Allgemein-didaktische Unterrichtsmodelle zur Arbeit mit Generativer KI:

Himmelstore oder Sackgassen?

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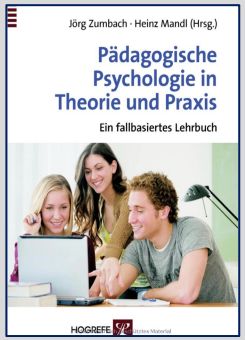
Digital Learning Research Group

Vortrag(20+10): Tagung der Sektionen LehrerInnenbildung und LehrerInnenbildungsforschung und Medienpädagogik der ÖFEB, 25.-26.2.2026, Johannes Kepler Universität Linz.

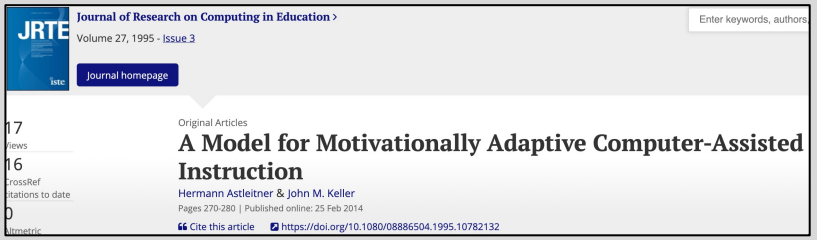
I. Kontext: EDUCATIONAL THEORY BUILDING LAB

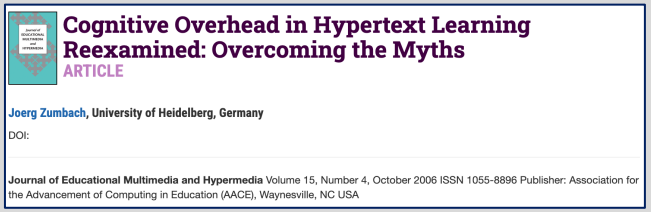
Digital Learning Research Group

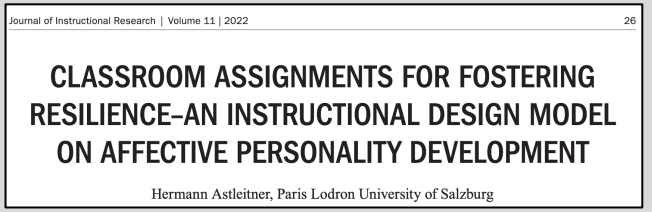
Basis

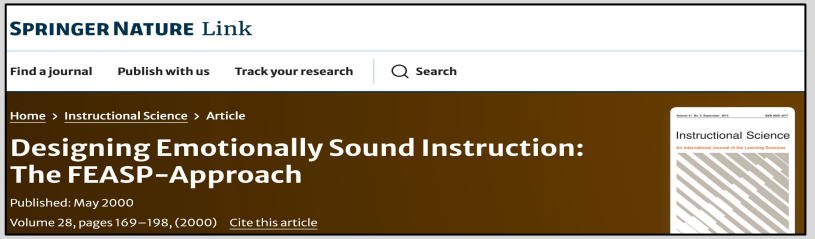


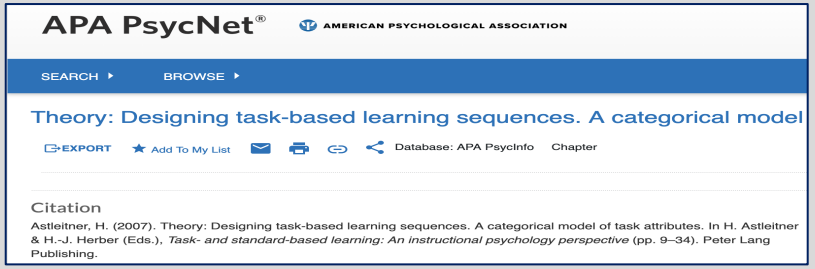
Topoi

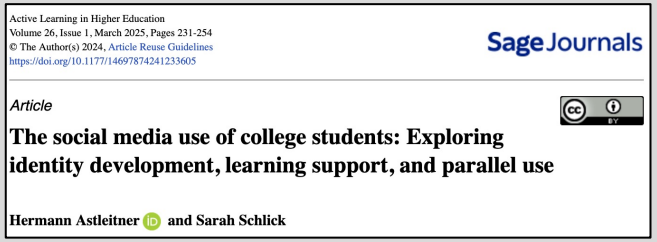












I. Kontext: EDUCATIONAL THEORY BUILDING LAB

Software, Daten, Statistik

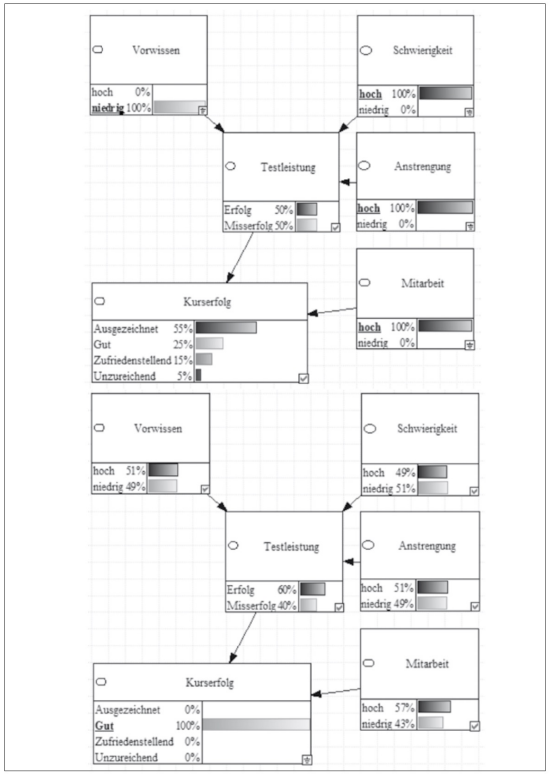
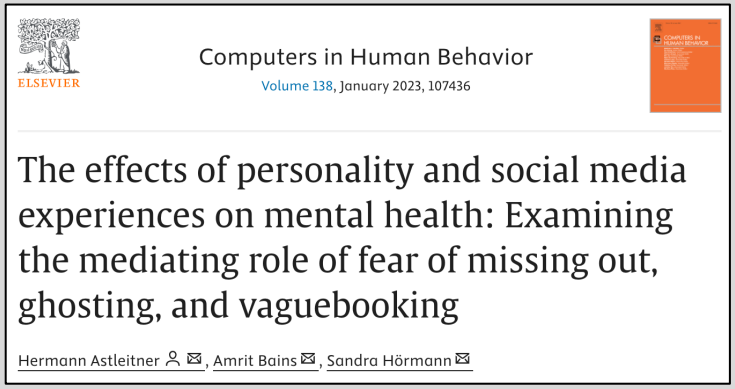


