Graduate Seminar: Advanced Topics in Educational Psychology

Course descriptions, course schedule, and reading list

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Course description
　　　　Educational psychology is the study of how children, adolescents, and adults develop, learn, teach, and interact in formal educational programs such as schools, college, apprenticeships, corporate training, and continuing education. Education is crucial to civilization in many ways, including economic growth, technological progress, cultural advancement, political stability, and geopolitical influence. Education is also important to individual well-being, including career success, personal happiness, and finding meaning in life. My goal is for this to be one of the most intellectually stimulating, socially engaging, and personally relevant courses you've ever taken.
　　　　This course focuses on four key themes in educational psychology:
- the evolutionary origins and adaptive functions of development, learning and teaching,
- the individual differences that influence learning and teaching, including general intelligence, personality traits, and behavior genetics,
- key content domains in education where there are some mismatches between children's evolved intuitions and modern academic content, including physics, biology, psychology, rationality, and decision-making
- the future of educational technology in the next several decades, including video, games, online learning, augmented reality, virtual reality, and artificial intelligence.

Module 1: Origins of education (4 weeks)

Week 1: Introduction to educational psychology and this course
Required readings:
- None

Week 2: Origins of development & learning
Required readings:
- Ginsburg, Simona, & Jablonka, Eva (2021). Evolutionary transitions in learning and cognition. *Phil. Trans Royal Society B: Biological Sciences, 376*(1821), 20190766. (8 pp, c. 7,000 words)
- Whiten, Andrew (2021). The psychological reach of culture in animals' lives. *Current Directions in Psychological Science, 30*(3), 211-217 (6 pp, c. 3,800 words)
- Pinker, Steven (2010). The cognitive niche: Coevolution of intelligence, sociality, and language. *PNAS, 107*(S2), 8993-8999. (7 pp, c. 7,000 words)
- Legare, Cristine H. (2017). Cumulative cultural learning: Development and diversity. *PNAS, 114*(30), 7877-7883. (5 pp, c. 5,200 words)
Total: 4 papers, 26 pages text, 23,000 words

Optional readings

- Dall, Sasha R. X., McNamara, John M., & Leimar, Olof (2015). Genes as cues: Phenotypic integration of genetic and epigenetic information from a Darwinian perspective. *Trends in Ecology & Evolution, 30*(6), 327-333. (6 pp, c. 5,000 words)
- Watson Richard A., & Szathmáry, Eos (2016). How can evolution learn? *Trends in Ecology & Evolution, 31*(2), 147-157. (9 pp, c. 6,600 words)

Week 3: Origins of childhood & adolescence
Required readings:
- Gopnik, A. (2020). Childhood as a solution to explore-exploit tensions. *Philosophical Transactions B*, 375, 20190502. (7 pages; 6,400 words)
- Rule, J. S., et al. (2020). The child as hacker. *Trends in Cognitive Sciences, 24*(11), 900-915. (13 pp; 7,200 words)
- Dahl, R. E., et al. (2018). Importance of investing in adolescence from a developmental science perspective. *Nature, 554*(7693), 441-450. (7 pp; 7,200 words)
Total: 3 papers, 27 pages text, 20,800 words

Optional readings
- Del Giudice, M. (2018). Middle childhood: An evolutionary-developmental synthesis. In N. Halfon et al. (Eds.), *The handbook of life course health development* (pp. 95-107). New York: Springer. (11 pp; 5,300 words)
- Riede, F., et al. (2018). The role of play objects and object play in human cognitive evolution and innovation. *Evolutionary Anthropology, 27*(1), 46-59. (11 pp; 7,200 words)

Week 4: Origins of teaching & pedagogy
Required readings:
- Pasquinelli, E., & Strauss, S. (2018). Introduction: Teaching and its building blocks. *Review of Philosophy and Psychology, 9*(4), 719-749. (25 pp; 13,500 words)
- Boyette, A. H., & Hewlett, B. S. (2018). Teaching in hunter-gatherers. *Review of Philosophy and Psychology, 9*(4), 771-797. (23 pp; 11,900 words)
Total: 2 papers, 48 pages text, 25,400 words

