Examples of research articles that use various statistical techniques

t test

- [+ χ^2] **Fiorella**, L., **Stull**, A. T., **Kuhlmann**, S., & **Mayer**, R. E. (2019). Instructor presence in video lectures: The role of dynamic drawings, eye contact, and instructor visibility. *Journal of Educational Psychology*, *111*(7), 1162–1171. https://doi.org/10.1037/edu0000325
- **Weng**, C., **Otanga**, S., **Weng**, A., & **Tran**, K. N. P. (2020). Effects of tangrams on learning engagement and achievement: Case of preschool learners. *Journal of Computer Assisted Learning*, *36*(4), 458–467. https://doi.org/10.1111/jcal.12411

chi square test (χ^2)

- **Jin**, L., & **Jeong**, A. (2013). Learning achieved in structured online debates: Levels of learning and types of postings. *Instructional Science*, *41*(6), 1141–1152. https://doi.org/10.1007/s11251-013-9269-2

ANOVA / ANCOVA

- [ANCOVA] **Ajabshir**, Z. F. (2019). The effect of synchronous and asynchronous computer-mediated communication (CMC) on EFL learners' pragmatic competence. *Computers in Human Behavior*, *92*, 169–177. https://doi.org/10.1016/j.chb.2018.11.015
- **Ghanaat Pisheh**, E. A., **NejatyJahromy**, Y., **Gargari**, R. B., **Hashemi**, T., & **Fathi-Azar**, E. (2019). Effectiveness of clicker-assisted teaching in improving the critical thinking of adolescent learners. *Journal of Computer Assisted Learning*, *35*(1), 82–88. https://doi.org/10.1111/jcal.12313
- **Thai**, N. T. T., **De Wever**, B., & **Valcke**, M. (2020). Face-to-face, blended, flipped, or online learning environment? Impact on learning performance and student cognitions. *Journal of Computer Assisted Learning*, *36*(3), 397–411. https://doi.org/10.1111/jcal.12423

2×2 factorial design [experimental]

- **Abel**, M., & **Bäuml**, K.-H. T. (2020). Would you like to learn more? Retrieval practice plus feedback can increase motivation to keep on studying. *Cognition*, *201*, 104316. https://doi.org/10.1016/j.cognition.2020.104316

Single-subject experimental design

- **Evanovich**, L. L., & **Scott**, T. M. (2020). Examining the effect of explicit reading instruction on the engagement of elementary students with challenging behaviors. *Exceptionality*, 1–15. https://doi.org/10.1080/09362835.2020.1727340

Multiple regression (*linear and nonlinear*)

- **Maguire**, R., **Egan**, A., **Hyland**, P., & **Maguire**, P. (2017). Engaging students emotionally: The role of emotional intelligence in predicting cognitive and affective engagement in higher education. *Higher Education Research and Development*, *36*(2), 343–357. https://doi.org/10.1080/07294360.2016.1185396
- **Galikyan**, I., & **Admiraal**, W. (2019). Students' engagement in asynchronous online discussion: The relationship between cognitive presence, learner prominence, and academic performance. *The Internet and Higher Education*, *43*, 100692. https://doi.org/10.1016/j.iheduc.2019.100692

Moderation / Interaction effects

- **Giacumo**, L. A., & **Savenye**, W. (2020). Asynchronous discussion forum design to support cognition: Effects of rubrics and instructor prompts on learner's critical thinking, achievement, and satisfaction. *Educational Technology Research and Development*, *68*(1), 37–66. https://doi.org/10.1007/s11423-019-09664-5
- **Könings**, K. D., **van Zundert**, M., & **van Merriënboer**, J. J. G. (2019). Scaffolding peer-assessment skills: Risk of interference with learning domain-specific skills? *Learning and Instruction*, *60*, 85–94. https://doi.org/10.1016/j.learninstruc.2018.11.007
- **Weiser**, O., **Blau**, I., & **Eshet-Alkalai**, Y. (2018). How do medium naturalness, teaching-learning interactions and students' personality traits affect participation in synchronous E-learning? *The Internet and Higher Education*, *37*, 40–51. https://doi.org/10.1016/j.iheduc.2018.01.001
- **Yeh**, Y., **Rega**, E. M., & **Chen**, S.-Y. (2019). Enhancing creativity through aesthetics-integrated computer-based training: The effectiveness of a FACE approach and exploration of moderators. *Computers & Education*, *139*, 48–64. https://doi.org/10.1016/j.compedu.2019.05.007