Abbildung 22: Bayes'sches Netzwerke als Entscheidungshilfe bei der Theoriebildung – Ergebnisse einer beispielhaften Analyse mit GeNIe

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


ELSEVIER
Computers in Human Behavior
Volume 138, January 2023, 107436

The effects of personality and social media experiences on mental health: Examining the mediating role of fear of missing out, ghosting, and vaguebooking

Hermann Astleitner, Amrit Bains, Sandra Hörmann


Article

We Have Big Data, But Do We Need Big Theory? Review-Based Remarks on an Emerging Problem in the Social Sciences

Hermann Astleitner[1]

Philosophy of the Social Sciences
2024, Vol. 54(1) 69–92

DOI: 10.1177/00483931231188825
journals.sagepub.com/home/pos
Sage

Will Artificial Intelligence Change the Creativity in Theory Building?
–
An Interdisciplinary Field of Discourse

II. Axiome: GenAI-Ambivalenz

GenAI – Ranking

https://artificialanalysis.ai/leaderboards/models

Effektivität GenAI

Gu, J., & Yan, Z. (2025). Effects of GenAI interventions on student academic performance: A meta-analysis. *Journal of Educational Computing Research*, *63*(6), 1460-1492.

$g = 0.68 : R^2 = 0.11$

https://visible-learning.org/hattie-ranking-influences-effect-sizes-learning-achievement/

Lehrer:in: 0.32

Lehrer:innenausbildung: 0.12

Co-/Team-Teaching: 0.19

https://www.d-velop.de/blog/wp-content/uploads/2024/02/starke-vs-schwache-ki.jpg

d.velop blog

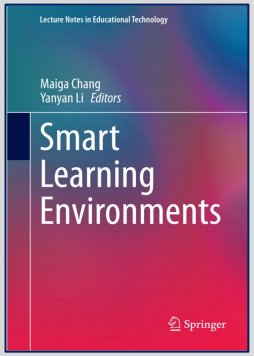
Starke vs. Schwache KI – Wo stehen wir aktuell?

	Schwach - Narrow AI (bezogen auf eine konkrete Aufgabe)	Stark - Strong AI / AGI (breites Spektrum an Aufgaben, Fähigkeit des Erlernens neuer Fähigkeiten)
Level 1: Emerging Vergleichbar oder etwas besser als ein ungeschulter Mensch	Emerging Narrow AI Einfache, regelbasierte Systeme	Emerging AGI ChatGPT, Bard, Llama 2, Gemini
Level 2: Competent Besser als 50% der qualifizierten Erwachsenen	Competent Narrow AI Smart Speaker (Alexa, Siri, Google Assistant), State-of-the-Art LLMs für bestimmte Aufgaben (Programmieren, Texte zusammenfassen)	Competent AGI Noch nicht erreicht
Level 3: Expert Besser als 90% der qualifizierten Erwachsene	Expert Narrow AI Generative Modelle zur Bild-Generierung (Imagen, Dall-E 2), Modelle für Rechtschreib- und Grammatik-Prüfung	Expert AGI Noch nicht erreicht
Level 4: Virtuoso Besser als 99% der qualifizierten Erwachsenen	Virtuoso Narrow AI AlphaGo	Virtuoso AGI Noch nicht erreicht
Level 5: Superhuman Übertrifft 100% der Menschen	Superhuman Narrow AI AlphaFold, AlphaZero	Artificial Superintelligence (ASI) Noch nicht erreicht

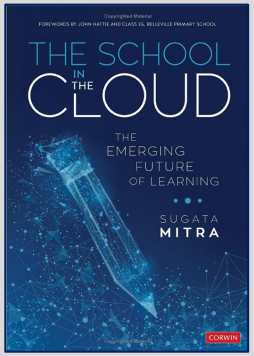
II. Axiome: GenAI-Ambivalenz

GenAI-Potentiale

- Problemlösung/Prävention
(Gestaltung, Diagnose, Intervention, Evaluation)
- Co-Intelligence
- Augmented Management
- Big Data Analysis
- Monitoring
- Digital Forensics



ohne Lehrer:in



ohne Schulhaus

GenAI-Regularien

- Relevanz als Gadget oder Werkzeug?
- Nutzungsregeln und –kontrolle
- Technologieakzeptanz und –mehrwert
- Hochwertige Prompts
- Hohes Vorwissen
- Kritische Prüfung
- **Subjektive und objektive Lehr-Lerntheorie**