Optional reading:
- Skerry, A. E., et al. (2013). The origins of pedagogy: Developmental and evolutionary perspectives. *Evolutionary Psychology, 11*(3), 550-572. (18 pp; 8,500 words)

Module 2: Individual differences in education (3 weeks)

Week 5: General intelligence & gifted education
Required readings:
- Gottfredson, L. S. (1998). The general intelligence factor. *Scientific American, 9*(4), 24-29, 51. (6 pp, 4,700 words)
- Miller, G. F. (2009). Excerpt from 'General intelligence' (Chapter 11). In *Spent: Sex, evolution, and consumer behavior*. NY: Viking. (7 pp, 4,100 words)
- Elman, B. A. (2009). Civil service examinations (Kējǔ). In L. Cheng et al. (Eds)., *Berkshire Encyclopedia of China* (pp. 405-410). Berkshire. (6 pp, 3,300 words)
- Wai, J., & Lovett, B. J. (2021). Improving gifted talent development can help solve multiple consequential real-world problems. *J. of Intelligence, 9*(2), 31. (9 pp, 5,700 words)
Total: 4 papers, 26 pages text, 17,800 words

Optional reading:
- Roth, B., et al. (2015). Intelligence and school grades: A meta-analysis. *Intelligence, 53*, 118-137. (9 pp text; 8,700 words)
- Lubinski, D., & Benbow, C. P. (2020). Intellectual precocity: What have we learned since Terman? *Gifted Child Quarterly, 65*(1), 3-28. (19 pp, 10,000 words)
- Warne, R. T., & J. Z. Burton (2020). Beliefs about human intelligence in a sample of teachers and nonteachers. *Journal for the Education of the Gifted, 43*(2), 143-166. (18 pp; 7,500 words)

Week 6: Personality traits & motivation in education
Required readings:
- McAbee, S. T., et al. (2019). The HEXACO model in education and work. Zeitschrift für Psychologie, 227(3), 174-185. (9 pp, 6,800 words)
- Shin, D. D., & Kim, S. I. (2019). Homo curious: Curious or interested? *Educational Psychology Review, 31*(4), 853-874. (16 pp, 7,800 words)
- Hauser, M. D. (2019). Patience! How to assess and strengthen self-control. Frontiers in Education, 4, 25. (7 pp, 4,600 words)

Total: 3 papers, 32 pages, 19,200 words

Optional reading:
- Duckworth, A. L., et al. (2019). Self-control and academic achievement. *Annual Review of Psychology, 70*, 373-399. (19 pp, 10,100 words)
- Richardson, M., et al. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological Bulletin, 138*, 353-387. (24 pp; 17,000 words)

Week 7: Behavior genetics of education
Required readings:
- Moreau, D., et al. (2019). Overstating the role of environmental factors in success: A cautionary note. *Current Directions in Psychological Science, 28*(1), 28-33. (4 pp, 2,700 words)
- Silventoinen, K., Jelenkovic, A., Sund, R., Latvala, A., Honda, C., ... Kaprio, J. (2020). Genetic and environmental variation in educational attainment: an individual-based analysis of 28 twin cohorts, *Scientific Reports, 10*, 12681. (8 pp text; 5,100 words)
- Krapohl, E., Rimfeld, K., Shakeshaft, N. G., Trzaskowski, M., McMillian, A., ... & Plomin, R. (2014). The high heritability of educational achievement reflects many genetically influenced traits, not just intelligence. *Proceedings National Academy of Sciences USA, 111*(42), 15273-15278. (4 pp text; 4,000 words)
- von Stumm, S., & Plomin, R. (2021). Using DNA to predict intelligence. *Intelligence, 86*, 101530. (4 pages, 4,300 words)