Mediation / Path analysis

- **Caluori**, N., **Jackson**, J. C., **Gray**, K., & **Gelfand**, M. (2020). Conflict changes how people view God. *Psychological Science*, *31*(3), 280–292. https://doi.org/10.1177/0956797619895286
- **Jackson**, J. C., **Castelo**, N., & **Gray**, K. (2020). Could a rising robot workforce make humans less prejudiced? *American Psychologist*, 1–14. https://doi.org/10.1037/amp0000582
- **Sun**, Y., & **Gao**, F. (2020). An investigation of the influence of intrinsic motivation on students' intention to use mobile devices in language learning. *Educational Technology Research and Development*, *68*(3), 1181–1198. https://doi.org/10.1007/s11423-019-09733-9
- **Tomaszewski**, W., **Xiang**, N., & **Western**, M. (2020). Student engagement as a mediator of the effects of socio-economic status on academic performance among secondary school students in Australia. *British Educational Research Journal*, *46*(3), 610–630. https://doi.org/10.1002/berj.3599

Moderated mediation / Mediated moderation

- **Jackson**, J. C., **Gelfand**, M. J., **Ayub**, N., & **Wheeler**, J. (2019). Together from afar: Introducing a diary contact technique for improving intergroup relations. *Behavioral Science & Policy*, *5*(1), 14–33. https://doi.org/10.1353/bsp.2019.0002
- **Edwards**, J. R., & **Lambert**, L. S. (2007). Methods for integrating moderation and mediation: A general analytical framework using moderated path analysis. *Psychological Methods*, *12*(1), 1–22. https://doi.org/10.1037/1082-989X.12.1.1
- **Song**, M., **Zhu**, Z., **Liu**, S., **Fan**, H., **Zhu**, T., & **Zhang**, L. (2019). Effects of aggressive traits on cyberbullying: Mediated moderation or moderated mediation? *Computers in Human Behavior*, *97*, 167–178. https://doi.org/10.1016/j.chb.2019.03.015

Logistic regression / Discriminant analysis

- [binary LR] **Abdous**, M. (2019). Influence of satisfaction and preparedness on online students' feelings of anxiety. *The Internet and Higher Education*, *41*, 34–44. https://doi.org/10.1016/j.iheduc.2019.01.001
- [binary LR] **Han**, I., & **Shin**, W. S. (2016). The use of a mobile learning management system and academic achievement of online students. *Computers & Education*, *102*, 79–89. https://doi.org/10.1016/j.compedu.2016.07.003

- [multinomial LR] **Toomey**, N., & **Heo**, M. (2019). Cognitive ability and cognitive style: Finding a connection through resource use behavior. *Instructional Science*, *47*(4), 481–498. https://doi.org/10.1007/s11251-019-09491-4
- [multinomial LR] **van den Bos**, A. H., & **Tan**, E. (2019). Effects of anonymity on online peer review in second-language writing. *Computers & Education*, *142*, 103638. https://doi.org/10.1016/j.compedu.2019.103638
- [DA] **Blöte**, A. W. (1995). Students' self-concept in relation to perceived differential teacher treatment. *Learning and Instruction*, *5*(3), 221–236. https://doi.org/10.1016/0959-4752(95)00012-R
- [DA] **Loh**, C. S., **Sheng**, Y., & **Li**, I.-H. (2015). Predicting expert–novice performance as serious games analytics with objective-oriented and navigational action sequences. *Computers in Human Behavior*, *49*, 147–155. https://doi.org/10.1016/j.chb.2015.02.053

