Promoting tolerance
Care	(7) Expanding others (8) Achieving compassionate goals (9) Doing perspective taking
Trust	(10) Being positive and open (11) Negotiating identities (12) Keeping balance
Love	(13) Realizing togetherness, passionate emotions, and defending (14) Communicating love (15) Maintaining novelty

https://www.waxmann.com/buecher/Intervention-Research-in-Educational-Practice

5. PRODUCTS
5.2. SOME THEORIES: Errors in Teaching

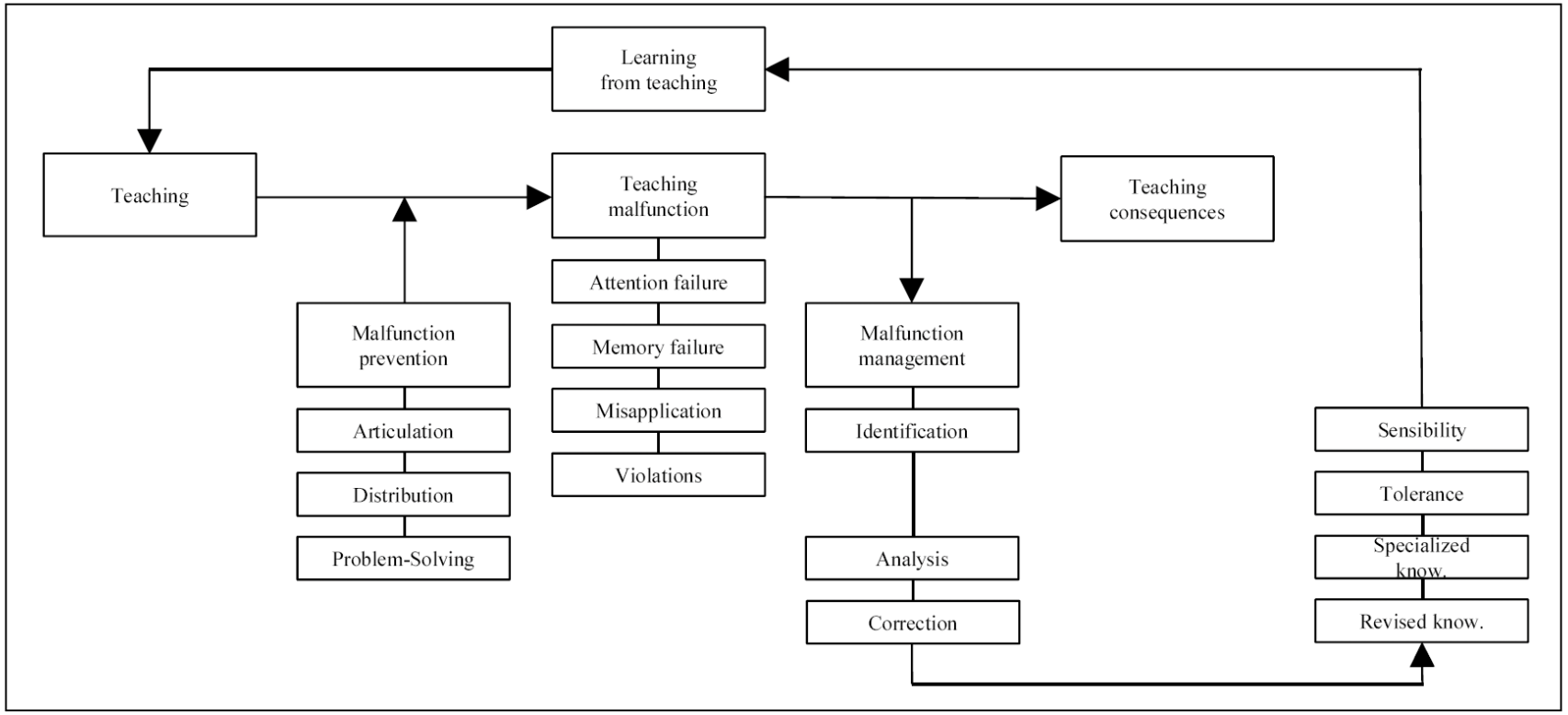


Fig. 2: A micro model on teaching malfunctions.