Total: 4 papers, 20 pages, 16,100 words

Optional reading:
- Malanchini, M., et a. (2020). Cognitive ability and education: How behavioral genetic research has advanced our knowledge and understanding of their association. *Neuroscience and Biobehavioral Reviews, 111*, 229-245. (14 pp; 15,500 words)
- Harden, K. P., Domingue, B. W., Belsky, D. W., Boardman, J. D., Crosnoe, R., ... Haris, K. M. (2020). Genetic associations with mathematics tracking and persistence in secondary school. *NPJ Science of Learning, 5*(1). (6 pp, 4,900 words)

Module 3: Content domains in education (3 weeks)

Week 8: Intuitive physics & biology in education
Required readings:
- Kurbricht, J. R., et al. (2017). Intuitive physics: Current research and controversies. *Trends in Cognitive Sciences, 21*(10), 749-759. (10 pp, 6,100 words)
- Solomon, G. E. A., & Zaitchik, D. (2012). Folkbiology. *Wiley Interdisciplinary Reviews: Cognitive Science, 3*(1), 105-115. (7 pp, 5,700 words)
- Kelemen, D. (2019). The magic of mechanism: Explanation-based instruction on counterintuitive concepts in early childhood. *Perspectives on Psychological Science, 14*(4), 510-522. (10 pp, 7,100 words)

Total: 3 papers, 27 pages, 18,900 words

Optional reading:
- Gelman, S. A., & Legare, C. H. (2011). Concepts and folk theories. *Annual Review of Anthropology, 40*, 379-398. (13 pp, 7,600 words)
- Longbottom, S. E., & Slaughter, V. (2016). Direct experience with nature and the development of biological knowledge. *Early Education and Development, 27*(6), 1145-1158. (12 pp, 5,900 words)

Week 9: Intuitive psychology & Theory of Mind in education
Required reading
- Byrne, R. W. (2018). Machiavellian intelligence retrospective. *Journal of Comparative Psychology, 132*(4), 432–436. (4 pp, 3,200 words
- Wellman, H. M. (2018). Theory of mind: The state of the art. *European J. of Developmental Psychology, 15*(6), 728-755. (21 pp, 8,900 words)
- Mar, R. A. (2018). Stories and the promotion of social cognition. *Current Directions in Psychological Science, 27*(4), 257-262. (4 pp, 2,700 words)
- Soto, C. J., et al. (2021). Taking skills seriously: Toward an integrative model and agenda for social, emotional, and behavioral skills. *Current Directions in Psychological Science, 30*(1), 26-33. (7 pp, 3,600 words)

Total: 4 papers, 36 pages, 18,400 words

Optional reading:
- Gweon, H. (2021). Inferential social learning: Cognitive foundations of human social learning and teaching. *Trends in Cognitive Sciences, 25*(10), 896-910. (13 pp, 7,800)
- Wu, Y., et al. (2021). Emotion as information in early social learning. *Current Directions in Psychological Science,* 30(6), 468-475. (6 pp, 3,900 words)

Week 10: Rationality & decision making in education
Required reading:
- Milkman, K. L., et al. (2009). How can decision making be improved? *Perspectives on Psychological Science, 4(4)*, 379-383. (4 pages; 3,200 words)
- Schmaltz, R. M., & Jansen, E. (2017). Redefining critical thinking: Teaching students to think like scientists. *Frontiers in Psychology, 8*, 459. (3 pp, 2,100 words)
- Nussbaum, E. M. (2021). Critical integrative argumentation: Toward complexity in students' thinking. *Educational Psychologist, 56*(1), 1-17. (14 pp, 11,600 words)

Total: 3 papers, 21 pages, 16,900 words

Optional reading:

- Bunge, S. A., & Leib, E. R. (2020). How does education hone reasoning ability? *Current Directions in Psychological Science, 29*(2), 167-173. (5 pp, 3,400 words)
- Caviola, L., et al. (2021). The psychology of (in)effective altruism. *Trends in Cognitive Sciences, 25*(7), 596-607. (9 pp, 5,400 words)

Module 4: The future of education (4 weeks)

Week 11: Videos, games, & online learning
Required reading:
- Crompton, H., et al. (2020). Psychological foundations of emerging technologies for teaching and learning in higher education. *Current Opinion in Psychology, 36*, 101-105 (3 pp, 2,000 words)
- Reich, J. (2021). Ed Tech's failure during the pandemic, and what comes after. *Phi Delta Kappan, 102*(6), 20-24 (5 pp, 2,700 words).
- Mayer, R. E. (2019). Computer games in education. *Annual Review of Psychology, 70*, 531-549. (15 pp, 7,600 words)

Total: 3 papers, 23 pp, 12,300 words

Optional reading:
- Guardia, L., et al. (2021). IDEAS for transforming higher education: An overview of ongoing trends and challenges. *Int'l Review of Research in Open and Distributed Learning, 22*(2), 166-184. (14 pp, 5,400 words)
- Noetel, M., et al. (2021). Video improves learning in higher education. *Review of Educational Research, 91*(2), 204-236. (24 pp, 10,400 words)
- Krath, J., et al. (2021). Revealing the theoretical basis of gamification: A systematic review and analysis of theory in research on gamification, serious games and game-based learning. *Computers in Human Behavior, 125*, 106963. (15 pp, 15,400 words)

Week 12: Extended Reality (XR) in education
Required reading:
- Johnson-Glenberg, M. C. (2019). The necessary nine: Design principles for embodied VR and active STEM education. In P. Diaz et al (Eds.) *Learning in a digital world* (pp. 83-112). Smart Computing and Intelligence. (25 pp, 10,300 words)
- Yan, Y. J. (2020). Immersion, interaction, and experience-oriented learning: Bringing virtual reality into FL learning. *Language Learning & Technology, 24*(1), 1-15. (9 pp, 6,000 words)

Total: 2 papers, 34 pages, 16,300 words

Optional reading:
- Guo, X. R., et al. (2021). The development of extended reality in education: Inspiration from the research literature. *Sustainability, 13*(24), 13776. (17 pp, 6,100 words)
- Bekele, M. K., & Champion, E. (2019). A comparison of immersive realities and interaction methods: Cultural learning in virtual heritage. *Frontiers in Robotics and AI, 6*, 91. (12 pp, 7,400 words)
- Radianti, J., et al. (2020). A systematic review of immersive virtual reality applications for higher education: Design elements, lessons learned, and research agenda. *Computers & Education, 147*, 103778. (26 pp, 17,000 words)

Week 13: Artificial Intelligence in education
Required reading:

- Howard, J. (2019). Artificial intelligence: Implications for the future of work. *American J. of Industrial Medicine, 62*(11), 917-926. (6 pages; 4,400 words)
- Goel, A., & Tong, R. (2021). The AAAI's new award for the societal benefits of Artificial Intelligence: An interview with Richard Tong. *AI Magazine, 41*(1), 95-100. (6 pp, 3,800 words)
- Gardner, J., et al. (2021). Artificial intelligence in educational assessment: 'Breakthrough? Or buncombe and ballyhoo?' *J. of Computer Assisted Learning, 37*(5), 1207-1216. (8 pp, 7,600 words)

Total: 3 papers, 20 pages, 15,800 words

Optional reading:
- Korteling, J. E. H., et al. (2021). Human versus artificial intelligence. *Frontiers in Artificial Intelligence, 4*, 622364. (10 pages; 9,600 words; 53 minutes)
- Webb, M. E., et al. (2020). Machine learning for human learners: Opportunities, issues, tensions, and threats. *Educational Technology Research and Development, 69*(3), 2109-2130. (18 pp, 8,400 words)