Poisson regression / Negative binomial regression

- **Bates**, M. S., **Phalen**, L., & **Moran**, C. (2018). Understanding teacher professional learning through cyber research. *Educational Technology Research and Development*, *66*(2), 385–402. https://doi.org/10.1007/s11423-017-9553-y
- **Greenhalgh**, S. P., **Rosenberg**, J. M., **Staudt Willet**, K. B., **Koehler**, M. J., & **Akcaoglu**, M. (2020). Identifying multiple learning spaces within a single teacher-focused Twitter hashtag. *Computers & Education*, *148*, 103809. https://doi.org/10.1016/j.compedu.2020.103809
- **Poquet**, O., **Jovanovic**, J., & **Dawson**, S. (2020). Differences in forum communication of residents and visitors in MOOCS. *Computers & Education*, *156*, 103937. https://doi.org/10.1016/j.compedu.2020.103937
- **Shchebetenko**, S. (2019). Do personality characteristics explain the associations between self-esteem and online social networking behaviour? *Computers in Human Behavior*, *91*, 17–23. https://doi.org/10.1016/j.chb.2018.09.017

Factor analysis: Exploratory (EFA) / Confirmatory (CFA) / Q-Methodology (QmFA)

- [EFA/CFA] **Thomas**, M. L., **Bangen**, K. J., **Palmer**, B. W., **Sirkin Martin**, A., **Avanzino**, J. A., **Depp**, C. A., … **Jeste**, D. V. (2019). A new scale for assessing wisdom based on common domains and a neurobiological model: The San Diego Wisdom Scale (SD-WISE). *Journal of Psychiatric Research*, *108*, 40–47. https://doi.org/10.1016/j.jpsychires.2017.09.005
- [Q-technique] **Cormier**, D. R. (2020). Assessing preservice teachers' cultural competence with the Cultural Proficiency Continuum Q-Sort. *Educational Researcher*, 0013189X2093667. https://doi.org/10.3102/0013189X20936670
- [Q-technique] **Rieber**, L. P. (2020). Q methodology in learning, design, and technology: An introduction. *Educational Technology Research and Development*. https://doi.org/10.1007/s11423-020-09777-2

Principal components analysis

- **Arbaugh**, J. B., **Cleveland-Innes**, M., **Diaz**, S. R., **Garrison**, D. R., **Ice**, P., **Richardson**, J. C., & **Swan**, K. P. (2008). Developing a community of inquiry instrument: Testing a measure of the Community of Inquiry framework using a multi-institutional sample. *The Internet and Higher Education*, *11*(3–4), 133–136. https://doi.org/10.1016/j.iheduc.2008.06.003
- **Graesser**, A. C., **McNamara**, D. S., & **Kulikowich**, J. M. (2011). Coh-Metrix: Providing multilevel analyses of text characteristics. *Educational Researcher*, *40*(5), 223–234. https://doi.org/10.3102/0013189X11413260

Structural equation modeling (SEM)

- **Kernan**, M. C., & **Hanges**, P. J. (2002). Survivor reactions to reorganization: Antecedents and consequences of procedural, interpersonal, and informational justice. *Journal of Applied Psychology*, *87*(5), 916–928. https://doi.org/10.1037/0021-9010.87.5.916
- [EFA/CFA/SEM] **Park**, Y., & **Jo**, I.-H. (2019). Factors that affect the success of learning analytics dashboards. *Educational Technology Research and Development*, *67*(6), 1547–1571. https://doi.org/10.1007/s11423-019-09693-0
- **Tandon**, A., **Kaur**, P., **Dhir**, A., & **Mäntymäki**, M. (2020). Sleepless due to social media? Investigating problematic sleep due to social media and social media sleep hygiene. *Computers in Human Behavior*, *113*, 106487. https://doi.org/10.1016/j.chb.2020.106487
- [EFA/SEM] **Zhu**, Y., **Zhang**, J. H., **Au**, W., & **Yates**, G. (2020). University students' online learning attitudes and continuous intention to undertake online courses: A self-regulated learning perspective. *Educational Technology Research and Development*, *68*(3), 1485–1519. https://doi.org/10.1007/s11423-020-09753-w