https://www.waxmann.com/buecher/Intervention-Research-in-Educational-Practice

5. PRODUCTS
5.2. SOME THEORIES: Social Media Use

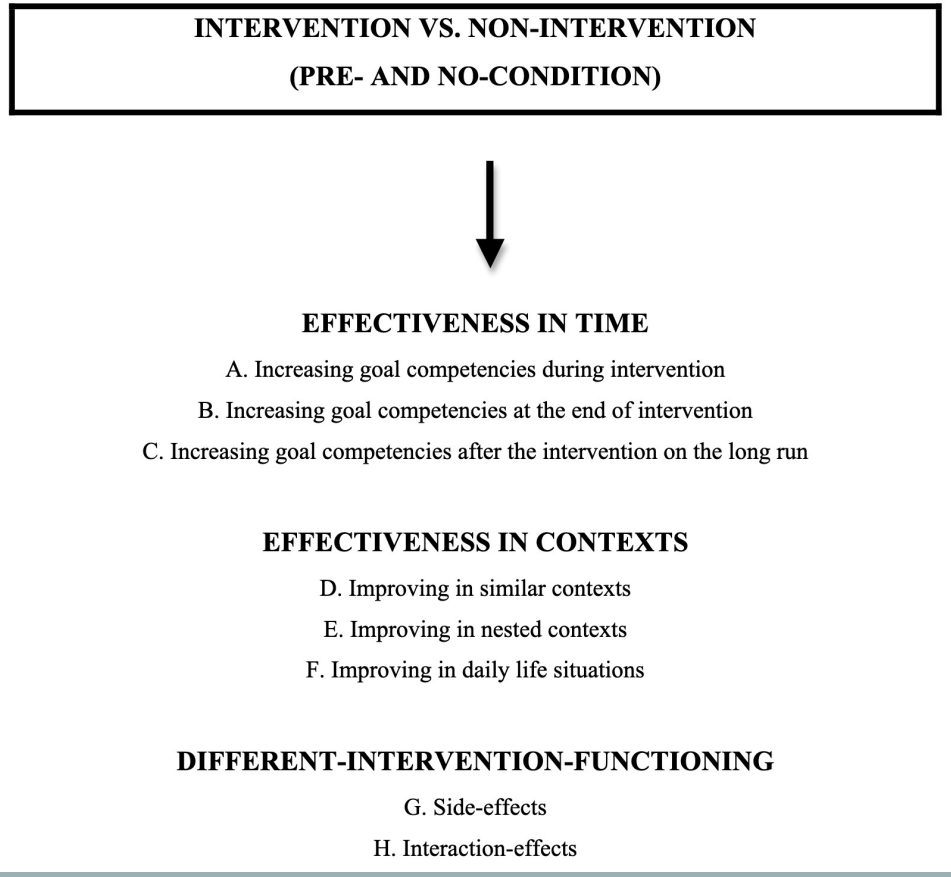
Table 3. A model of social media use of college students when attending class.

Goal areas	Mode of use	
	Active	Passive
Identity development	Designing Impression management Social comparison Self-concept clarifying	Registering
Learning support	Giving support Collaborative learning Intrinsic motivation Self-efficacy	Getting support
Parallel use during learning	Posting Entertainment Escapism Relaxation	Browsing

https://journals.sagepub.com/doi/full/10.1177/14697874241233605

5. PRODUCTS
5.2. SOME THEORIES: Evaluation Approaches

Figure 1. A multiple evidence model (MUEMO) for educational interventions (related to Hager & Hasselhorn, 2000, p. 81 and Middleton, Gorard, Taylor, & Bannan-Ritland, 2008, p. 32).



