Medienvergleichsstudien:
Probleme, Chancen, Alternativen

Josef Buchner

Ed Tech Research: Jenseits von Medienvergleichen

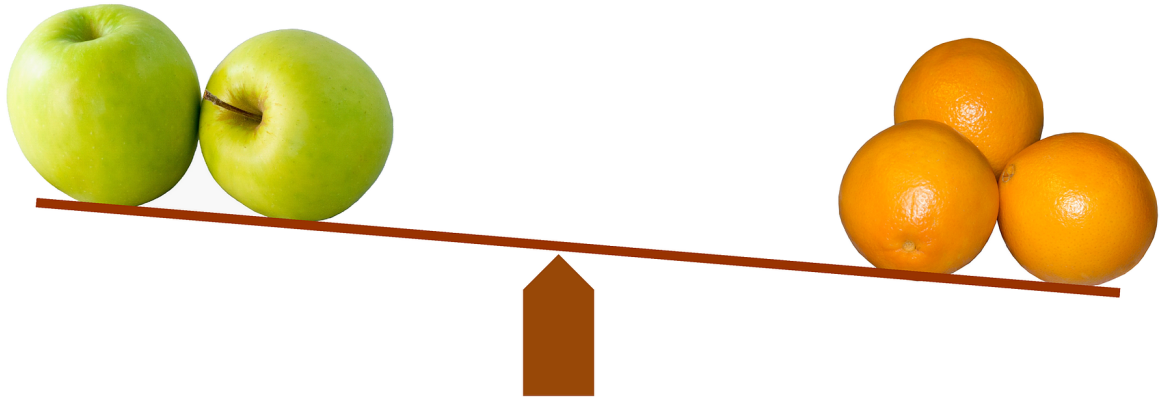
Universität Duisburg-Essen & Online

15.05.2023

Relevanz

40 Jahre Medienwirkungsdebatte

- Great media debate
  (Clark, 1983, 1994; Kozma, 1991, 1994; Übersicht in Sickel, 2019)
- «Pseudoscience»
  (Reeves, 1995)
- Computers & WWW
  (Hastings & Tracey, 2005; Surry & Ensminger, 2001)
- Rigorous & relevant studies
  (Amiel & Reeves, 2008; Mishra et al., 2009; Ross et al., 2010)
- From things to problems
  (Kerres, 2018; Reeves & Reeves, 2015)
- Improve instead of prove
  (Buchner & Kerres, 2023; Hodges et al., 2020; Honebein & Reigeluth, 2021; Kerres & Buchner, 2022; Makransky & Petersen, 2021; Mayer, 2020; Reeves & Lin, 2020)



Probleme

Konfundierung

- Technologie = Methode
  - z.B. AR teaching method
- Technologie + Methode
  - Problem-based VR learning
- → vs. «traditional» teaching

Fehlender Theoriebezug

- Bezug zu Lehr-/Lerntheorien fehlt
- Theorie/Framework = Verweise auf ähnliche Studien
- Kein Beitrag zur Weiterentwicklung theoretischer Annahmen

Technikzentriertheit

- Untersuchte Technologie bewirkt festgestellte Effekte
- Lernaktivitäten werden ignoriert
- Komplexität von Lehren/Lernen wird negiert
  - z.B. Novelty-Effect, Bildungspraxis

(e.g. Hew et al., 2019; Hodges, Curry, et al., 2020; Hodges, Moore, et al., 2020; Honebein & Reigeluth, 2021)

Chancen

Critical Ed Tech Research

- Technologiezentrierte Annahmen hinterfragen
- z.B. Welche Rolle spielen Immersionserleben oder Presence wenn die Kontrollgruppe aktiv ist?

- Lehr-/Lerntheoretische Annahmen überprüfen
- z.B. Welche spezifischen Lehr-/Lernziele können mit einer Technologie gefördert werden?

- Kontextfaktoren berücksichtigen!
- z.B. In welcher Relation stehen Effektivität und Effizienz?
- → Bildungspraxis!

(e.g. Honebein & Honebein, 2015; Huang et al., 2023; Kirschner, 2015; Parong & Mayer, 2018; Richter et al., 2022; Wasson & Kirschner, 2020; Zumbach et al., 2022)

Alternativen

Learner-centred approaches	Gestaltungsorientierung	?
• Value-added studies • Learner-Treatment-Interaction (LTI) studies • Kombinationen	• Forschungsbasierte Entwicklung von Bildungsanwendungen • Pilotstudien • Within-Subjects Design • → Ziel: Mastery!	• Radikales Umdenken? • Do we really need a control group? (Sanchez, 2020) • Learning instead of technology-enhanced learning? (Kirschner, 2015)

(e.g. Buchner et al., 2022; Buchner & Kerres, 2023; Kerres et al., 2022; Mayer, 2019, 2020; Mulders, 2022; Mulders et al., 2022)

VIELEN DANK!

