

Utah State University

DigitalCommons@USU

Exploring How We Teach

Empower Teaching Open Access Book Series

8-15-2022

Teaching to Fail: Creating Vulnerable Learning Communities to Facilitate Students' Growth

Avaneesh Narla

University of California, San Diego

Follow this and additional works at: <https://digitalcommons.usu.edu/howweteach>

Recommended Citation

Narla, Avaneesh, "Teaching to Fail: Creating Vulnerable Learning Communities to Facilitate Students' Growth" (2022). *Exploring How We Teach*. Paper 13.

<https://digitalcommons.usu.edu/howweteach/13>

This Chapter is brought to you for free and open access by the Empower Teaching Open Access Book Series at DigitalCommons@USU. It has been accepted for inclusion in Exploring How We Teach by an authorized administrator of DigitalCommons@USU. For more information, please contact digitalcommons@usu.edu.



CHAPTER 11.

TEACHING TO FAIL: CREATING VULNERABLE LEARNING COMMUNITIES TO FACILITATE STUDENTS' GROWTH

AVANEESH NARLA

KEY TAKEAWAYS

- In today's academic environment, students perceive no room for failure. Thus, they do not explore or take risks, and this limits their growth. As a result, the instructor must create opportunities for failure while mitigating the stress associated with failure.
- Opportunities for failure can be created in the curriculum and course structure through scaffolding, formative assessments, and extensive feedback. The instructor must also adopt a growth mindset when it comes to the students' abilities.
- Instructors can create an environment where failure is expected by being vulnerable in the classroom themselves and highlighting their failures and subsequent growth. Graduate students are particularly well-placed to do so because of the proximity of their experience to that of their students.
- Higher education institutions emphasize learning as a transaction that can be measured and count failure against both students and instructors. Thus, instructors (and students) are incentivized to present themselves as having control and mastery rather than being vulnerable in the classroom. We must overcome these forces to create a shared learning community that emphasizes strong interpersonal relationships in the classroom.

FAILURE IS AN OPTION

When I started college eight years ago, I was encouraged by my teachers to take risks. I was told that college was the one time that I could explore and fail without any serious (negative) consequences. But

soon, I realized that most students do not approach college with that attitude. In today's cut-throat world, students' anxieties regarding their careers preclude risk-taking and promote the perception that they cannot fail (Beiter et al., 2015; Yang et al., 2021). Competition and the association of self-worth to the arbitrary selection criteria for graduate schools, fellowships, and prestigious jobs has led to one dictum in the classroom: You Must Succeed.

In the summer of 2021, I taught 250 pre-health students for whom this dictum is the loudest. In informal conversations with me, students repeatedly shared their perception that getting an A in as many academic courses as possible is non-negotiable for them because of the unforgiving system they are navigating. Further, they feel that most instructors have been weaponizing this immense stress and fear to get students to perform academically, hanging the carrot of good grades to get students to follow a narrow path instead of allowing them to explore the content itself. Instead, I decided not to establish an expectation of success in the classroom, but rather one of failure and subsequent growth. My position as a graduate student instructor was invaluable in establishing this expectation and has transformed the perspectives of my students and me.

I now realize that though institutions of higher education operate assuming that learning is a transaction that can be codified, measured, and used to determine the worth of both educators and students, shared vulnerability in the classroom is what allows for growth, exploration, and innovation. The course I was tasked to teach was not unique in any way, and I believe that higher education would benefit greatly from more courses designed and led by educators, and especially graduate students, who are prepared to be vulnerable and empathetic.

CRAFTING STRUCTURES THAT ENCOURAGE FAILURE

The course I taught was the introductory mechanics course in the Physics department at the University of California, San Diego. I taught it twice remotely over five weeks, and I was supported by two graduate teaching assistants (TAs), who graded assignments and held office hours, and one undergraduate "Supplemental Instructor" who led group problem-solving sessions. The course covered five basic concepts in mechanics (each covered over one week) and assumed only basic mathematical knowledge as a prerequisite. Students could participate in the course either synchronously by attending lectures and problem-solving sessions or asynchronously by watching recorded lectures.