II. Axiome: GenAI-Professionalität

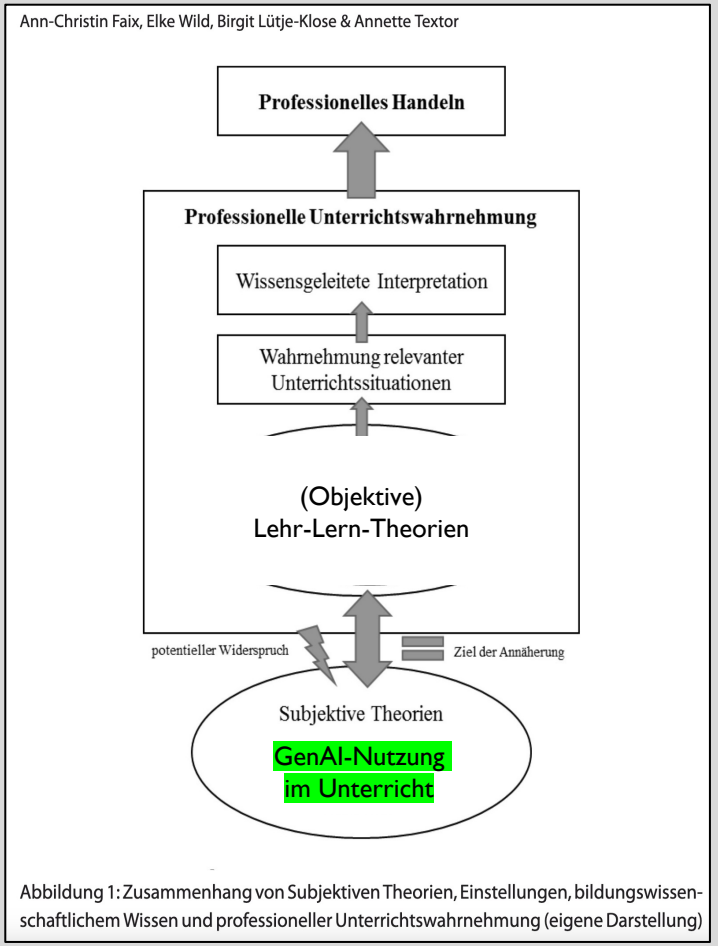


Abbildung 1: Zusammenhang von Subjektiven Theorien, Einstellungen, bildungswissenschaftlichem Wissen und professioneller Unterrichtswahrnehmung (eigene Darstellung)

Faix, A. C., Wild, E., Lütje-Klose, B., & Textor, A. (2019). Professionalisierung für inklusiven Unterricht im Rahmen interdisziplinärer und videogestützter Lehrveranstaltungen. *Journal für Psychologie*, 27(2), 71–94. (Modifiziert)

Berkman, E. T., & Wilson, S. M. (2021). So useful as a good theory? The practicality crisis in (social) psychological theory. *Perspectives on Psychological Science*, *16*(4), 864-874.

III. Interrogative und Methodik

Interrogative
In der vorliegenden Arbeit geht es um die Frage, ob es **allgemein-didaktische Lehr-Lern-Theorien** zur Arbeit mit generativer Künstlicher Intelligenz (GenAI wie z.B. ChatGPT) gibt und wenn ja, welche Qualität diese aufweisen.

Drei Typen von Qualitäten werden in einem Modell integriert und repräsentieren einen **innovativen Bewertungsrahmen** für Research-and-Development-Vorhaben im Bereich der Unterrichtsforschung.

Methodik
Methodisch wird ein narrativer **Literaturreview** durchgeführt (vgl. Baumeister & Leary, 1997). Als Ergebnis dieses Literaturreviews sind eine Reihe von didaktischen Modellen identifiziert worden, die mit dem **Bewertungsrahmen evaluiert** werden. Dabei wird festgestellt, ob ein bestimmtes Qualitätsmerkmal gegeben ist oder nicht.

IV. Qualitätsattribute einer Lehr-Lerntheorie

Klarheit, Konsistenz, Sparsamkeit, Überprüfbarkeit, empirische Angemessenheit, Produktivität, Generalisierbarkeit, Integration, Nutzen, Praktikabilität und Wirkung (Prochaska et al. 2008)

Theoretisch	Empirisch	Praktisch
T1. Lernen unter Lehren	E1. Keine Evidenz: Subjektive /Wiss. Theorie	P1. Handlungsempfehlungen
T2. Lerneffekte/Entwicklungsziele	E2. Schwache Evidenz: Qualitative Studien, Befragungen	P2. Didaktikbeispiele
T3. Lehr-/Lernmethoden	E3. Mittelstarke Evidenz: (Quasi-)experimentelle Studien	P3. Unterrichtsmaterialien
T4. Bedingungen der Anwendung	E4. Starke Evidenz: Langzeittest im Feld/Metaanalyse	P4. Fortbildungsmaßnahmen

Reigeluth, C. M. (2013). What is instructional-design theory and how is it changing? In C. M. Reigeluth (Ed.), *Instructional-design theories and models* (pp. 5–29). Routledge.

John, K. S., & McNeal, K. S. (2017). The strength of evidence pyramid: One approach for characterizing the strength of evidence of geoscience education research (GER) community claims. *Journal of Geoscience Education*, *65*(4), 363–372.

Burke, L. A., & Hutchins, H. M. (2008). A study of best practices in training transfer and proposed model of transfer. *Human Resource Development Quarterly*, *19*(2), 107–128.

V. Resultate
V.1. Multidimensionales Engagement

Table 1. Instructional Strategies for Fostering Multidimensional Engagement

Levels	Goals	General Strategies in Elements of Learning
	Cognitive Engagement	
Knowledge	Stimulating rehearsal/repetition and encoding	-Repeat knowledge to be learned in intervals -Use memory aids
Comprehension	Making thinking explicit and visible	-Think aloud -Use visual representations
Convergent thinking	Varying task-contexts	-Make tasks the core elements of instruction -Diversify tasks
Evaluation	Promoting critical-analytic thinking	-Stimulate multiperspective reasoning -Cultivate standard-based knowledge revision
Synthesis	Supporting divergent thinking/idea generation	-Assist in theory building -Foster system-thinking
	Motivational Engagement	
Attention	Allowing choice-making and classroom structuring	-Permit to select/modify task assignments -Use activity schedules
Relevance	Generating utility value and multiple perspectives	-Communicate and self-generate utility value information -Strive for multiple goals
Interest	Being cool and dynamic	-Use popular topics -Use changing topics
Identification	Stimulating mastery orientation and positivity	-Focus on individual progress -Increase booster thoughts and behaviors
Intrinsic motivation	Enhancing fantasy and curiosity	-Establish game-like activities -Stimulate discovery learning
	Social-emotional Engagement	
Self-assertion	Considering prosocial contexts	-Foster identity building -Balance power
Entertainment	Covering enjoyment and emotional needs	-Offer sensations -Include moving experiences
Belongingness	Promoting acceptance and commitment	-Emphasize similarities and complementarities -Include service learning activities
Adaptiveness	Practicing mindfulness	-Forcing perspective recognition -Reducing prejudice and stereotyping
Security	Establishing nonthreatening atmospheres	-Striving for secure attachment -Building resilience

Chi, M. T., & Wylie, R. (2014). The ICAP framework: Linking cognitive engagement to active learning outcomes. *Educational Psychologist*, *49*(4), 219–243.