Multilevel (Hierarchical) linear modeling

- **Du**, J., **Fan**, X., Xu, J., **Wang**, C., **Sun**, L., & **Liu**, F. (2019). Predictors for students' self-efficacy in online collaborative groupwork. *Educational Technology Research and Development*, *67*(4), 767–791. https://doi.org/10.1007/s11423-018-9631-9
- **Furtak**, E. M., **Kiemer**, K., **Circi**, R. K., **Swanson**, R., **de León**, V., **Morrison**, D., & **Heredia**, S. C. (2016). Teachers' formative assessment abilities and their relationship to student learning: Findings from a four-year intervention study. *Instructional Science*, *44*(3), 267–291. https://doi.org/10.1007/s11251-016-9371-3
- **Kuo**, Y.-C., **Walker**, A. E., **Schroder**, K. E. E., & **Belland**, B. R. (2014). Interaction, Internet self-efficacy, and self-regulated learning as predictors of student satisfaction in online education courses. *The Internet and Higher Education*, *20*, 35–50. https://doi.org/10.1016/j.iheduc.2013.10.001
- **Magner**, U. I. E., **Glogger**, I., & **Renkl**, A. (2016). Which features make illustrations in multimedia learning interesting? *Educational Psychology*, *36*(9), 1596–1613. https://doi.org/10.1080/01443410.2014.933177
- **Moore**, R. L., **Oliver**, K. M., & **Wang**, C. (2019). Setting the pace: Examining cognitive processing in MOOC discussion forums with automatic text analysis. *Interactive Learning Environments*, *27*(5–6), 655–669. https://doi.org/10.1080/10494820.2019.1610453

Meta-analysis

- **Chen**, J., **Wang**, M., **Kirschner**, P. A., & **Tsai**, C.-C. (2018). The role of collaboration, computer use, learning environments, and supporting strategies in CSCL: A meta-analysis. *Review of Educational Research*, *88*(6), 799–843. https://doi.org/10.3102/0034654318791584
- **Chernikova**, O., **Heitzmann**, N., **Stadler**, M., **Holzberger**, D., **Seidel**, T., & **Fischer**, F. (2020). Simulation-based learning in higher education: A meta-analysis. *Review of Educational Research*, *90*(4), 499–541. https://doi.org/10.3102/0034654320933544
- **Darabi**, A., **Arrington**, T. L., & **Sayilir**, E. (2018). Learning from failure: A meta-analysis of the empirical studies. *Educational Technology Research and Development*, *66*(5), 1101–1118. https://doi.org/10.1007/s11423-018-9579-9
- **Sedlmeier**, P., **Eberth**, J., **Schwarz**, M., **Zimmermann**, D., **Haarig**, F., **Jaeger**, S., & **Kunze**, S. (2012). The psychological effects of meditation: A meta-analysis. *Psychological Bulletin*, *138*(6), 1139–1171. https://doi.org/10.1037/a0028168

Generalized linear models (*Linear mixed models, Nonlinear mixed models, Spatial regression models*)

- **Obergriesser**, S., & **Stoeger**, H. (2020). Students' emotions of enjoyment and boredom and their use of cognitive learning strategies – How do they affect one another? *Learning and Instruction*, *66*, 101285. https://doi.org/10.1016/j.learninstruc.2019.101285
- **Wirzberger**, M., **Beege**, M., **Schneider**, S., **Nebel**, S., & **Rey**, G. D. (2016). One for all?! Simultaneous examination of load-inducing factors for advancing media-related instructional research. *Computers & Education*, *100*, 18–31. https://doi.org/10.1016/j.compedu.2016.04.010

Item response theory / Generalizability theory

- **Aesaert**, K., **van Nijlen**, D., **Vanderlinde**, R., & **van Braak**, J. (2014). Direct measures of digital information processing and communication skills in primary education: Using item response theory for the development and validation of an ICT competence scale. Computers & Education, 76, 168–181. https://doi.org/10.1016/j.compedu.2014.03.013
- **Praetorius**, A.-K., **Pauli**, C., **Reusser**, K., **Rakoczy**, K., & **Klieme**, E. (2014). One lesson is all you need? Stability of instructional quality across lessons. *Learning and Instruction*, *31*, 2–12. https://doi.org/10.1016/j.learninstruc.2013.12.002
- **Willoughby**, M. T., **Wirth**, R. J., & **Blair**, C. B. (2011). Contributions of modern measurement theory to measuring executive function in early childhood: An empirical demonstration. *Journal of Experimental Child Psychology*, *108*(3), 414–435. https://doi.org/10.1016/j.jecp.2010.04.007
- **Winne**, P. H. (2020). Construct and consequential validity for learning analytics based on trace data. *Computers in Human Behavior*, *112*, 106457. https://doi.org/10.1016/j.chb.2020.106457

