Education Review Reseñas Educativas
Resenhas Educativas

Feel Free to Fail Once in a While: We all Do! That's How We Learn from Life's Lessons

Ronald W. Marx

There is, no doubt, some hubris to claim that one merits inclusion in a collection of essays on how one acquires wisdom. The *acquired* part is not an issue. It is not a special claim that one has acquired, that is, learned something, or even that one has learned quite a bit. It is what all of us humans do, and we do so sometimes with little effort as we navigate life and its challenges and opportunities. And yet at other times we appear thick headed in the face of trials. At times our friends and mentors wonder why we have learned so little. They shake their heads in dismay as we stubbornly cling to clearly unsuccessful ideas.

But wisdom, that is something else entirely. Among other synonyms, Microsoft Word's thesaurus gives us *insight*, *acumen, prudence, sagacity* and *good judgment*. To claim any of these attributes is to say much about oneself. Perhaps it is inevitable that my five decades in educational research, first as a graduate student and then an academic, would somehow accrete some modicum of wisdom. When I returned from my first sabbatical in the early 1980s, I discovered Edward Shils's (2008) essay on the academic ethic. He opens the essay with "Universities have a distinctive task. It is the methodical discovery and the teaching of truths about serious and important things" (p. 3). Although I was well on my way to a fulfilling career having successfully navigated past some milestones, I had not yet acquired a deep understanding of the enterprise. I was a bit stuck in the weeds. I did not know until I read that essay quite what the academic project was really about. Sure, I had some ideas having been engaged in the enterprise for some time. Perhaps I am a slow learner, but the desire for career can push first principles to the background. I think wisdom follows from this first principle of truth seeking. So at least in that regard, I can claim some ownership of wisdom.

Along the way I have learned a lesson or two. Some were the result of reaching too far and efforts that resulted in failure. Learning from failure is frequently not so pleasant, although you doubly fail if you do not learn from those failures. Yet other lessons resulted from wonderful collisions of opportunity and the presence of colleagues who, working in collaboration, would enable my contributions to make a difference.

Marx, R. W. (2019, October 23). Feel free to fail once in a while: We all do! That's how we learn from life's lessons. Acquired Wisdom Series, S. Nieto, F. Erickson & P. Winne (Eds.). *Education Review, 26*. http://dx.doi.org/10.14507/er.v26.2771

Early Years

I did not enjoy childhood in a family with a high degree of stable support. My father quit school in the eighth grade to work in the family bootlegging business in Detroit. His family was large and confusing. I could never quite grasp who was who and what roles they played in the family. It was not until I was a pre-adolescent that I learned that few families have characters like "Big Louie" (he was impressively big and dramatically silent) around at family gatherings. I didn't know what he did, but I had suspicions. Perhaps my father's biggest lesson from his family was how to drink seriously. At that he was a master. Consumption of a fifth of Canadian whiskey nightly can have striking effects on one's health, and my father died in his mid-50s. But along the way, my sisters and I had to figure out how to live with a drunk. My sisters all married by the time they turned 20. To all of us he was mean and surly, but to me he added an occasional beating for good measure.

My father knew how to cook and how to run a delicatessen, and he taught me that cooking was a noble craft. I worked in the food business from early in junior high school (my family was living in Miami briefly at the end of the 1950s, and I don't think anyone there paid much attention to child labor laws; perhaps they didn't even exist) through the completion of my M.A. So, my father's gifts (when I was 11, I learned with great skill how to use a 12-inch chef's knife and how to slice lox off a side of salmon with a 15-inch slicing knife) helped me fund a good part of my education. To this day I love cooking and have taught my children and now my grandchildren the wonderous alchemy of good ingredients, intense concentration, and fire.

My family had little money. As a young child in Detroit in the immediate post-war years I didn't know we were poor. We lived in a "two-family flat." My grandparents and aunt lived upstairs and we lived downstairs. I never heard my grandfather speak English, although I suspected he did if pressed. He spoke Yiddish with his friends and read the Yiddish left wing papers. He and his friends carried on thunderous debates in Yiddish about mysterious topics. I had three older sisters. My father would sometimes binge drink and he would disappear for weeks, sometimes months at a time. As a result, I grew up primarily among women and girls: Grandmother, aunt, mother, and sisters.