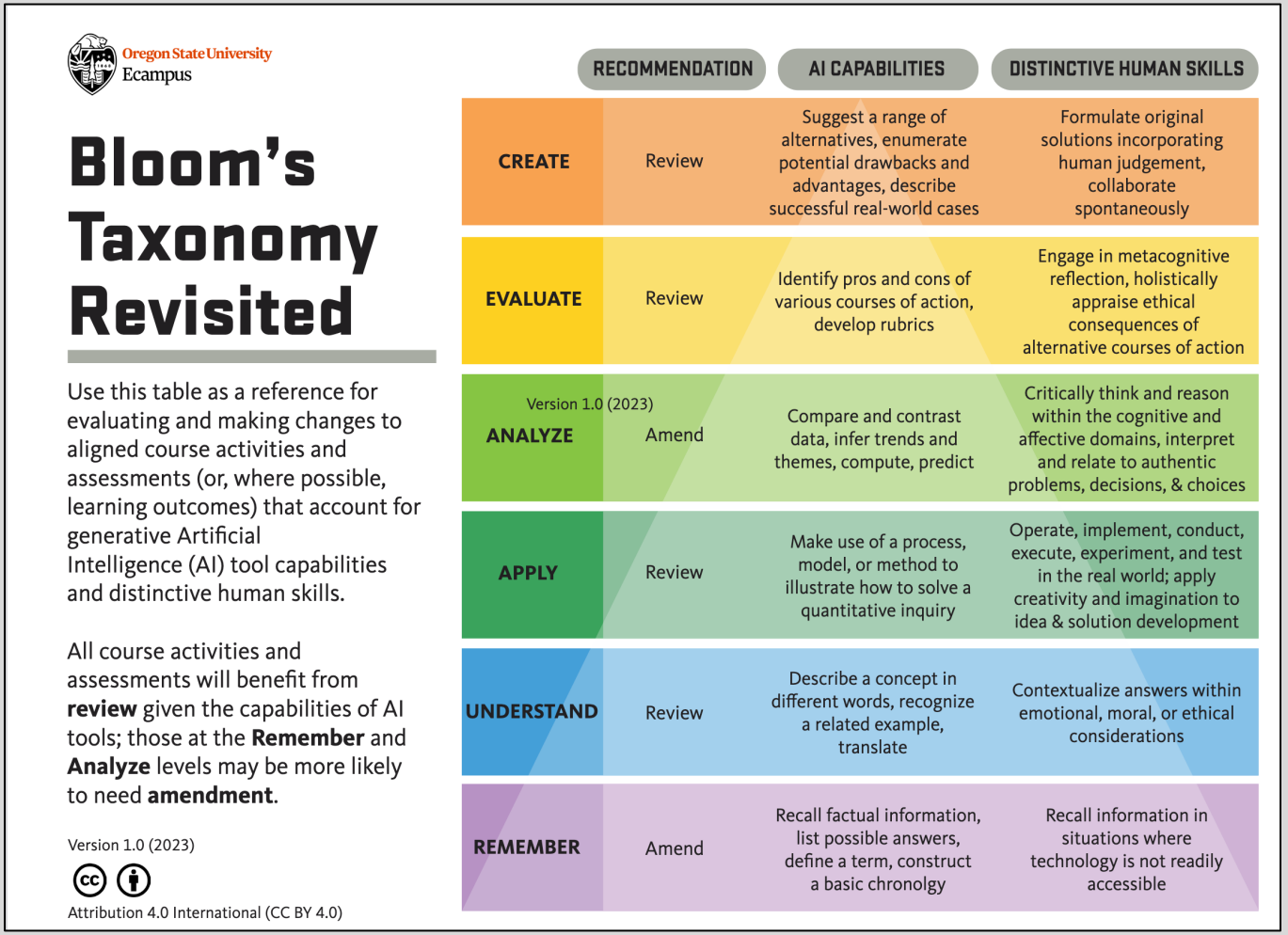
Astleitner, H. (2018). Multidimensional Engagement in Learning - An Integrated Instructional Design Approach. *Journal of Instructional Research*, *7*, 6–32.

Yuan, L., & Liu, X. (2025). The effect of artificial intelligence tools on EFL learners' engagement, enjoyment, and motivation. *Computers in Human Behavior*, *162*, 108474.

Bewertung

T1: Ja
T2: Ja
T3: Ja
T4: Nein
E1: Ja
E2: Nein
E3: Nein
E4: Nein
P1: Ja
P2: Ja
P3: Nein
P4: Nein

V. Resultate
V.2. Lehrzieltaxonomien



Oregon State University Ecampus

Bloom's Taxonomy Revisited

Use this table as a reference for evaluating and making changes to aligned course activities and assessments (or, where possible, learning outcomes) that account for generative Artificial Intelligence (AI) tool capabilities and distinctive human skills.

All course activities and assessments will benefit from **review** given the capabilities of AI tools; those at the **Remember** and **Analyze** levels may be more likely to need **amendment**.

Version 1.0 (2023)

	RECOMMENDATION	AI CAPABILITIES	DISTINCTIVE HUMAN SKILLS
CREATE	Review	Suggest a range of alternatives, enumerate potential drawbacks and advantages, describe successful real-world cases	Formulate original solutions incorporating human judgement, collaborate spontaneously
EVALUATE	Review	Identify pros and cons of various courses of action, develop rubrics	Engage in metacognitive reflection, holistically appraise ethical consequences of alternative courses of action
ANALYZE	Amend	Compare and contrast data, infer trends and themes, compute, predict	Critically think and reason within the cognitive and affective domains, interpret and relate to authentic problems, decisions, & choices
APPLY	Review	Make use of a process, model, or method to illustrate how to solve a quantitative inquiry	Operate, implement, conduct, execute, experiment, and test in the real world; apply creativity and imagination to idea & solution development
UNDERSTAND	Review	Describe a concept in different words, recognize a related example, translate	Contextualize answers within emotional, moral, or ethical considerations
REMEMBER	Amend	Recall factual information, list possible answers, define a term, construct a basic chronolgy	Recall information in situations where technology is not readily accessible