The first way I designed the classroom to establish an expectation of failure was by allowing for ample opportunities in the course structure for students to fail and recover, without potentially losing out on their final grade. I designed the course to rely heavily on scaffolding, i.e., instructional support that is gradually removed as students develop their own learning strategies (Sawyer, 2005). In my course structure, scaffolding consisted of two components. The first component was the guidance given as each topic was introduced and slowly removed until the students were expected to solve a complex problem without guidance. For example, when I introduced a new concept, I demonstrated how to utilize the concept to solve problems, and then asked the students to redo, in detail, the same problem with different numbers. Then, I provided a detailed worksheet that guided them through solving problems themselves. The next assignment was a problem set with optional hints for each problem. And in the weekly quizzes, most questions were broken into sub-parts that guided the student to the final answer. Thus, the guidance provided to the students was gradually removed, leading up to the

final exam when the students were expected to demonstrate mastery by doing the entire problem on their own.

FACILITATING AN IMPASSE

Guidance in solving problems with scaffolding has been extensively documented to be effective in helping students learn (Brown et al., 1989; Beed, 1991; Wood, 1996). However, the level of structure that must be provided to students in their tasks has been extensively debated (Kapur, 2008). Though I decided to provide a significant degree of structure, there is extensive recent evidence that even if tasks are ill-structured, failing in these tasks can be a productive exercise in failure (Kapur, 2008, 2010, 2015; Kapur & Bielaczyc, 2012). What is central to the learning process is not the structure itself but the facilitation of impasse, i.e., when a student realizes that they lack a complete understanding of a specific piece of knowledge (VanLehn, 1999; VanLehn et al. 2003). In fact, it was found that learning did not take place despite instructor guidance of the concept if the students did not reach an impasse (VanLehn et al., 2003). This is because the impasse initiates a metacognitive process of explanation and reflection in which students contrast their deficient concepts with the correct concepts and subsequently establish accurate mental models (Chi, 1996; Kapur, 2008; Oser & Spychiger, 2005; Siegler, 2002; Tulis et al., 2016; VanLehn et al., 2003).

Thus, it is incredibly vital that students be encouraged to challenge themselves and reach an impasse early on, with positive attitudes associated with the impasse. Guided assignments facilitate reaching an impasse by providing accessible tasks as early as right after the concept is introduced. In contrast, expecting the students to develop a mastery of the concepts before starting problem-solving often intimidates them when they start working on problems on their own. Early and frequent impasses counter-intuitively serve to make concepts more accessible by altering the expectations regarding failure and impasses—as steppingstones rather than as hurdles. However, it must be emphasized that the instructor must only expect failure and impasse appropriate to the difficulty of the problem relative to the knowledge of the student. The instructor's perception of the abilities of the learner is incredibly important to determine the learner's perception of their own learning ability (Braun, 1976).

ALLOWING FOR LEARNING AFTER ASSESSMENT

The second integral component of the scaffold I constructed was the nature of the evaluations that allow students to understand initial assessments as opportunities for exploration that allow for mistakes rather than as stressful assignments. For example, the course TAs graded the initial assignments subjectively for honest effort rather than correctness and provided quick feedback on whether the problem was done correctly. The problem sets allowed for students to get some questions wrong and still get full marks (and even extra credit). Students could also resubmit quizzes with new randomly generated numbers for the problems to recover half of the points that they lost. These opportunities blurred the line between formative and summative assessment, with each assessment serving both purposes (Black & William, 2009).

It must be noted that a key element that makes an assessment formative is the feedback provided to the learners (Black & William, 2009). An unfortunate reality of our current education system is the over-reliance on summative assessments leads to undue stress placed on learners. The instructor must allow for participation and assessment that seek to mitigate this stress. Thus, I led students to

impasses by creating simple tasks and by removing the stress associated with an expectation of high performance in the assignment. This reduced anxiety, and students approached the questions as a challenge rather than as a stressful task.

