DR. ESTHER ZIEGLER – CV English

PERSONAL DATA

Dr. sc. ETH Esther Ziegler
Lecturer ETH Zürich

LernConsulting GmbH
Lehr- & Lernberatung
Sonneggstrasse 4, 8006 Zürich, Switzerland
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RESEARCH

- Desirable difficulties in Medical Education
- Math-gender stereotypes and improving STEM engagement
- Intelligence and High School admission
- Interleaving, blocking, sequencing or contrasting the introduction of concepts
- Productive failure and creativity

EDUCATION (PSYCHOLOGY, EDUCATION AND MUSIC)

2007-2011	Promotion in Research on Learning & Instruction with Prof. Dr. Elsbeth Stern, ETH Zürich, PhD
2003-2007	Lizentiat in Psychology with a specialization in Neuropsychology with Prof. Dr. Lutz Jäncke, Minors: Educational Sciences and Psychopathology of childhood and youth, University of Zürich, Lic. Phil / Master
1994-2000	Violin Studies at the Conservatory of Zürich with Mariann Häberli and Gunhild Hölscher, Lehrdiplom Violine
1989-1992	Formation as Primary School Teacher at the PH Zürich, Primarlehrerdiplom
1989	Matura Type B, Kantonsschule Limmattal in Urdorf ZH

SCIENTIFIC CAREER

since 2020	Own company LernConsulting GmbH: consulting for teachers, lecturers and students in the field of teaching and learning
since 2020	Lecturer at ETH Zürich (Professorship of Learning Sciences: Prof. Dr. Manu Kapur)
2017-2019	Senior Research Assistant and Lecturer at the Institute for Learning Sciences & Higher Education, ETH Zürich (Head: Prof. Dr. Manu Kapur)
2015-2016	Visiting Postdoctoral Fellow an der Harvard School of Education, Cambridge, MA, USA
2013-2016	Senior Research Assistant at the Institute for Research on Learning & Instruction, ETH Zürich (Head: Prof. Dr. Elsbeth Stern)
2011-2013	Postdoc at the Institute for Research on Learning & Instruction, ETH Zürich (Head: Prof. Dr. Elsbeth Stern)
2007-2011	Doctoral Student at the Institute for Research on Learning & Instruction, ETH Zürich (Head: Prof. Dr. Elsbeth Stern)

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CAREER AS VIOLINIST AND PRIMARY SCHOOL TEACHER

2011-2020 Member of the Orchester vom See, Zürich (Conductor: Dominic Limburg)

2000-2013 Teaching Violin and Guitar at the Pädagogische Hochschule, PH Zürich

2002-2010 Violin teaching at the Musisches Gymnasium [Muscial High School] Zürich

2000-2001 Teaching a 6th primary class (80%) in Zürich

1992-1993 Teaching a 4th primary class (100%) in Wettswil am Albis ZH

PEER-REVIEWED ARTICLES

Ziegler, E. Trninic, D. & Kapur, M. (2021). Micro productive failure and the acquisition of algebraic procedural knowledge. *Instructional Science.*

Ziegler, E., Edelsbrunner, P., & Stern, E. (2021). The benefits of combining teacher-direction with contrasted presentation of algebra principles. *European Journal of Psychology of Education.* 36(1), 187–218.

Ziegler, E., Edelsbrunner, P., & Star, J. R. (2019). Preventing interference: Reordering complexity in the learning of new concepts. *Journal of Educational Psychology*. 111(7), 1202-1219.

Ziegler, E. & Kapur, M. (2018). The interplay of creativity, failure and learning in generating algebra problems. *Thinking Skills and Creativity*. 30(1), 64-75.

Ziegler, E., Edelsbrunner, P. A. & Stern, E. (2018). The relative merits of explicit and implicit learning of contrasted algebra principles. *Educational Psychology Review*. 30(2), 531–558.

Ziegler, E. & Stern, E. (2016). Consistent advantages of contrasted comparisons: Algebra learning under direct instruction. *Learning and Instruction*, 41(1), 41-51.

Ziegler, E. & Stern, E. (2014). Delayed benefits of learning elementary algebraic transformations through contrasted comparisons. *Learning and Instruction*, 33(1), 131-146.

Geiser, E., Ziegler, E., Jancke, L. & Meyer, M. (2009). Early electrophysiological correlates of meter and rhythm processing in music perception. *Cortex*, 45(1), 93-102.