Version 1.0 (2023)

https://ecampus.oregonstate.edu/faculty/artificial-intelligence-tools/blooms-taxonomy-revisited-v1-2023.pdf

https://www.iqesonline.net/unterrichten/aufgaben/werkzeuge-kompetenzrad-fragewuerfel-aufgabenmap/

Bewertung

T1: Ja
T2: Ja
T3: Ja
T4: Nein
E1: Ja
E2: Nein
E3: Nein
E4: Nein
P1: Ja
P2: Ja
P3: Ja
P4: Ja

V. Resultate
V.3. Self-Determination Theory

Table 2 Learning activities using ChatGPT and their impact on the SDT needs and SRL phases derived through the participants' consensus

	Learning Activities	Autonomy	Competence	Relatedness	Forethought	Performance	Self-reflection
When teachers design learning activities, students use ChatGPT to …							
#1	Search information	X			X		
#2	Get examples	X			X		
#3	Check their answers		X				X
#4	Generate review questions to check for their understanding		X				X
#5	Create new problems for practice		X				X
#6	Create challenging problems		X				X
#7	Get insight into complex problems	X				X	
#8	Ask ideas for their improvement		X				X
#9	Make lists or outlines	X			X		
#10	Summarize their own work			X		X	
#11	Ask for definitions		X		X		
#12	Generate questions for discussions	X				X	
#13	Generate questions for essays	X				X	
#14	Get feedback for their work		X				X
#15	Practice peer feedback		X			X	
#16	Prepare for tough conversations		X			X	
#17	Visualize a problem			X		X	
	When teachers design learning activities, students are expected to …						
#18	Anticipate ChatGPT's outputs		X				X
#19	Grade ChatGPT's outputs		X				X
#20	Debate with ChatGPT	X				X	

Bewertung

T1: Ja
T2: Ja
T3: Ja
T4: Nein
E1: Ja
E2: Ja
E3: Nein
E4: Nein
P1: Ja
P2: Nein
P3: Nein
P4: Nein

Chiu, T. K. (2024). A classification tool to foster self-regulated learning with generative artificial intelligence by applying self-determination theory: a case of ChatGPT. *Educational Technology Research and Development*, 72(4), 2401–2416.

V. Resultate
V.4. Selbstregulation

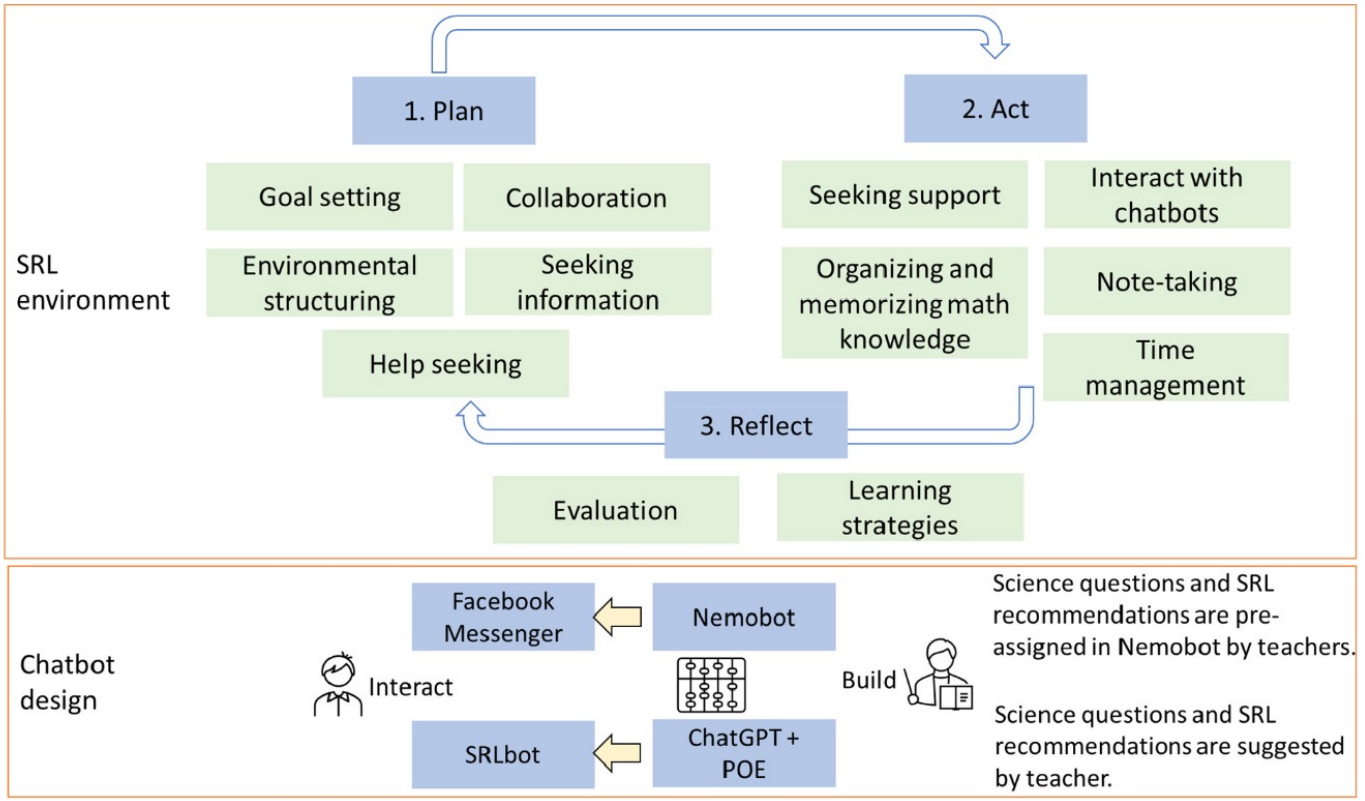


FIGURE 5 Zimmerman's (2002) three-cycle model adapted from Hsu et al. (2023).

Ng, D.T. K., Tan, C.W., & Leung, J. K. L. (2024). Empowering student self-regulated learning and science education through ChatGPT: A pioneering pilot study. British Journal of Educational Technology, 55(4), 1328–1353.

Bewertung

T1: Ja
T2: Ja
T3: Nein
T4: Nein
E1: Ja
E2: Ja
E3: Nein
E4: Nein
P1: Ja
P2: Nein
P3: Nein
P4: Nein

V. Resultate
V.5. Metakognition

TABLE 1 Metacognitive support framework.