TEACHERS MUST NOT BE AFRAID TO FAIL THEMSELVES

However, I believe that the real role of the instructor in cultivating an environment where failure and growth are embraced is in leading by example. In preparing to teach last summer (as much as one can prepare in a continually evolving pandemic), I spent a lot of time watching other instructors, what worked for them and what did not in the remote classroom, and diving into the literature to design the perfect classroom. In the end, I decided to adapt the cognitive apprenticeship model (Brown et al., 1989; Collins, 1991; Collins et al., 1991) to a large remote classroom by creating a dynamic classroom where students could actively participate. I decided to also make thinking visible by solving problems in real-time and in conversation with students. However, it was painfully apparent by the second lecture that this was just not working. I was unable to adapt techniques meant for small in-person classrooms that relied on proper infrastructure and resources for feedback to a large Zoom room with 120 attendees. Where I thought students would find a vibrant classroom full of discussion, they found my lectures, and the constant interruptions by other students, unorganized and confusing.

I was dejected but realized that I had to respond by listening and adapting. I sent an apology announcement to my students; redid all subsequent lectures with careful organization of the material, structured discussion, and student engagement into discernible modules with a cohesive flow; and re-recorded the content that I had failed to present properly. I kept making incremental improvements to the course as the session progressed and was very proud of the structure I had built when I taught it again (though I never stopped collecting feedback and tailoring it even when I taught it again). But what I am particularly proud of is the process as it demonstrated to my students that I took very seriously what I had asked them to do: identify their mistakes and grow by learning how to resolve them. And just as I provided opportunities for them to make mistakes, I asked them for the opportunity for me to learn from mine. My students proved to be incredibly forgiving and resilient, recognizing that I cared about their learning and was willing to put in the work to create a conducive environment. They repeatedly and overwhelmingly identified this process as being foundational to their learning in the class in anonymous feedback collected after the course and explicitly stated that they related to my learning process in their own learning process.

ADOPTING A GROWTH MINDSET

In the last two decades, the development of mindset theory (Dweck, 2006) has had huge impacts on education. Numerous studies demonstrate that people with a growth mindset (who view intelligence as malleable) work and learn more effectively than people with a fixed mindset (who view intelligence as static and unchangeable), displaying a desire for challenge and resilience in the face of failure (Dweck, 2006; Boaler, 2013). While this is usually interpreted to mean that interventions must focus on building a growth mindset in students (Aronson et al., 2002; Good et al., 2003; Blackwell et al. 2007), studies have also shown that the instructor must believe that everybody's ability can grow and give all students opportunities to achieve at high levels so that students can actually do so (Boaler, 2013; Stigler & Hiebert, 1999; Sahlberg, 2011). In particular, feedback on the "process" of problem-

solving (challenge-seeking, hard work, good strategies, focus, and persistence) instead of ability or intelligence creates a growth mindset and enhanced achievement in students (Dweck, 2014).

However, beyond giving opportunities to students, other educational theories suggest that students' learning environments strongly shape their learning and development (Pianta et al., 2003; Ryan and Deci, 2000; Mesler et al., 2021). A recent study found that in classrooms where teachers had a growth mindset, the students developed a growth mindset over time (Mesler et al., 2021). This is consistent with ecological systems theory, which postulates that rules, norms, and expectations established in the environment of the learner influence the development of the learner. Further, the immediate environment of the learner, which includes the teacher and the classroom, are among the most influential (Bronfenbrenner, 1992).

My experience shows that the growth mindset of the instructor in their own teaching abilities is perhaps just as influential in fostering a growth mindset in the student. By assessing growth mindset in teachers (what he calls the teacher mindset), Greg Gero found that instructors who endorsed more of a growth mindset valued learning over risk-free teaching or the appearance of good instruction (Gero, 2013). For example, instructors who endorsed more of a growth mindset agreed more that "The value of trying new teaching methods outweighs the risk of making a mistake" and "For me, the development of my teaching ability is important enough to take risks." They did not believe that a mistake-free lesson on their part or a lesson that went exactly as planned defined them as a good teacher (Gero, 2013; Dweck, 2014). When instructors view themselves as learners, there is a sense of vulnerability that their students can sense (Dale & Frye, 2009). Gero found that teachers with more of a growth mindset specifically confronted problems in their teaching head-on and were more likely to agree that "I discuss problems in my classroom teaching with others in order to learn from them" (Gero, 2013). They also engaged in more professional development, such as reading professional literature and observing other teachers, and specifically asked for feedback on their teaching from a respected colleague or supervisor (Gero, 2013; Dweck, 2014).

