1 Appendix A

References

[AI11] Benjamin O. Abakpa and Clement O. Iji. Effect of mastery learning approach on senior secondary school students achievement in geometry. *Journal of the Science Teachers Association of Nigeria*, 46(1):165–177, 2011.

> Study conducted on students in a secondary school mathematics course on geometry. Quantitative results show massive improvements after mastery learning methods. Gender differences were also analyzed, but there was no significant differences in achievement between male and female students with mastery learning approaches.

[AW14] Laura Ariovich and Sad A. Walker. Assessing Course Redesign: The Case of Developmental Math. *Research & Practice in Assessment*, 9:45–57, 2014.

> This study uses modular (mastery based) curriculum with the assistance of computer software. The problems that arose included computer software issues, but were not restricted to those. The workload of the class was far heavier than traditional settings, which students showed dissatisfaction for.

[Blo68] Benjamin S. Bloom. Learning for Mastery. Instruction and Curriculum. Regional Education Laboratory for the Carolinas and Virginia, Topical Papers and Reprints, Number 1. *Evaluation Comment*, 1(2), May 1968.

> This is one of Benjamin Bloom's original and first papers officially on the subject of learning for mastery (LFM). The paper begins with the current problems that exist in the status quo method of instruction, in particular regarding the use of the normal curve in assessment. Bloom discusses variables that determine "mastery" in students: aptitude, quality of instruction as well as ability to understand instruction, perseverance and the time allowed for learning. This paper broadly describes the ways in which learning for mastery can be incorporated into the classroom setting, and shows a little bit of evidence of the success of LFM.

[BMPQ18] Emily Badger, Claire Cain Miller, Adam Pearce, and Kevin Quealy. Extensive Data Shows Punishing Reach of Racism for Black Boys. *The New York Times*, March 2018.

[BPEH00] Vittorio V Busato, Frans J Prins, Jan J Elshout, and Christiaan Hamaker. Intellectual ability, learning style, personality, achievement motivation and academic success of psychology students in higher education. *Personality and Individual Differences*, 29(6):1057–1068, December 2000.

[Bra17] Kirk Bradley. *Evaluating the effects of mastery learning in postsecondary developmental mathematics*. PhD thesis, ProQuest Information & Learning, US, 2017.

The study looks at community college students in intermediate algebra under a mastery learning environment. Results showed fewer dropouts and failed grades, as well as higher test scores for students that underwent the modified classes.

[BS72] Joanna S. Burris and Lee Schroeder. Developmental Mathematics: Self-Instruction with Mathematics Laboratory. *The Two-Year College Mathematics Journal*, 3(1):16–22, 1972.

[CC16] Cheng-Huan1 Chen and Chiung-Hui1 Chiu, cchui@ntnu.edu.tw. Collaboration Scripts for Enhancing Metacognitive Self-regulation and Mathematics Literacy. *International Journal of Science & Mathematics Education*, 14(2):263–280, March 2016.

[CMS18] Kwok-cheung Cheung, Soi-kei Mak, and Pou-seong Sit. Resolving the attitudeachievement paradox based on anchoring vignettes: evidences from the PISA 2012 mathematics study. *Asia Pacific Education Review*, pages 1–11, March 2018.

This short paper looks into the paradox between attitude and assessment in students' mathematics performance across various countries in East Asia. There is little discussion of why the paradox may exist, and discusses more about a new way to identify the paradox.

[FK14] Carlton J. Fong and Jaimie M. Krause. Lost Confidence and Potential: A Mixed Methods Study of Underachieving College Students' Sources of Self-Efficacy. *Social Psychology of Education: An International Journal*, 17(2):249–268, June 2014.

This study looks at the differences of self-efficacy between underachieving and achieving groups of students. Results showed no statistically significant differences. Factors that may have led to this result include the fact that underachievers received more positive, verbal feedback. Furthermore, the study pointed toward mastery learning experiences as one of the more influential reasons that

boosted self-efficacy in the underachievers. One caveat of this study is that they students are coming from a relatively high-achieving university, so self-efficacy could likely have carried over from past experiences in high school.

[Flo07] Alfinio Flores. Examining Disparities in Mathematics Education: Achievement Gap or Opportunity Gap? *The High School Journal*, 91(1):29–42, 2007.

[FTWC18] Teukava Finau, David F. Treagust, Mihye Won, and A. L. Chandrasegaran. Effects of a Mathematics Cognitive Acceleration Program on Student Achievement and Motivation. *International Journal of Science and Mathematics Education*, 16(1):183–202, January 2018.

[Gut12] Rochelle Gutierrez. Embracing Nepantla: Rethinking "Knowledge" and its Use in Mathematics Teaching. *Journal of Research in Mathematics Education*, 1(1):29–56, February 2012.

[Her11] Michele Lynn Heron. *How Does Self-Regulation Impact Student's Use of Mathematical Strategies in a Remedial Mathematics Course*. PhD thesis, ProQuest LLC, January 2011.

[HH18] Anesa Hosein and Jamie Harle. The relationship between students prior mathematical attainment, knowledge and confidence on their self-assessment accuracy. *Studies in Educational Evaluation*, 56:32–41, March 2018.

[KE09] Sahin Kesici and Ahmet Erdogan. Predicting college students' mathematics anxiety by motivational beliefs and self-regulated learning strategies. *College Student Journal*, 43(2):631–642, June 2009.

[Len15] Laurie Lenz. Active Learning in a Math for Liberal Arts Classroom. *PRIMUS*, 25(3):279–296, January 2015.