MANOVA / MANCOVA

- **Basol**, G., & **Balgalmis**, E. (2016). A multivariate investigation of gender differences in the number of online tests received-checking for perceived self-regulation. *Computers in Human Behavior*, *58*, 388–397. https://doi.org/10.1016/j.chb.2016.01.010
- **Beege**, M., **Schneider**, S., **Nebel**, S., **Häßler**, A., & **Rey**, G. D. (2018). Mood-affect congruency. Exploring the relation between learners' mood and the affective charge of educational videos. *Computers & Education*, *123*, 85–96. https://doi.org/10.1016/j.compedu.2018.05.001
- [MANOVA + hierarchical multiple regression] **Clark**, M., & **Bussey**, K. (2020). The role of self-efficacy in defending cyberbullying victims. *Computers in Human Behavior*, *109*, 106340. https://doi.org/10.1016/j.chb.2020.106340
- **Kant**, J. M., **Scheiter**, K., & **Oschatz**, K. (2017). How to sequence video modeling examples and inquiry tasks to foster scientific reasoning. *Learning and Instruction*, *52*, 46–58. https://doi.org/10.1016/j.learninstruc.2017.04.005
- **Park**, B., **Korbach**, A., & **Brünken**, R. (2020). Does thinking-aloud affect learning, visual information processing and cognitive load when learning with seductive details as expected from self-regulation perspective? *Computers in Human Behavior*, *111*, 106411. https://doi.org/10.1016/j.chb.2020.106411

Cluster analysis

- **Ferguson**, L. E., & **Bråten**, I. (2013). Student profiles of knowledge and epistemic beliefs: Changes and relations to multiple-text comprehension. *Learning and Instruction*, *25*, 49–61. https://doi.org/10.1016/j.learninstruc.2012.11.003

- **Jarrell**, A., **Harley**, J. M., **Lajoie**, S., & **Naismith**, L. (2017). Success, failure and emotions: Examining the relationship between performance feedback and emotions in diagnostic reasoning. *Educational Technology Research and Development*, *65*(5), 1263–1284. https://doi.org/10.1007/s11423-017-9521-6
- **Schophuizen**, M., **Kreijns**, K., **Stoyanov**, S., & **Kalz**, M. (2018). Eliciting the challenges and opportunities organizations face when delivering open online education: A group-concept mapping study. *The Internet and Higher Education*, *36*, 1–12. https://doi.org/10.1016/j.iheduc.2017.08.002

Multidimensional scaling

- **Clariana**, R. B., **Engelmann**, T., & **Yu**, W. (2013). Using centrality of concept maps as a measure of problem space states in computer-supported collaborative problem solving. *Educational Technology Research and Development*, *61*(3), 423–442. https://doi.org/10.1007/s11423-013-9293-6
- **Hofer**, M., **Kuhnle**, C., **Kilian**, B., **Marta**, E., & **Fries**, S. (2011). Motivational interference in school-leisure conflict and learning outcomes: The differential effects of two value conceptions. *Learning and Instruction*, *21*(3), 301–316. https://doi.org/10.1016/j.learninstruc.2010.02.009
- **Roy**, A. (2020). Studying positioning and repositioning of brands using multidimensional scaling. *Journal of Education for Business*, *95*(1), 53–58. https://doi.org/10.1080/08832323.2019.1599795
- **Zsóka**, Á., **Szerényi**, Z. M., **Széchy**, A., & **Kocsis**, T. (2013). Greening due to environmental education? Environmental knowledge, attitudes, consumer behavior and everyday pro-environmental activities of Hungarian high school and university students. *Journal of Cleaner Production*, *48*, 126–138. https://doi.org/10.1016/j.jclepro.2012.11.030

Canonical correlation analysis

- **Ho**, C.-L., & **Dzeng**, R.-J. (2010). Construction safety training via e-Learning: Learning effectiveness and user satisfaction. *Computers & Education*, *55*(2), 858–867. https://doi.org/10.1016/j.compedu.2010.03.017
- **Rovai**, A. P., & **Wighting**, M. J. (2005). Feelings of alienation and community among higher education students in a virtual classroom. *The Internet and Higher Education*, *8*(2), 97–110. https://doi.org/10.1016/j.iheduc.2005.03.001
- **Sun**, J. (2016). Tool choice in innovation diffusion: A human activity readiness theory. *Computers in Human Behavior*, *59*, 283–294. https://doi.org/10.1016/j.chb.2016.02.014