Thus, growth mindsets may be manifest in many ways in the classroom, ranging from the instructor inculcating a growth mindset in the students, to the instructor adopting a growth mindset regarding their students and their own instruction, which in turn facilitates development of a growth mindset in students. This allows students and instructors to take risks in the classroom and learn from the process of failing.

BEING VULNERABLE IN THE CLASSROOM

As a graduate student instructor, I am very aware of the power structures that we inhabit (Symonds, 2021). We are extremely precarious students/employees/apprentices (Fairbrother, 2012; Bolumole, 2020; Rao et al., 2021) employed by departments whose primary interest is research (Street et al., 1993; Robert et al., 2017), and our prospects as instructors are in part determined by student evaluations (Wachtell, 1998; Leckey & Neill, 2001; Chen & Hoshower, 2003; Mitchell & Martin, 2018; Alshammari, 2020). Even if we inhabit positions of authority in the classroom, we occupy a position of utmost precarity professionally (Andrzejewski et al., 2019). Thus, we are expected to demonstrate

how to succeed in the classroom and perform as a successful instructor with control and mastery over the course and its content (Dale & Frye, 2009) in order to establish ourselves as hireable instructors. Highlighting our failures in this context requires us to set all internalized expectations aside, be vulnerable, and be open to change, learning, and criticism (Dale & Frye, 2009; Dweck, 2014). This process can be deeply uncomfortable (Kelchtermanns, 2011), but in choosing to learn something new, students are being vulnerable every day (Brown, 2016). As Dale and Frye (2009) argue, we must “recognize and embrace vulnerability and love as necessary relational qualities in developing and maintaining both the art of learning and the art of teaching” (page 123). By demonstrating vulnerability, educators exhibit what we expect of our students: to choose discomfort and grow from the process (Dale & Frye, 2009). If we can do so, the opportunities we provide to students to fail without stress can be realized. In fact, due to our precarity and our simultaneous role as students, I believe that graduate students are particularly well-situated to demonstrate vulnerability in the classroom and thus lead by example. Our proximity to our students, in the experiences and cultural knowledge we share, the stage of our careers we are in, and the recentness of being in the classroom, enables us to empathize with our students and for our students to empathize with us (Harland & Plangger, 2004; Muzaka, 2009; Fairbrother, 2012). The mutual empathy emphasizes the need for us to be vulnerable in the classroom.

However, being vulnerable requires significant emotional labor (Andrzejewski et al., 2019), and graduate students must be trained to be vulnerable and empathize in the classroom (Dale & Frye, 2009; Kelchtermanns, 2011). Unfortunately, the little pedagogical training most graduate students receive is currently entirely focused on the curricular aspects of the classroom, and we are left without the tools or inclination to engage with our students as people (Andrzejewski et al., 2019). Our current system emphasizes teaching as a transaction where students pay tuition and we are expected to impart knowledge (in fact, it is in particular what the institution deems as the relevant knowledge). The system thus deemphasizes and even completely ignores the fact that educators have a strong relationship with their students as fellow learners and human beings (Dale & Frye, 2009; Andrzejewski et al., 2019). We must recognize that we have severe impacts on our students, and our students on us, and must be trained to understand and embrace this relationship (Dale & Frye, 2009; Kelchtermanns, 2011).