My childhood years in Detroit with an absent father had its effects. I was a terror in school. My guess is that these days they would send me to see the counselor, but I doubt such services were available in Detroit's elementary schools in the early 1950s. I had regular and sometimes intense fights with Bobby Bryant. I have no recollection of why these fights started, but they were a fixture of my life. And why Bobby Bryant? Who knows? Perhaps this odd friendship was a harbinger of my later penchant for collaborations. Detroit Public Schools' report cards in those years had separate grades for behavior and comportment, in addition to grades for academic learning. Bobby and I would work hard to claim the greater number of unsatisfactory grades for behavior on our report cards. The more transgressions, the more "U" marks. It was an open-ended scale. Sky was the limit.

Corporal punishment was common in Winterhalter elementary school. Built in 1921, the school already looked ancient when I attended. The desks were bolted to each other and to strips of wood that were then screwed to the floor. When the teacher grabbed a student by the shoulders and gave them a nasty jolt, the entire row of desks would shake (I particularly remember Miss Spaulding and her shoulders—she could shake you till your teeth rattled). I am sure the kids in my row grew tired of the shaking desks that resulted from my misbehavior.

Although family life was disruptive and tentative, I did have all of those women around for support. My maternal grandmother ran a catering business, and I

stood at her side as she taught me. I learned how to make wonderful old-world delicacies—knishes (Jewish versions of meat or potato pies), apple strudel, and kishka (cow intestines stuffed with matzo, onion, and schmaltz—sort of like an Ashkenazi haggis). Recipes were based on the number of handfuls of different ingredients. My 4'10" grandmother had small hands so as I grew older the quality of the resulting dish, affected by my growing hands, did not match my grandmother's. My aunt was a wonderful and calming presence, and my mother tried as best she could to protect us from life at home. My sisters and I learned to sing all of the current pop hits as we worked around the house, so I had access to social capital, even in the presence of an otherwise pathological nuclear family. I was resilient and I now know that psychological research shows that such resilience is not such an uncommon outcome of early years (Masten, 2001, 2015). I was lucky I suppose, because had other features of my adaptational system been in equal disrepair, I might not have developed in quite the way I did. Luthar's (2015) excellent review of resilience in development concludes that relationships form the fundamental bedrock of resilience, and my extended family most assuredly provided this bedrock.

We moved to Miami in 1956 in the summer of my 10th year. My father had two delicatessens in partnership with relatives. My family was not active in civic or political affairs, but somehow, I picked up a sense of social justice. The family would receive occasional letters from the KKK telling my father to take his Jew food and get out of town. I noticed that all of the kids in my school, Kinloch Park, were white. So, I circulated a petition among my fellow sixth graders to allow Blacks in the school. I have no idea what the school authorities told my parents, but I was soon diverted from political action to running the small school store, selling pencils and pens in the morning.

We moved to Los Angeles three years later and that is where I finished junior high and high school. I was now fully aware of our poverty and to earn spending money and to buy new clothes and other adolescent necessities, I started working in a barbecue restaurant in Hollywood's famous Farmers' Market. I worked for that same company off and on until I finished my M.A. in 1971. Throughout my high school years, we lived in a two-bedroom apartment, my parents occupying one bedroom and my sisters the other. I slept on a rollaway bed hidden in a closet in the hallway during the day. None of my school friends lived that way, and some even lived in what looked to me to be mansions in the Hollywood Hills. Our situation was humiliating and to me the stigma of poverty felt like a brand I wore everywhere.

It should not be surprising to learn that I was not a particularly strong high school student. The high school curriculum was straightforwardly academic with little in the way of electives. Fairfax High School was a good school. The faculty was, by and large, competent and cared about the students, so even the most middling of students actually could learn quite a bit. But my grades were uninspired and by the time I graduated, I was clearly not headed to the best universities. I took the SAT and did reasonably well, but not brilliantly. I applied to UCLA, where most of my friends who were good students attended. UCLA sent me an expected rejection, so off I went to what was then called San Fernando Valley State College.

Early in my senior year in high school, a brother-in-law who was in the Navy Reserve convinced me that a major war was on the horizon, and I should somehow put myself in a position to control what might happen to me should I be drafted. The Army had a plan that, should you enlist in the reserves prior to your 18th birthday, you would have six months active duty and just three and a half years of active reserve service instead of five years should you join after turning 18. In the fall of my senior year in high school, I joined an artillery battalion in the San Fernando Valley and began my

reserve service. I didn't know I would be paid for this reserve duty, and that was an added bonus. In June, the day after high school graduation I flew to Fort Ord, CA, for basic training. It was my first airplane flight.