Josef Buchner
josef.buchner@phsg.ch

Literatur - Relevanz

Amiel, T., & Reeves, T. C. (2008). Design-Based Research and Educational Technology: Rethinking Technology and the Research Agenda. Educational Technology & Society, 11(4), 29–40.

Buchner, J., & Kerres, M. (2023). Media comparison studies dominate comparative research on augmented reality in education. Computers & Education, 195, 104711. https://doi.org/10.1016/j.compedu.2022.104711

Clark, R. E. (1983). Reconsidering Research on Learning from Media. Review of Educational Research, 53(4), 445–459.

Clark, R. E. (1994). Media Will Never Influence Learning. Educational Technology Research and Development, 42(2), 21–29.

Hastings, N. B., & Tracey, M. W. (2005). Does media affect learning: Where are we now? TechTrends, 49(2), 28–30. https://doi.org/10.1007/BF02773968

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The Difference Between Emergency Remote Teaching and Online Learning. Educause Review, 1–12. https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning

Honebein, P. C., & Reigeluth, C. M. (2021). To prove or improve, that is the question: The resurgence of comparative, confounded research between 2010 and 2019. Educational Technology Research and Development, 69(2), 465–496. https://doi.org/10.1007/s11423-021-09988-1

Kerres, M. (2018). Mediendidaktik: Konzeption und Entwicklung mediengestützter Lernangebote (5. Auflage). De Gruyter Oldenbourg Verlag.

Kerres, M., & Buchner, J. (2022). Education after the Pandemic: What We Have (Not) Learned about Learning. Education Sciences, 12(5), 315. https://doi.org/10.3390/educsci12050315

Kozma, R. B. (1991). Learning With Media. Review of Educational Research, 61(2), 179–211.

Kozma, R. B. (1994). Will media influence learning? Reframing the debate. Educational Technology Research and Development, 42(2), 7–19. https://doi.org/10.1007/BF02299087

Makransky, G., & Petersen, G. B. (2021). The Cognitive Affective Model of Immersive Learning (CAMIL): A Theoretical Research-Based Model of Learning in Immersive Virtual Reality. Educational Psychology Review. https://doi.org/10.1007/s10648-020-09586-2

Mayer, R. E. (2020). Multimedia Learning (Third Edition). Cambridge University Press. cambridge.org/9781107187504

Mishra, P., Koehler, M. J., & Kereluik, K. (2009). The Song Remains the Same: Looking Back to the Future of Educational Technology. TechTrends, 53(5), 48–53. https://doi.org/10.1007/s11528-009-0325-3

Reeves, T. C. (1995). Questioning the questions of instructional technology research. Proceedings of the Annual Conference of the Association for Educational Communications and Technology, 459–470.

Reeves, T. C., & Lin, L. (2020). The research we have is not the research we need. Educational Technology Research and Development, 68(4), 1991–2001. https://doi.org/10.1007/s11423-020-09811-3

Reeves, T. C., & Reeves, P. M. (2015). Reorienting educational technology research from things to problems. Learning: Research and Practice, 1(1), 91–93. https://doi.org/10.1080/23735082.2015.1008120

Ross, S. M., Morrison, G. R., & Lowther, D. L. (2010). Educational Technology Research Past and Present: Balancing Rigor and Relevance to Impact School Learning. Contemporary Educational Technology, 1(1). https://doi.org/10.30935/cedtech/5959

Sickel, J. L. (2019). The Great Media Debate and TPACK: A Multidisciplinary Examination of the Role of Technology in Teaching and Learning. Journal of Research on Technology in Education, 51(2), 152–165. https://doi.org/10.1080/15391523.2018.1564895

Surry, D. W., & Ensminger, D. (2001). What's Wrong with Media Comparison Studies? Educational Technology, 41(4), 32–35. https://www.jstor.org/stable/44428679

Literatur – Probleme (Auswahl; mehr bei Relevanz)

Hew, K. F., Lan, M., Tang, Y., Jia, C., & Lo, C. K. (2019). Where is the “theory” within the field of educational technology research? *British Journal of Educational Technology*, *50*(3), 956–971. https://doi.org/10.1111/bjet.12770