CREATING A SHARED LEARNING COMMUNITY

The impression that educators and students are merely involved in a transaction (Bradford, 1958; Parrish et al., 2011; Gunn, 2018) implies that neither students nor educators can risk failure in the transaction process (Dale & Frye, 2009). We are led to believe that we are failing each other if we “fail” in any way. As Dale and Frye (2009) argue, “the prevailing institutional conception of learning that has shaped our students (and us)” is that “to learn is to master; to control one’s knowledge of facts, concepts, and theories” (page 124). Emphasizing the relationship between the educator and the student as fellow learners lets us recognize that both are resilient and can grow from failure. It allows for classrooms to be sites of exploration and risk-taking, with the possibility of great innovation in pedagogy as a result. Unfortunately, the systems of education in place do not incentivize such a

relationship. Institutions focus on metrics as a means to collapse the richness of the classroom into a scalable tool to assess both instructors and students (Pettersen, 2015; Gunn, 2018). Consequently, as Dale and Frye (2009) point out, “in a society increasingly dominated by consumerism, one learns to sell oneself and to assert and exalt one’s attributes. The marketplace has little room for humility and is an arena in which asserting control and controlling vulnerability are prized actions” (page 124). However, a good instructor must overcome the forces of the system to create a shared learning community that can allow everybody to make mistakes and grow from the process.

Emphasizing the relationship as shared learners also allows educators and learners to appreciate each other as complete people with complex lives beyond the classroom. As a result, allowing for failure and growth extends beyond the limited curriculum of the course. When I started teaching my class, I hoped that I would show my students how wonderful and useful physics is. As proud as I am that they said that I was able to do that, what truly impacted me were the relationships that I formed and the appreciation of my students for me as a person and a leader who cares about them. While I was delighted to receive many grateful notes from students who were previously intimidated by physics but embraced and even mastered the course content by the end of the course, the note that touched me the most was from a student who got an F in my class. They were depressed and struggling with substance abuse, deep emotional pain, and homelessness while taking my class. They could not complete all the assignments, but I encouraged them to do what they could and, most importantly, take care of themselves. They did not want to try because they felt that they would fail in the class anyway. I told them that it does not matter if they got a failing grade if they succeeded in feeling a little bit better about themselves at the end of the day, and if being able to do a few physics problems is what does it, then that’s a victory. This student did a few problems every week, insufficient for me to give them a passing grade but enough to provide something for them to look forward to every week. I chose to see their inability to solve problems due to the challenges they were facing as an opportunity to identify what they needed at that moment rather than as a judgment of their worth and ability. And what they needed was not an A or even a passing grade but a shared learning community that allowed them to make mistakes and grow from the process. In the note, they said, “your encouragement this quarter is the one thing that got through to me above everything else. Above my parents and my friends telling me I could pull through, you reminding me that failing a class is not failing my whole war meant everything to me.”

REFERENCES

- Alshammari, E. (2020). Student evaluation of teaching. Is it valid?. *Journal of Advanced Pharmacy Education & Research, 10*(2), 97.
- Andrzejewski, C. E., Baker-Doyle, K. J., Glazier, J. A., & Reimer, K. E. (2019). (Re) framing vulnerability as social justice work: Lessons from hacking our teacher education practices. *Review of Education, Pedagogy, and Cultural Studies, 41*(4-5), 317-351.
- Aronson, J., Fried, C. B., & Good, C. (2002). Reducing the effects of stereotype threat on African American college students by shaping theories of intelligence. *Journal of experimental social psychology, 38*(2), 113-125.