BUCH

Ziegler, E. (2022). Plus Vite ! Brillant Französisch *[More Quickly: Brilliant French].* BoD Verlag. ISBN 978-3-7534-9102-8

BOOK CHAPTERS

Ziegler, E. & Stern, E. (2021). Der Einfluss von Erbe und Umwelt auf Bildung, Intelligenz und Lernen: Möglichkeiten der Lern- und Bildungsprozesse. In V. Müller-Oppliger, & G. Weigand (Eds.), Handbuch Begabung (S. 104-114). Weinheim Basel: Beltz Verlag.

Ziegler, E., Deiglmayr, A., Schalk, L., & Stern, E. (2018). *Kognitive Entwicklung im Jugendalter*. In: B. Gniewosz & P. Tietzmann (Eds.), Handbuch Jugend. Stuttgart, Deutschland: Kohlhammer Verlag.

Ziegler, E. (2014). *Talent und Begabung in der Kognitionspsychologie*. In M. Stamm (Eds.), Handbuch Talententwicklung. Theorien, Methoden und Praxis in Psychologie und Pädagogik. (S. 97-106). Bern: Huber Verlag.

Ziegler, E., Neubauer, A. & Stern, E. (2012). *Kompetenzen aus der Perspektive der Kognitionswissenschaften und der Lehr-Lern-Forschung*. In M. Paechter, M. Stock, S. Schmölzer-Eibinger (Eds.), Kompetenzorientiertes Unterrichten in der Schule (S. 14-26). Weinheim Basel: Beltz Verlag.

TEACHING AT ETH ZÜRICH

Seminar The Science of Learning from Failure
2022 (FS), 2021 (HS/FS), 2020 (HS/FS), 2019 (HS/FS), 2018 (HS/FS)

Seminar Forschungsmethoden der empirischen Bildungsforschung [*Seminar Research Methods in Educational Science*]
2016 (HS/FS), 2015 (HS/FS), 2014 (HS)

Vorlesung Gestaltung schulischer Lernumgebungen [*Lecture The Design of Learning Environments for School*]
2016, 2015, 2014, 2013, 2012, 2011

Seminar Empirische Arbeit: Praktische Lehr- und Lernforschung [*Seminar Student Research Projects: Practical Research on Learning and Instruction*]
2016, 2015, 2014

Vorlesung Didaktische Grundlagen für die Ausbildungsplanung, -durchführung & -evaluation [*Lecture Learning Environments for Training: Planning, Operation, Assessment*]
2016 , 2015, 2014

Vorlesung Menschliches Lernen in Co-Teaching with Prof. Elsbeth Stern [*Lecture Human Learning*]
2014, 2013, 2012, 2011, 2010

CONFERENCE CONTRIBUTIONS

Ziegler, E., (2019, August). Minimal productive failure occasions in learning mathematics. Paper presented at the 18th Conference of the European Association for Research on Learning and Instruction (EARLI), Aachen, Germany.

Ziegler, E., & Kapur, M. (2018, August). Failure interventions in mathematics education. Paper presented at the EARLI Sig Conceptual Change Conference, in Klagenfurt, Austria.

Ziegler, E., Edelsbrunner, P. A., & Star, J. A. (2017, August). Confronting confusion of similar algebraic concepts by teaching multiplication before addition. Paper presented at the 17th Conference of the European Association for Research on Learning and Instruction (EARLI), Tampere, Finland.

Hofer, S. I., Stern, E., & Ziegler, E. (2017, August) Educational tracking in early adolescence: To what extent does intelligence prevail? Paper presented at the 17th Conference of the European Association for Research on Learning and Instruction (EARLI), Tampere, Finland.

Ziegler, E. & Pollack, C. (2016, September). Prior knowledge, preconceptions and misconceptions in the representation of letters and the influence on elementary algebra learning. Presentation at the 50. Kongress der Deutschen Gesellschaft für Psychologie DGP, Leizpig, Germany.

Ziegler, E., Edelsbrunner, P. A., & Stern, E. (2016, June). Instruction or discovering of crucial principles in mathematics learning. Paper presented at the EARLI Sig Teaching and Teacher Education, in Zurich, Switzerland.

Ziegler, E. (2014, December). High- and low-achievers benefit equally from demanding contrasted algebra materials. Poster presented at the Conference of the International Society for Intelligence Research (ISIR), in Graz, Austria.

Ziegler, E. (2014, September). Direkte Instruktion übertrifft Selbstlernen in kurz- und mittelfristigen Ergebnissen: Elementares Algebralernen. Präsentation am 49. Kongress der Deutschen Gesellschaft für Psychologie. Bochum, Deutschland.

Ziegler, E. (2014, August). Direct instruction supported conceptual change in a classroom algebra introduction. Paper presented at the EARLI Sig Conceptual Change Conference, in Bologna, Italy.