An experiment utilizing POGIL (Process Oriented Guided Inquiry Learning)

[LH16] Chiu-Lin Lai and Gwo-Jen Hwang. A self-regulated flipped classroom approach to improving students learning performance in a mathematics course. *Computers & Education*, 100:126–140, September 2016.

[LPT00] Maureen J. Lage, Glenn J. Platt, and Michael Treglia. Inverting the Classroom: A Gateway to Creating an Inclusive Learning Environment. *The Journal of Economic Education*, 31(1):30–43, 2000.

[LZH10] Andju Sara Labuhn, Barry J. Zimmerman, and Marcus Hasselhorn. Enhancing students self-regulation and mathematics performance: the influence of feedback and self-evaluative standards. *Metacognition and Learning*, 5(2):173–194, August 2010.

This study looks at a particular self-evaluative methods that take into account individual versus social comparative feedback playing a role in improving self-efficacy. Predicted results would be that receiving individual feedback that is not affected by competition factors would do better to improve self-efficacy. Actual results showed that students who received individual feedback were actually the most dissatisfied with their performance. Possible reasons included the fact that social comparative feedback gives context to what are realistic and achievable goals that motivate both over-confident students and well-achieving students to have a more solid grasp of what is expected in their performance.

[MAY+11] Shahrzad Elahi Motlagh, Kourosh Amrai, Mohammad Javad Yazdani, Haitham altaib Abderahim, and Hossein Souri. The relationship between self-efficacy and academic achievement in high school students. *Procedia - Social and Behavioral Sciences*, 15:765–768, January 2011.

[McQ16] Dr Fiona McQuarrie. Changes in K-12 Education. page 20, 2016.

Regarding changes made in k-12 education. Not pertinent necessarily.

[MG] L Musu-Gillette. Status and Trends in the Education of Racial and Ethnic Groups 2016. page 188.

[MGH17] Kimberly Martin, Molly Goldwasser, and Eugenia Harris. Developmental Educations Impact on Students Academic Self-Concept and Self-Efficacy. *Journal of College Student Retention: Research, Theory & Practice*, 18(4):401–414, February 2017.

[Mon07] Marjorie Montague. Self-Regulation and Mathematics Instruction. *Learning Disabilities Research & Practice*, 22(1):75–83, February 2007.

[MS15] David Miller and Matthew Schraeder. Research on Group Learning and Cognitive Science: A Study of Motivation, Knowledge, and Self-Regulation in a Large Lecture College Algebra Class. *Mathematics Educator*, 24(2):27–55, 2015.

[Mui08] Krista R. Muis. Epistemic profiles and self-regulated learning: Examining relations in the context of mathematics problem solving. *Contemporary Educational Psychology*, 33(2):177–208, April 2008.

[noa] Self-Regulation: A Characteristic and a Goal of Mathematics Education - Handbook of Self-Regulation - Chapter 21.

> This chapter is a thorough overview of self-regulation in the context of mathematics, and is probably the best starting read to understand the scope of self-regulation in mathematics, in particular in the classroom setting. Multiple intervention studies are taken into consideration and analyzed, and subjects of the studies are varied in demographics. Common successful components were identified and significant evidence suggested that fostering self-regulation skills were possible. The sort of self regulation implemented in classrooms were more related to problem solving skills than self-regulated assessment.

[PSK+16] OiYan Poon, Dian Squire, Corinne Kodama, Ajani Byrd, Jason Chan, Lester Manzano, Sara Furr, and Devita Bishundat. A Critical Review of the Model Minority Myth in Selected Literature on Asian Americans and Pacific Islanders in Higher Education. *Review of Educational Research*, 86(2):469–502, June 2016.

[SAD+15] Rebecca A. Simon, Mark W. Aulls, Helena Dedic, Kyle Hubbard, and Nathan C. Hall. Exploring Student Persistence in STEM Programs: A Motivational Model. *Canadian Journal of Education*, 38(1), January 2015.

> The study looks particularly into the effects of supporting student autonomy in order to increase the feeling of self-efficacy. In particular, it looks into STEM fields and differences in gender. Results showed that the effects were more visible and positive in male students, but not so much in female students. In addition, the study confirms that a mastery based approach was beneficial to developing intrinsic motivation, despite lower performance.

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[The07] Melissa K. Thevenin. *Mentors, role models, and differences in self-efficacy and motivation among construction management students.* Thesis, Colorado State University. Libraries, January 2007.

[TS00] Nan L. Travers and Barry G. Sheckley. *Changes in Students' Self-Regulation Based on Different Teaching Methodologies.* May 2000.

[WYLZ17] Wenlan Wang, Hongbiao Yin, Genshu Lu, and Qiaoping Zhang. Environment Matters: Exploring the Relationships between the Classroom Environment and College Students' Affect in Mathematics Learning in China. *Asia Pacific Education Review*, 18(3):321–333, September 2017.

[Zol17] Steven Zollinger. The Impact of an Online, Mastery, and Project-Based Developmental Math Curriculum on Student Achievement and Attitude. *Walden Dissertations and Doctoral Studies*, January 2017.

> This is a detailed literature review and research conduced on online, mastery and project based learning, specifically in mathematics in college level classrooms. Research needs for each learning style are outlined. In particular for mastery based learning, qualitative research is needed, in particular because of contradictory results on student stress levels and engagement. Research questions explored quantitative data on content knowledge as well as qualitative input on things like student attitude.