- Beed, P. L., Hawkins, E. M., & Roller, C. M. (1991). Moving learners toward independence: The power of scaffolded instruction. *The Reading Teacher*, 44(9), 648-655.
- Beiter, R., Nash, R., McCrady, M., Rhoades, D., Linscomb, M., Clarahan, M., & Sammut, S. (2015). The prevalence and correlates of depression, anxiety, and stress in a sample of college students. *Journal of affective disorders*, 173, 90-96.
- Black, P., & Wiliam, D. (2009). Developing the theory of formative assessment. *Educational Assessment, Evaluation and Accountability (formerly: Journal of Personnel Evaluation in Education)*, 21(1), 5-31.
- Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child development*, 78(1), 246-263.
- Boaler, J. (2013). Ability and mathematics: The mindset revolution that is reshaping education. *Forum*, 55(1), 143-152 .
- Bolumole, M. (2020). Student life in the age of COVID-19. *Higher Education Research & Development*, 39(7), 1357-1361.
- Bradford, L. P. (1958). The teaching-learning transaction. *Adult Education*, 8(3), 135-145.
- Braun, C. (1976). Teacher expectation: Sociopsychological dynamics. *Review of Educational Research*, 46(2), 185-213.
- Bronfenbrenner, U. (1992). *Ecological systems theory*. Jessica Kingsley Publishers.
- Brown, B. (2016). Brené Brown encourages educators to normalize the discomfort of learning and reframe failure as learning. *About Campus*, 20(6), 3-7.
- Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational researcher*, 18(1), 32-42.
- Chen, Y., & Hoshower, L. B. (2003). Student evaluation of teaching effectiveness: An assessment of student perception and motivation. *Assessment & evaluation in higher education*, 28(1), 71-88.
- Chi, M. T. (1996). Constructing self-explanations and scaffolded explanations in tutoring. *Applied Cognitive Psychology*, 10(7), 33-49.
- Collins, A. (1991). Cognitive apprenticeship and instructional technology. *Educational values and cognitive instruction: Implications for reform, 1991*, 121-138.
- Collins, A., Brown, J. S., & Holum, A. (1991). Cognitive apprenticeship: Making thinking visible. *American educator*, 15(3), 6-11.
- Dale, M., & Frye, E. M. (2009). Vulnerability and love of learning as necessities for wise teacher education. *Journal of Teacher Education*, 60(2), 123-130.

- Dweck, C. S. (2006). *Mindset: The New Psychology of Success*. New York City, NY: Random House Publications.
- Dweck, C. (2014). Teachers' Mindsets: "Every Student has Something to Teach Me" Feeling overwhelmed? Where did your natural teaching talent go? Try pairing a growth mindset with reasonable goals, patience, and reflection instead. It's time to get gritty and be a better teacher. *Educational Horizons*, 93(2), 10-15.
- Fairbrother, H. (2012). Creating space: maximising the potential of the Graduate Teaching Assistant role. *Teaching in Higher Education*, 17(3), 353-358.
- Gero, G. P. (2013). *What drives teachers to improve? The role of teacher mindset in professional learning* [Doctoral dissertation, The Claremont Graduate University].
- Good, C., Aronson, J., & Inzlicht, M. (2003). Improving adolescents' standardized test performance: An intervention to reduce the effects of stereotype threat. *Journal of Applied Developmental Psychology*, 24(6), 645-662.
- Gunn, A. (2018). Metrics and methodologies for measuring teaching quality in higher education: Developing the Teaching Excellence Framework (TEF). *Educational Review*, 70(2), 129-148.
- Harland, T., & Plangger, G. (2004). The postgraduate chameleon: Changing roles in doctoral education. *Active learning in higher education*, 5(1), 73-86.
- Kapur, M. (2008). Productive failure. *Cognition and instruction*, 26(3), 379-424.
- Kapur, M. (2010). Productive failure in mathematical problem solving. *Instructional science*, 38(6), 523-550.
- Kapur, M. (2015). Learning from productive failure. *Learning: Research and practice*, 1(1), 51-65.
- Kapur, M., & Bielaczyc, K. (2012). Designing for productive failure. *Journal of the Learning Sciences*, 21(1), 45-83.
- Kelchtermans, G. (2011). Vulnerability in teaching: The moral and political roots of a structural condition. In *New Understandings of Teacher's Work* (pp. 65-82). Springer, Dordrecht.
- Leckey, J., & Neill, N. (2001). Quantifying quality: the importance of student feedback. *Quality in Higher Education*, 7(1), 19-32.
- Loveless, D., Beverly, C. L., Bodle, A., Dredger, K. S., Foucar-Szocki, D., Harris, T., ... & Wishon, P. (2016). *The vulnerability of teaching and learning in a selfie society*. Springer.
- Mesler, R. M., Corbin, C. M., & Martin, B. H. (2021). Teacher mindset is associated with development of students' growth mindset. *Journal of Applied Developmental Psychology*, 76, 101299.
- Mitchell, K. M., & Martin, J. (2018). Gender bias in student evaluations. *PS: Political Science & Politics*, 51(3), 648-652.