Ziegler, E. (2014, March). Bereits wenig Vorwissen bewirkt ein Unterschied, wie sehr von einer Einführung in die Algebra profitiert wird. Paper präsentiert an der 2. Tagung der Gesellschaft für Empirische Bildungsforschung (GEBF), Frankfurt, Germany.

Ziegler, E. & Stern, E. (2013, August). Consistent advantages of contrasted mathematical concept learning. Paper presented at the 15th Conference of the European Association for Research on Learning and Instruction (EARLI), Munich, Germany.

Ziegler, E. & Stern, E. (2013, August). Direct instruction outperforms self-learning in the short and medium turn: Introduction in elementary algebraic term transformation. Paper presented at the 15th Conference of the European Association for Research on Learning and Instruction (EARLI), Munich, Germany.

Ziegler, E. (2013, April). Prior knowledge helps students gaining from less favorable sequential learning materials. Paper presented at the Conference of the American Educational Research Association (AERA), San Francisco, USA.

Ziegler, E. & Stern, E. (2011, August). The impact of self-explaining on learning similar concepts in mathematics. Paper presented at the 14th Conference of the European Association for Research on Learning and Instruction (EARLI), Exeter, United Kingdom.

DISSERTATION / THESIS

Ziegler, E. (2011). Comparison Processes and Their Benefits for Learning Frequently Confused Concepts in Algebra. Doctoral thesis. ETH Zurich, Switzerland.

Ziegler, E. (2007). Rhythmus- und Metrumverarbeitung bei Musikern versus Nichtmusikern. Lizentiatsarbeit / Master thesis. Universität Zürich.

ACTUAL PROJECTS

Influence of intelligence for the access to university education: Analysis of different data sets from Switzerland: Examining whether intelligence guides access to university education? Data from Switzerland indicate an undesirable development (with Dr. Sarah Hofer, TMU Munich, Germany; Prof. Elsbeth Stern, IFV ETH, Dr. Ursina Markwalder, IFV ETH)

Failure occasions and desirable difficulties in developing visual expertise in different medical fields: The benefit of productive failure and desirable difficulties in promoting long-term gains in Higher Education (with PhD cand. Nadja Beeler and Prof. Manu Kapur, ETH; Prof. Dr. med. Alexander Navarini, University of Basel)

Improving STEM engagement of Swiss students: Novel approaches using individual differences to improve girls' math self-concepts and gender stereotypes in elementary school students: Developing and examining intervention strategies targeting explicit and implicit cognitions about mathematics to

improve girls' mathematical self-concepts (with PhD cand. Alexander Berger and Prof. Manu Kapur, ETH; Dr. Dario Cvencek and Prof. Andrew N. Meltzoff, University of Washington, USA)

Interleaving the introduction of mathematical concepts compared to contrasting or sequencing the introduction: Examining the interplay of interleaved, contrasted and blocked learning of concepts

Overall analysis of the effects of contrasted vs. sequenced learning, implicit vs. explicit learning, teacher-instruction vs. self-learning, mathematics grade and reasoning ability: An overall analysis over all my primary school intervention studies (with Dr. Peter Edelsbrunner, IFV ETH; Dr. Paul Buerkner, University Münster, Germany; Dr. Fabian Dablander, University of Amsterdam, The Netherlands)

INVITED TALKS, LECTURES & WORKSHOPS

Wünschenswerte Schwierigkeiten und produktives Scheitern zur Förderung der Entwicklung und Leistung [*Desirable difficulties and productive failure to promote development and achievement*]

- *Fortbildung für Gymasiallehrpersonen am Gymnasium Oberwil BL, 2022*
- *Fortbildung für Lehrpersonen der Swiss International Schools Schweiz, online 2021*
- *Fortbildung für Lehrpersonen der Swiss International Schools Deutschland, online 2021*
- *Keynote* am *IAS Tag der Lehre an der ZHAW Wädenswil, 2020*
- *Fortbildung für Gymnasiallehrpersonen an der Kantonsschule Baden, 2020*
- *Vortrag im Rahmen der MusicTalks an der Hochschule Luzern, Musik, 2020*
- *Vortrag an der Sekundarschule Leonhard Basel, 2020*

Unterstützung des Rechenerwerbs durch wünschenswerte Schwierigkeiten [*Support of the mathematical knowledge acquisition by desirable difficulties*]

- *Kurs am IDeA-Zentrum Leibniz-Institut für Bildungsforschung, Frankfurt a.M., Deutschland, 2019*

StudyEssentials – Zielgerichtet und effizient lernen: Lerntechniken für langfristiges Wissen [*StudyEssentials - Targeted and efficient learning: Learning techniques for long-term knowledge*]