Hodges, C., Curry, J., & Grant, M. (2020). *Getting started with Educational Technology Research* [Presentation]. Curriculum Studies Summer Collaborative. https://digitalcommons.georgiasouthern.edu/cssc/2020/2020/23

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The Difference Between Emergency Remote Teaching and Online Learning. *Educause Review*, 1–12. https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning

Honebein, P. C., & Reigeluth, C. M. (2021). To prove or improve, that is the question: The resurgence of comparative, confounded research between 2010 and 2019. *Educational Technology Research and Development*, *69*(2), 465–496. https://doi.org/10.1007/s11423-021-09988-1

Literatur - Chancen

Honebein, P. C., & Honebein, C. H. (2015). Effectiveness, efficiency, and appeal: Pick any two? The influence of learning domains and learning outcomes on designer judgments of useful instructional methods. *Educational Technology Research and Development*, *63*(6), 937–955. https://doi.org/10.1007/s11423-015-9396-3

Huang, Y., Richter, E., Kleickmann, T., & Richter, D. (2023). Comparing video and virtual reality as tools for fostering interest and self-efficacy in classroom management: Results of a pre-registered experiment. *British Journal of Educational Technology*, *54*(2), 467–488. https://doi.org/10.1111/bjet.13254

Kirschner, P. A. (2015). Do we need teachers as designers of technology enhanced learning? *Instructional Science*, *43*(2), 309–322. https://doi.org/10.1007/s11251-015-9346-9

Parong, J., & Mayer, R. E. (2018). Learning science in immersive virtual reality. *Journal of Educational Psychology*, *110*(6), 785–797. https://doi.org/10.1037/edu0000241

Richter, E., Hußner, I., Huang, Y., Richter, D., & Lazarides, R. (2022). Video-based reflection in teacher education: Comparing virtual reality and real classroom videos. *Computers & Education*, *190*, 104601. https://doi.org/10.1016/j.compedu.2022.104601

Wasson, B., & Kirschner, P. A. (2020). Learning Design: European Approaches. *TechTrends*, *64*(6), 815–827. https://doi.org/10.1007/s11528-020-00498-0

Zumbach, J., von Kotzebue, L., & Pirklbauer, C. (2022). Does Augmented Reality Also Augment Knowledge Acquisition? Augmented Reality Compared to Reading in Learning About the Human Digestive System? *Journal of Educational Computing Research*, *60*(5), 1325–1346. https://doi.org/10.1177/07356331211062945

Literatur - Alternativen

Buchner, J., & Kerres, M. (2023). Media comparison studies dominate comparative research on augmented reality in education. *Computers & Education*, *195*, 104711. https://doi.org/10.1016/j.compedu.2022.104711

Buchner, J., Rüter, M., & Kerres, M. (2022). Learning with a digital escape room game: Before or after instruction? *Research and Practice in Technology Enhanced Learning*, *17*(1), 10. https://doi.org/10.1186/s41039-022-00187-x

Kerres, M., Sander, P., & Waffner, B. (2022). Zum Zusammenwirken von Bildungsforschung und Bildungspraxis: Gestaltungsorientierte Bildungsforschung als Ko-Konstruktion. *bildungsforschung*, *2*, 1–20.

Kirschner, P. A. (2015). Do we need teachers as designers of technology enhanced learning? *Instructional Science*, *43*(2), 309–322. https://doi.org/10.1007/s11251-015-9346-9

Mayer, R. E. (2019). Computer Games in Education. *Annual Review of Psychology*, *70*, 531–549. https://doi.org/doi.org/10.1146/annurev-psych-010418- 102744

Mayer, R. E. (2020). *Multimedia Learning* (Third Edition). Cambridge University Press. cambridge.org/9781107187504

Mulders, M. (2022). Vocational Training in Virtual Reality: A Case Study Using the 4C/ID Model. *Multimodal Technologies and Interaction*, *6*(7), 49. https://doi.org/10.3390/mti6070049

Mulders, M., Buchner, J., & Kerres, M. (2022). Virtual Reality in Vocational Training: A Study Demonstrating the Potential of a VR-based Vehicle Painting Simulator for Skills Acquisition in Apprenticeship Training. *Technology, Knowledge and Learning*. https://doi.org/10.1007/s10758-022-09630-w

Sanchez, E. (2020). Research into Technology Enhanced Learning: Do we Really Need a Control Group? *International Journal of Instruction*, *13*(3).