- Muzaka, V. (2009). The niche of graduate teaching assistants (GTAs): Perceptions and reflections. *Teaching in Higher Education, 14*(1), 1-12.
- Oser, F., & Spychiger, M. (2005). *Lernen ist schmerzhaft. Zur Theorie des Negativen Wissens und zur Praxis der Fehlerkultur [Learning is painful. On the theory of negative knowledge and the practice of error culture]*. Weinheim, Germany: Beltz
- Parrish, P. E., Wilson, B. G., & Dunlap, J. C. (2011). Learning experience as transaction: A framework for instructional design. *Educational Technology, 15*-22.
- Pettersen, I. J. (2015). From metrics to knowledge? Quality assessment in higher education. *Financial Accountability & Management, 31*(1), 23-40.
- Pianta, R. C., Hamre, B., & Stuhlman, M. (2003). Relationships between teachers and children. In W. M. Reynolds & G. E. Miller (Eds.), *Handbook of psychology: Educational psychology*, Vol. 7, pp. 199–234. John Wiley & Sons Inc.
- Rao, N., Hosein, A., & Raaper, R. (2021). Doctoral students navigating the borderlands of academic teaching in an era of precarity. *Teaching in Higher Education, 26*(3), 454-470.
- Robert, J., & Carlsen, W. S. (2017). Teaching and research at a large university: Case studies of science professors. *Journal of research in science teaching, 54*(7), 937-960.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist, 55*(1), 68.
- Sahlberg, P. (2011). *Finnish lessons: What can the world learn from educational change in Finland?* (Series on School Reform). New York: Teachers College Press.
- Sawyer, R. K. (Ed.). (2005). *The Cambridge handbook of the learning sciences*. Cambridge University Press.
- Siegler, R. S. (2002). Microgenetic studies of self-explanation. In N. Granott & J. Parziale (Eds.), *Microdevelopment. Transition processes in development and learning* (pp. 31–58). Cambridge: Cambridge University Press
- Stigler, J.W. & Hiebert, J. (1999) *The Teaching Gap*. New York: Free Press.
- Street, D. L., Baril, C. P., & Benke Jr, R. L. (1993). Research, teaching, and service in promotion and tenure decisions of accounting faculty. *Journal of Accounting Education, 11*(1), 43-60.
- Symonds, E. (2021). An ‘unavoidable’ dynamic? Understanding the ‘traditional’ learner–teacher power relationship within a higher education context. *British Journal of Sociology of Education, 1*-16.
- Tulis, M., Steuer, G., & Dresel, M. (2016). Learning from Errors: A Model of Individual Processes. *Frontline Learning Research, 4*(2), 12-26.
- VanLehn, K. (1999). Rule learning events in the acquisition of a complex skill: An evaluation of cascade. *The Journal of the Learning Sciences, 8*(1), 71–125.

- VanLehn, K., Siler, S., Murray, C., Yamauchi, T., & Baggett, W. B. (2003). *Why do only some events cause learning during human tutoring?* *Cognition and Instruction*, 21(3), 209–249.
- Wachtel, H. K. (1998). Student evaluation of college teaching effectiveness: A brief review. *Assessment & Evaluation in Higher Education*, 23(2), 191-212.
- Wood, D., & Wood, H. (1996). Vygotsky, tutoring and learning. *Oxford review of Education*, 22(1), 5-16.
- Yang, C., Chen, A., & Chen, Y. (2021). College students' stress and health in the COVID-19 pandemic: The role of academic workload, separation from school, and fears of contagion. *PloS one*, 16(2), e0246676.