Dimension of prompts	Examples
A. During the task initiation phase (planning)	
Identifying specific learning objectives	What is the main objective of this task?
Planning how to use the GenAI tools	What questions do I need to ask ChatGPT to get useful information?
Clarifying their prior knowledge	What prior knowledge will I rely on when interacting with GenAI?
B. During the task execution phase (monitoring and reflection)	
Assessing the relevance and accuracy of the AI responses	Is this information accurate and relevant to my task?
Summarizing their understanding of the content	Can I explain this concept in my own words?
Adjusting strategies as needed	Do I need to ask more specific questions or improve my methods?
C. Task completion phase (evaluation and reflection)	
Assessing the achievement of initial learning goals	Have I achieved my goals? What else can I improve next time?
Reflecting on GenAI tools' contribution to comprehension	How has ChatGPT helped me understand the topic?
Planning improvements for future learning	What strategies will I use next time to improve my learning outcomes?
[Participants can record their thoughts in the blank space.]	

Xu, X., Qiao, L., Cheng, N., Liu, H., & Zhao, W. (2025). Enhancing self-regulated learning and learning experience in generative AI environments: The critical role of metacognitive support. British Journal of Educational Technology, 56(5), 1842–1863.

Bewertung

T1: Ja
T2: Ja
T3: Ja
T4: Nein
E1: Ja
E2: Nein
E3: Nein
E4: Nein
P1: Ja
P2: Nein
P3: Nein
P4: Nein

V. Resultate
V.6. Instruktionale Interaktion

Table 5 Summary of the students' and instructors' perceptions of AI systems in online learning

Factor of learner–instructor interaction	The impact of AI systems	Students' perceptions	Instructors' perceptions
Communication	Quantity & Quality	(+) Students believe that the anonymity afforded by AI would make them less self-conscious and, as a result, allow them to ask more questions	(+) Instructors believe that AI could help answer simple, repetitive questions, which would allow them to focus on more meaningful communication with students
	Responsibility	(−) Students worry that AI could give unreliable answers and negatively impact their grades	(−) Instructors predicted conflicts between students and the instructor due to AI-based misunderstandings or misleadingness
Support	Just-in-time support	(+) Students believe that AI would support personalized learning experiences, particularly with studying and group projects	(+) Instructors believe AI could be effectively leveraged to help students receive just-in-time personalized support
	Agency	(−) Students perceived that canned and standardized support from AI might have a negative influence on their ability to learn effectively	(−) Instructors are wary of the fact that too much support from AI could take away students' opportunities for exploration and discovery
Presence	Connection	(+) Students believe that AI can address privacy concerns and support learner–instructor connections by providing social interaction cues without personal camera information	(+) Instructors believe that the addition of AI would help them become more aware of students' needs
	Surveillance	(−) Students are uncomfortable with the measurement of their unconscious behavior, such as eye tracking or facial expression analysis, because it feels like surveillance	(−) Instructors were negative about relying on AI interpretation to understand students' social interaction cues

(+) indicates perceived benefit and (−) indicates perceived concern

Seo, K., Tang, J., Roll, I., Fels, S., & Yoon, D. (2021). The impact of artificial intelligence on learner–instructor interaction in online learning. *International Journal of Educational Technology in Higher Education*, *18*, 1–23.

Bewertung

T1: Ja
T2: Nein
T3: Ja
T4: Nein
E1: Ja
E2: Ja
E3: Nein
E4: Nein
P1: Ja
P2: Nein
P3: Nein
P4: Nein