- *Kurs für Businesstools an der ETH Zürich, 2022, 2021, 2020, 2019, 2018*

Die Kontroverse um Frontalunterricht und Selbstlernen: Hintergrundinformationen und Anregungen aus der Lehr- und Lernforschung zur Optimierung des Unterrichts [*The controversy of frontal teaching versus self-learning: Background information and suggestions from research on learning and instruction*]

- *Fortbildung für Studierende der Lehrerausbildung an der Autonomen Hochschule Ostbelgien, 2021*
- *Kurs am ZAL, Zürcher Arbeitsgemeinschaft für Weiterbildung der Lehrpersonen, Zürich, 2019*
- *Fortbildung für Gymnasiallehrpersonen am ETH-Kompetenzzentrum Lehren & Lernen, 2022, 2021, 2020, 2019, 2018, 2016*
- *Fortbildung für Lehrpersonen am Musischen Gymnasium Unterstrass, Zürich, 2016*
- *Fortbildung für Gymnasiallehrpersonen am MNG Gymnsasium Rämibühl, Zürich, 2015*

Spitzenplätze in internationalen Studien - Was kann man von Finnland lernen? [*Top places in international studies - What one can learn from Finland?*]

- *Fortbildung für Gymnasiallehrpersonen am ETH-Kompetenzzentrum Lehren & Lernen, 2014, 2013*

Frontalunterricht? Ja klar, aber effizient. Über eine gute Balance zwischen hochstehendem Lehrerinput und angeleitetem Selbstlernen! [*Frontal teaching? Yes, but efficient. About a good balance between a high-level teacher input and guided self-learning!*]

- *Fortbildung für Lehrpersonen der Swiss International Schools Schweiz und Deutschland, Basel, 2014*
- *Fortbildung für Gymnasiallehrpersonen am ETH-Kompetenzzentrum Lehren & Lernen, 2014, 2013*

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GRANTS

Innovedum Project Grant ETH Zürich: Productive Failure in Medical Education: Developing visual expertise for differential diagnosis. Project lead: Dr. Esther Ziegler (2019-2022, 180'000 CHF)

Jacobs Foundation Project Grant: Improving STEM Engagement of Swiss Students: Novel Approaches Using Individual Differences to Improve STEM Outcomes in Elementary School Students. Project lead: Dr. Esther Ziegler (2018-2021, 294'000 CHF)

SNF-Projektantrag "Is Adding more Difficult than Multiplying in Algebra?" for an International Short Visit at the Harvard School of Education, Cambridge, USA (2016, 8'000 CHF)

Collaboration in the Jacobs-Longitudinal-Study project «Boosting Hidden Potential in Science Education» under the direction of Prof. Dr. Elsbeth Stern (Jacobs Foundation 2010-2015, 780'000 CHF)

DISSERTATIONS / THESIS

Dissertations

Alexander von Bergen, *Designing tests and interventions aimed at investigating gender differences in math self-concepts of primary school children in Switzerland* (Main supervisor: Prof. Dr. Manu Kapur, ETH Zürich); since 2018, running

Nadja Beeler, *The benefit of failure occasions and desirable difficulties in promoting long-term gains in Higher Education* (Main supervisor: Prof. Dr. Manu Kapur, ETH Zürich); since 2019, running

Bachelor theses

Christoph Rohrer, *Lernen durch Schmerz: Steigerung der Lerneffizienz durch Schmerzstimulation, Bachelor Staatswissenschaften* (Co-Supervision with Dr. Hubert Annen, ETH Zürich); 2017, finalized

Nathalie Berchtold, *Halbjahreswerte für den Mottier-Test bei 5-jährigen Kindern, Bachelor Logopädie* (Schweizer Hochschule für Logopädie Rorschach), 2019, finalized

ACADEMIC SERVICES / COMMITTEES / MEMBERSHIPS

since 2013	Member of the Council of the Pädagogische Hochschule PH Zug (since 2015 vice president)
since 2007	Member of the European Association for Research on Learning and Instruction (EARLI)
2017-2019	Organization and Lead of the Doctoral Research Colloquium at the Institute for Learning Sciences & Higher Education (together with Dr. Dragan Trninic)
2017 (HS/FS)	Organization of the Behavioral Studies Colloquium at the GESS Department, Behavioral Section, ETH Zürich
2011-2019	Member of the Association of Scientific Staff ASST of the GESS Department at ETH Zurich
Reviewing	Cognitive Science; Learning and Instruction; Instructional Science; International Journal of Artificial Intelligence in Education; EARLI conference,

LANGUAGE SKILLS

German: mother tongue
French & English: highly proficient in spoken and written
Italian & Spanish: good knowledge