Time-series analysis

- **Hong**, J.-C., **Hwang**, M.-Y., **Tai**, K.-H., & **Lin**, P.-H. (2019). Improving cognitive certitude with calibration mediated by cognitive anxiety, online learning self-efficacy and interest in learning Chinese pronunciation. *Educational Technology Research and Development*, *67*(3), 597–615. https://doi.org/10.1007/s11423-018-9628-4
- **Ibrahim**, N. F., & **Wang**, X. (2019). Decoding the sentiment dynamics of online retailing customers: Time series analysis of social media. *Computers in Human Behavior*, *96*, 32–45. https://doi.org/10.1016/j.chb.2019.02.004
- **Liborius**, P., **Bellhäuser**, H., & **Schmitz**, B. (2019). What makes a good study day? An intraindividual study on university students' time investment by means of time-series analyses. *Learning and Instruction*, *60*, 310–321. https://doi.org/10.1016/j.learninstruc.2017.10.006

- **Saurabh**, S., & **Gautam**, S. (2019). Modelling and statistical analysis of YouTube's educational videos: A channel Owner's perspective. *Computers & Education*, *128*, 145–158. https://doi.org/10.1016/j.compedu.2018.09.003

Survival/Failure analysis

- **Xing**, W., **Goggins**, S., & **Introne**, J. (2018). Quantifying the effect of informational support on membership retention in online communities through large-scale data analytics. *Computers in Human Behavior*, *86*, 227–234. https://doi.org/10.1016/j.chb.2018.04.042
- **Xing**, W., **Tang**, H., & **Pei**, B. (2019). Beyond positive and negative emotions: Looking into the role of achievement emotions in discussion forums of MOOCs. *The Internet and Higher Education*, *43*, 100690. https://doi.org/10.1016/j.iheduc.2019.100690
- **Zhuhadar**, L., **Daday**, J., **Marklin**, S., **Kessler**, B., & **Helbig**, T. (2019). Using survival analysis to discovering pathways to success in mathematics. *Computers in Human Behavior*, *92*, 487–495. https://doi.org/10.1016/j.chb.2017.12.016

Repeated-measures analysis & Nonparametric statistics

- [paired sample *t* test] **Alioon**, Y., & **Delialioğlu**, Ö. (2019). The effect of authentic m-learning activities on student engagement and motivation. *British Journal of Educational Technology*, *50*(2), 655–668. https://doi.org/10.1111/bjet.12559
- **Ninaus**, M., **Greipl**, S., **Kiili**, K., **Lindstedt**, A., **Huber**, S., **Klein**, E., … **Moeller**, K. (2019). Increased emotional engagement in game-based learning – A machine learning approach on facial emotion detection data. *Computers & Education*, *142*, 103641. https://doi.org/10.1016/j.compedu.2019.103641

Bayesian statistics

- **Bian**, L., **Leslie**, S.-J., & **Cimpian**, A. (2018). Evidence of bias against girls and women in contexts that emphasize intellectual ability. *American Psychologist*, *73*(9), 1139–1153. https://doi.org/10.1037/amp0000427
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- **Nguyen**, T. D., & **Bai**, Q. (2018). A Dynamic Bayesian Network approach for agent group trust evaluation. *Computers in Human Behavior*, *89*, 237–245. https://doi.org/10.1016/j.chb.2018.07.028
- **Praetorius**, A.-K., **Koch**, T., **Scheunpflug**, A., **Zeinz**, H., & **Dresel**, M. (2017). Identifying determinants of teachers' judgment (in)accuracy regarding students' school-related motivations using a Bayesian cross-classified multi-level model. *Learning and Instruction*, *52*, 148–160. https://doi.org/10.1016/j.learninstruc.2017.06.003
- **Vakhitova**, Z. I., **Alston-Knox**, C. L., **Reynald**, D. M., **Townsley**, M. K., & **Webster**, J. L. (2019). Lifestyles and routine activities: Do they enable different types of cyber abuse? *Computers in Human Behavior*, *101*, 225–237. https://doi.org/10.1016/j.chb.2019.07.012