V. Resultate
V.7. Spielendes Lernen

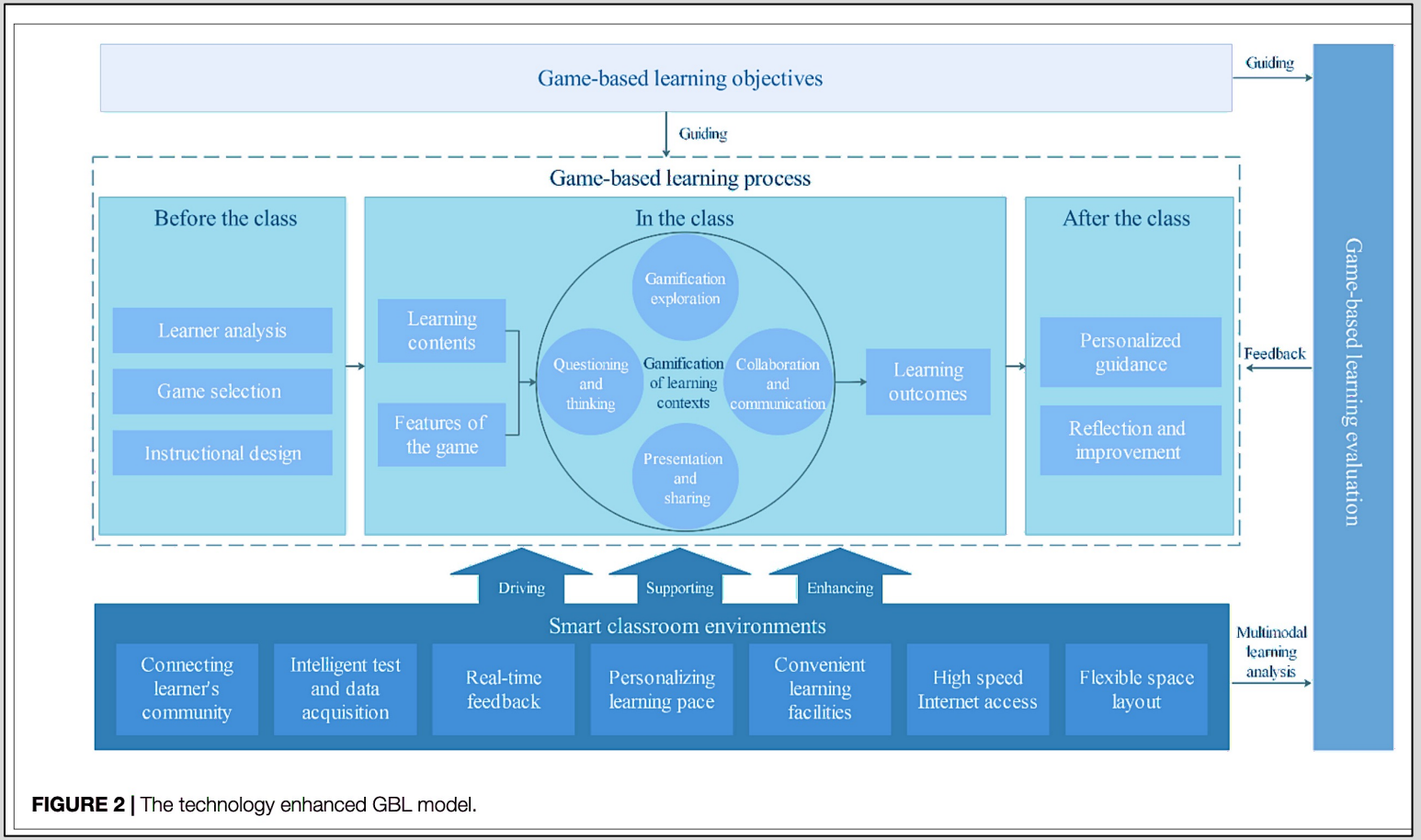


FIGURE 2 | The technology enhanced GBL model.

Bewertung

T1: Ja
T2: Ja
T3: Ja
T4: Nein
E1: Ja
E2: Nein
E3: Nein
E4: Nein
P1: Ja
P2: Nein
P3: Nein
P4: Nein

Pan, L., Tlili, A., Li, J., Jiang, F., Shi, G., Yu, H., & Yang, J. (2021). How to implement game-based learning in a smart classroom? A model based on a systematic literature review and Delphi method. *Frontiers in Psychology*, *12*, 749837.

V. Resultate
V.8. Computational Thinking

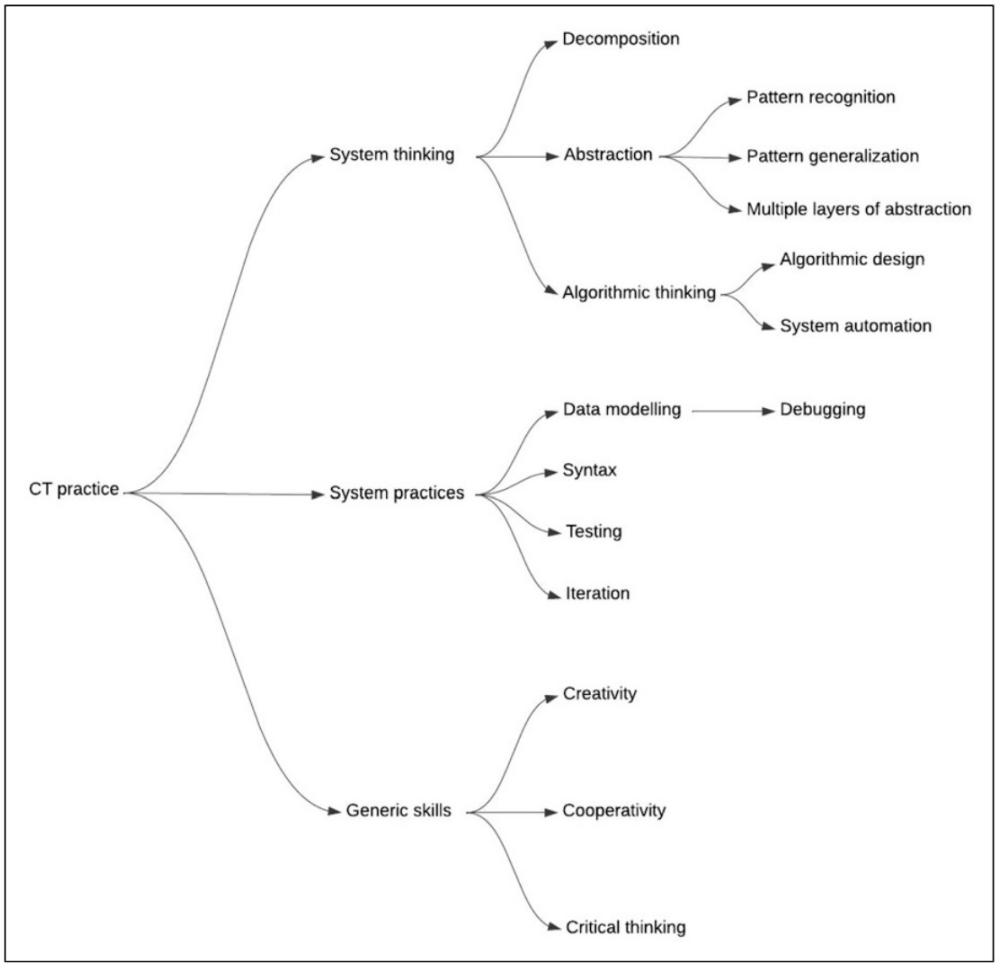
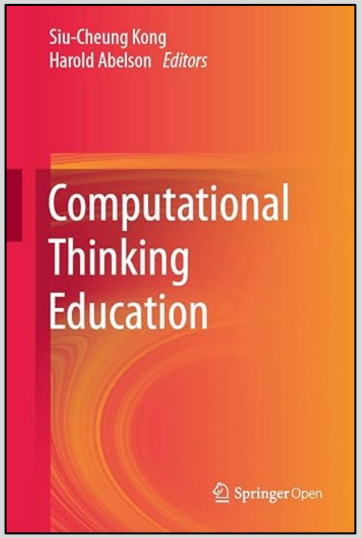


Figure 3. Diagram of CT practices.

Weng, X., Ye, H., Dai, Y., & Ng, O. L. (2024). Integrating artificial intelligence and computational thinking in educational contexts: A systematic review of instructional design and student learning outcomes. Journal of Educational Computing Research, 62(6), 1420–1450.