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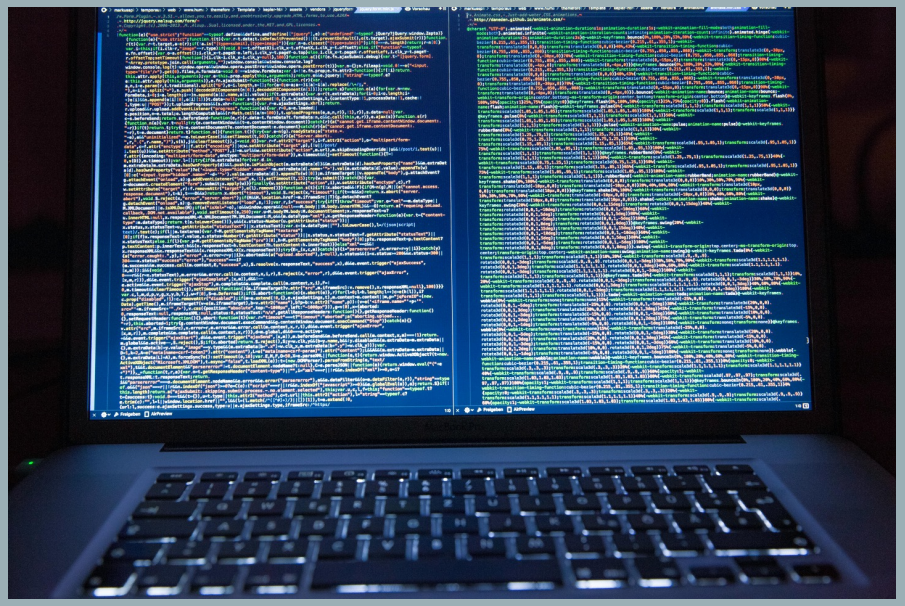
5. PRODUCTS
5.2. SOME THEORIES: Big Data and Theory



https://journals.sagepub.com/doi/full/10.1177/00483931231188825

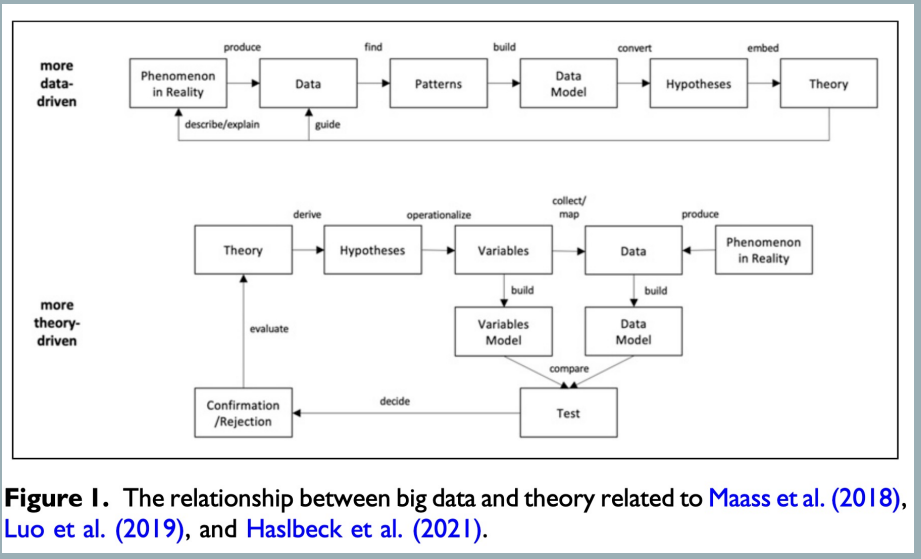


Figure 1. The relationship between big data and theory related to Maass et al. (2018), Luo et al. (2019), and Haslbeck et al. (2021).

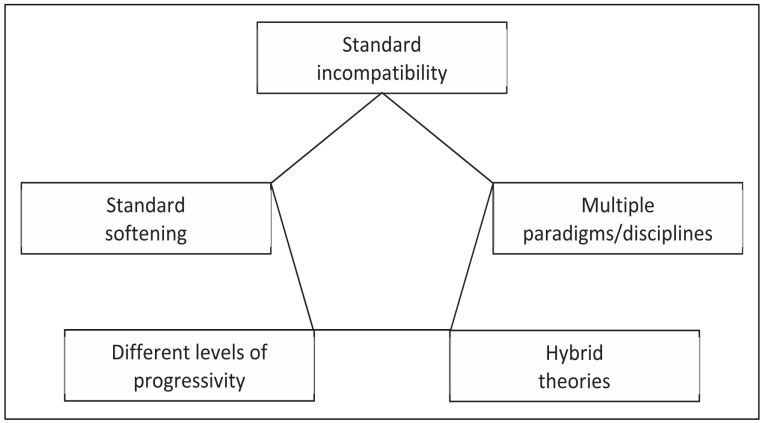


Figure 2. Big data-related problems in theory building.

5. PRODUCTS
5.3. SOME COURSES: Theory Building

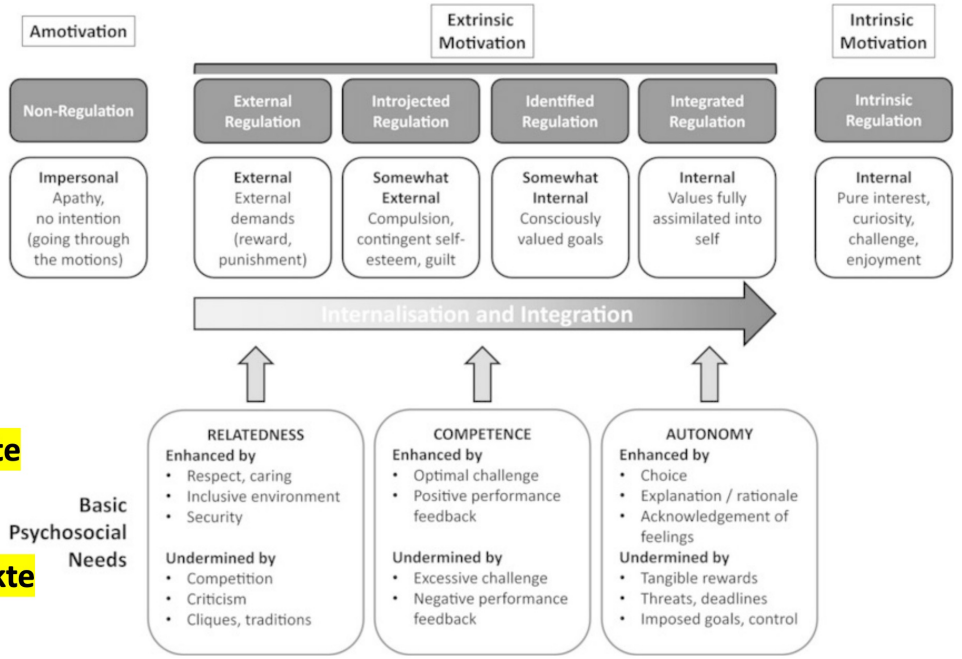
Showing students that we often test not core theories, but extended theories!

C. Konfrontation mit Forschungsergebnissen

Verfeinerte Theorie = Ursprüngliche Theorie + positive und negative Effekte

Beispiel:

Refined SDT



Positive Effekte

Basic Psychosocial Needs

Negative Effekte

Cook, D. A., & Artino Jr, A. R. (2016). Motivation to learn: an overview of contemporary theories. *Medical Education*, *50*(10), 997-1014.

We identified 60 meta-analyses that tested many of the propositions of SDT's six mini-theories, other theory-based hypotheses, and SDT's utility in applied domains. Ryan, R. M., Duineveld, J. J., Di Domenico, S. I., Ryan, W. S., Steward, B. A., & Bradshaw, E. L. (2022). We know this much is (meta-analytically) true: A meta-review of meta-analytic findings evaluating self-determination theory. *Psychological Bulletin*, *148*(11-12), 813.

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5. PRODUCTS
5.3. SOME COURSES: Digital interventions

Showing students how theories contribute to digital educational interventions!