Bewertung

T1: Nein
T2: Ja
T3: Nein
T4: Nein
E1: Ja
E2: Nein
E3: Nein
E4: Nein
P1: Ja
P2: Nein
P3: Nein
P4: Nein

V. Resultate
V.9. Denkschulung

Didaktik der Denkförderung

Prompts zu Ebenen des Kritischen Denkens

Didaktisches Fördermodell
(Practical Inquiry Model von Garrison)

Schrittweises Vorgehen mit Validierung

Jahn, D. (2024). CT goes ChatGPT - Kritisches Denken mit dem Chatbot fördern und einen souveränen Umgang damit kultivieren. In T. Köhler (Hrsg.), *Handbuch E-Learning. Expertenwissen aus Wissenschaft und Praxis* (106. Ergänzungslieferung Februar 2024. Beitrag 4.88). Fachverlag Deutscher Wirtschaftsdienst.

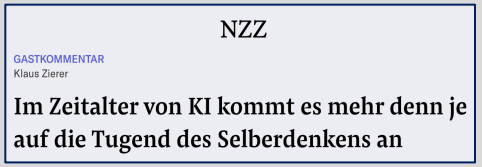
Bewertung

T1: Ja
T2: Ja
T3: Ja
T4: Ja
E1: Ja
E2: Ja
E3: Nein
E4: Nein
P1: Ja
P2: Ja
P3: Ja
P4: Ja

VI. Diskussion: Toolbox für R&D + Denken

Tabelle 4: Theorien in unterschiedlichen Entwicklungsphasen
(vgl. Astleitner, 2011)

Phase	Phase 1	Phase 2	Phase 3
Zustand	„Naive" Annahmen Alltagstheorien Einschätzungen	Sammlung von Arbeitshypothesen	Theorie in einer ersten Version
Grundlage	Subjektive Ansichten	Explorationen von wissenschaftlichem Wissen	Literaturbasierte und kriterienorientierte Entwicklung
Phase	**Phase 4**	**Phase 5**	**Phase 6**
Zustand	Wenig geprüfte Theorie	Stark geprüfte Theorie	Weiterentwicklungen einer Theorie
Grundlage	Beschreibende und Zusammenhänge klärende empirische Prüfungen	Kontrollierte Prüfungen von Ursache-Wirkungs-Beziehungen	Reformulierungen aufgrund empirischer und theoretischer Erkenntnisse


NZZ

GASTKOMMENTAR
Klaus Zierer

Im Zeitalter von KI kommt es mehr denn je auf die Tugend des Selberdenkens an

Armitage, R. (2025). Your brain on ChatGPT. *British Journal of General Practice*, *75*(758).

The MIT-study suggests that early reliance on LLMs may impair the development of essential cognitive skills.

VII. Implikation: GenAI und Denkregression?

Google - Wissen

SM - Aufmerk.

GenAI passiv - Denken

X

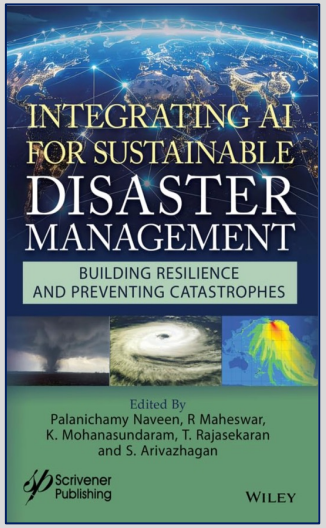
Fehlfunktionen im Unterricht

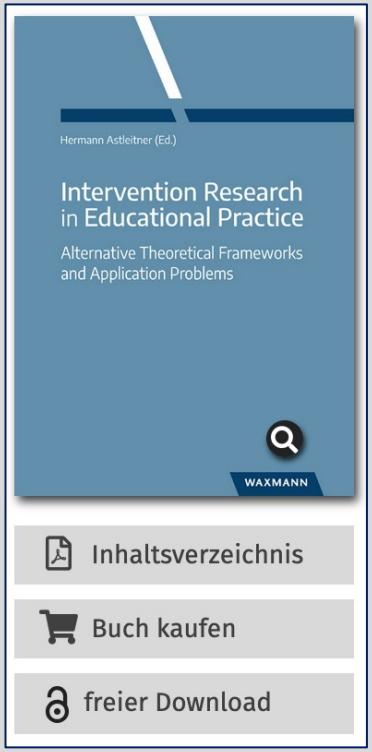
=

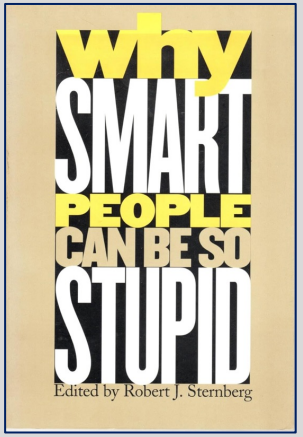
Denk-regression

= eine Rückkehr zu einem früheren, niedrigeren Zustand der kognitiven ... Funktionsfähigkeit.
(https://dictionary.apa.org/regression)

Ilgun Dibek, M., Sahin Kursad, M., & Erdogan, T. (2024). Influence of artificial intelligence tools on higher order thinking skills: a meta-analysis. *Interactive Learning Environments*, 1-23







VII. Implikation: Definition Denkregression

Funktionale Stupidität = "Unfähigkeit und/oder der Unwille, kognitive und reflektierende Fähigkeiten über einen engen und vorsichtigen Rahmen hinaus einzusetzen. Sie beinhaltet mangelnde Reflexionsfähigkeit, eine Abneigung gegen die Forderung oder Bereitstellung von Begründungen sowie die Vermeidung substanzieller Argumentation".

Alvesson, M. and A. Spicer (2012) 'A stupidity-based theory of organizations', *Journal of Management Studies*, 49(7): 1194-1220.

Anomie = "Zusammenbruch sozialer Normen, Werte und Erwartungen innerhalb einer Gesellschaft. Sie tritt auf, wenn sich Individuen von gesellschaftlichen Normen entfremdet oder abgeschnitten fühlen, was zu Gefühlen der Ziellosigkeit, Desorientierung und sogar moralischer Verwirrung führt".

https://oxford-review.com/the-oxford-review-dei-diversity-equity-and-inclusion-dictionary/anomie-definition-and-explanation/

https://dorsch.hogrefe.com/stichwort/anomie

= Einschränkung des Denkens und seiner Standards

(= Funktionale Stupidität + Anomie)

Goblin-Mode:

Selbstgefällig, faul, schlampig, gierig, ohne Normen

VIII. Literaturhinweise

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[Free Pictures: www.pexels.com]

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