4. Methoden von päd.-psych. Interventionen: Entwicklungsbedingungen

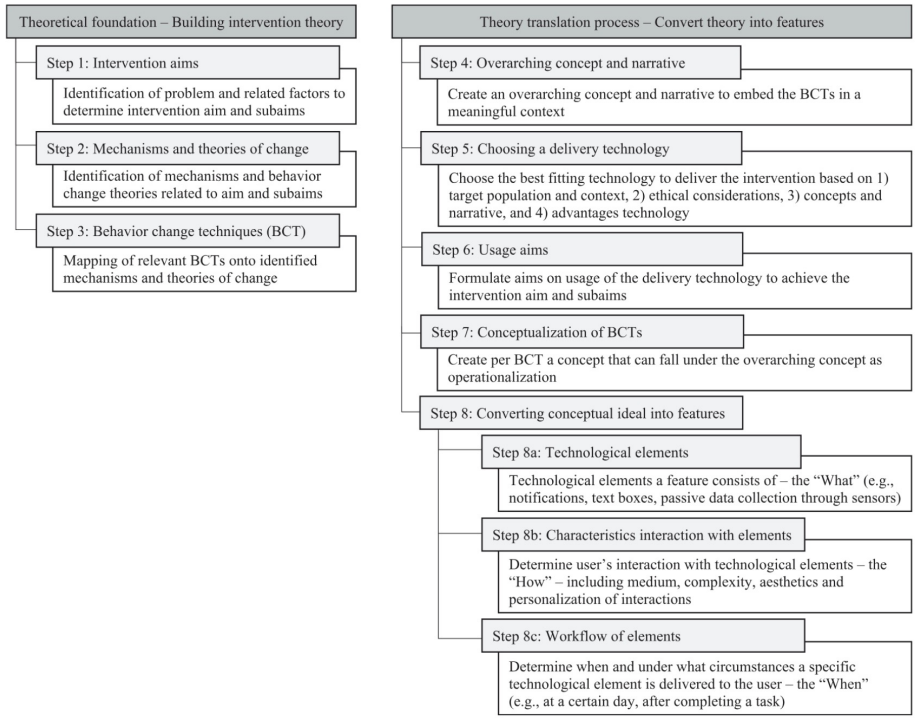

Fig. 2. Overview of the DID-Guide Showing the Theory Foundation Phase and the Theory Translation Phase Including the Steps of Each Phase.

Mertens, E. C. A., & Van Gelder, J. L. (2025). The DID-guide: A guide to developing digital mental health interventions. *Internet Interventions*, *39*, 100794

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6. DISCUSSIONS/LIMITATIONS

- Theory building is a rewarding activity in the hard life of a creative scientist!

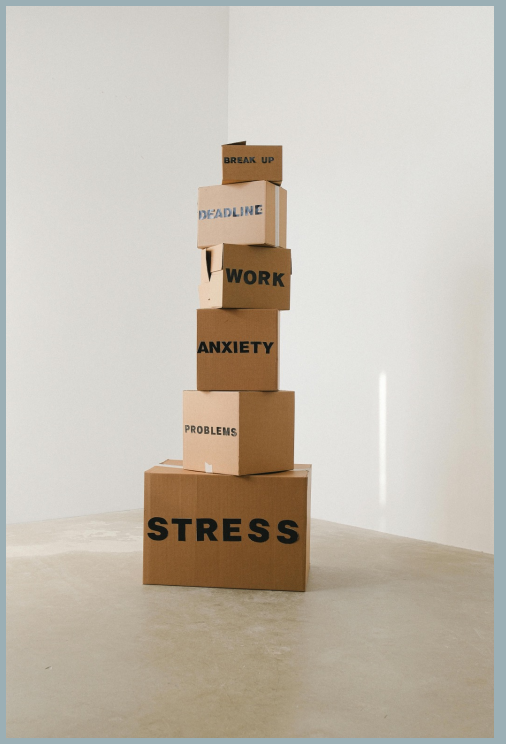
- Theory building is risky for publications due to conservativism in science: I see many old theories in the field and many (young) researchers who are focusing the old!

- Some of our theories were published in high-quality journals, some were not.

- Many of our theories were not comprehensively empirically tested.

- Some tests were positive, some were negative.

- We were (hopefully) not boring and inspired colleagues, students and practitioners!



7. IMPACT AND FUTURE

- Scholar.google: Probably about 1000 Citations

- Future activities

    - 2026: Digital learning theories

    - 2027: Artificial intelligence and creativity in theory building

    - 2028: The great stink theory of education (about cascade-effects in educational crisis)

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[Free Pictures: www.pexels.com]