Artillery training on the 105mm howitzer was at Fort Sill, Oklahoma, and there I experienced a wonderful, serendipitous eye opener. This was fall, 1963, and it so happened that the New York National Guard had an artillery battalion that had a large number of recent college graduates. They were in the same situation as me, having started their active reserve obligations while students, although in their case they were college students. They were four or five years older and they had just finished bachelor's degrees at places like NYU, Hofstra, CCNY, and Fordham. They were educated. They read books, magazines, and newspapers. They were well read and they had opinions. Educated, informed opinions. I was struck by what they knew and how articulate and smart they all seemed. I realized then that there must be something to college, and I was impressed by the potential impact that a good education could provide. Two of my brothers-in-law were recent college graduates, but no other person in my immediate family went to college. I became a first-generation college student before the concept became a commonplace in our understanding of the college student experience.

Student Years

I returned from active service in the Army in December, 1963, and immediately started college at Valley State (now California State University Northridge). It was exhilarating. High school had never engaged my intellect, but college was a different experience. Fed, I think, by my admiration of those National Guard members from New York, I worked at academics in a way I never had previously. Everything was an adventure, and even though many of us in the academy worry about what role general education can play in the intellectual development of our students, for me it was a feast – an inexpensive feast at about $50 a semester. Valley State was not a great university, not by any measure, but it was full of eager, ambitious students and dedicated faculty. It provided a first-class education at bargain basement prices.

The Master Plan for Higher Education in California (Coons et al., 1960) was a brilliant piece of education policy created by the California legislature with leadership from Gov. Pat Brown and Clark Kerr, President of the UC system. The master plan created the community college, state college, and university systems that helped propel California's economy and the quality of life of its residents. I didn't know at the time that I was enjoying a great advantage. To me, it was how college worked. Even my friends at UCLA paid only marginally more. As a first generation, working poor student, I benefited enormously from the vision that created that plan. It seems incredible looking back that, as we wallow in a political climate that views the benefits of higher education to be singularly for the individual, there was a generation and a time in our country when the civic, social, and economic benefits of higher education were viewed with a commitment to the commonweal.

I majored in psychology, but I was drawn to all of the social sciences, taking courses in anthropology, economics, and political science. The faculty in the psychology department was helpful and encouraging, and my high grades were quite different from my high school experience. After a few semesters on the dean's list, I was invited to the California State Colleges study abroad program. I decided to go to Sweden because I didn't have to demonstrate language proficiency to study there and the marginal costs were manageable. I spent a year at the University of Uppsala, just outside Stockholm. It was an amazing experience, studying in Sweden and traveling in Europe. I was elected student body leader for our group of 50 or

so students in Uppsala, which earned me the opportunity to get to know the administrator of the entire program, Tom Lantos, who was then an economics professor at San Francisco State University and would later become the only Holocaust survivor to serve in Congress (1981-2008).

Prior to departing to Sweden, I dated Anne Bonfert. We met at Farmers' Market. I was at the barbeque restaurant and she was at the ice cream stand. Anne and I travelled in Europe together after my studies in Sweden. We married when I returned from Sweden and upon completing my B.A., I began studying for my M.A. in school psychology, also at Valley State. That program taught me that I could never be a successful clinician. My colleagues in the program loved the clinical courses, but they never fit me very well. In one of my clinical placements in a local rural school district in the Santa Clara River Valley north of Los Angeles, I participated in assessing a recent immigrant boy from Mexico. Here I was, a monolingual white guy from a suburban university testing this kid in English, when he not only could not speak English, he had never previously attended school. But the school district authorities still wanted to identify him as a special needs learner. I didn't then understand the fiscal reasons why districts might want to identify kids as having special needs, but this episode helped turn me away from school psychology. It is a perfectly fine specialization in psychology, but to my young eyes, it seemed as though I would serve as an agent of an oppressive system, and that was that.

During my studies, the professor who taught psychological assessment was Phil Smith. He was trained as a clinical psychologist, and had worked extensively on human factors research for the military. We found each other in that program, and he would become the first, and in some ways the most important, mentor in my career. He was doing research on test validation of commonly used children's assessments in the school psychologist's tool kit. He had only a small amount of funding, but he believed in me and somehow saw talent in me that I did not recognize. That research assistantship lead to my first two journal publications (Smith & Marx, 1971, 1972) and launched my career in educational research. We used factor analysis in those papers, but we did not have computers. We did all calculations on Monroe Model IQ-213 calculating machines (now in the National Museum of American History, see http://americanhistory.si.edu/collections/search/object/nmah_6905730). What a task that was, but I learned more about how the mathematics work in factor analysis than I ever thought possible.

It was clear by the time the second year of my M.A. program began that I would be happier going on to a Ph.D. instead of getting a job in school psychology. I applied to three or four programs on the advice of some of faculty members. I really had little idea what I might get into as a doctoral student. Valley State had no doctoral programs. That was a feature of the Master Plan—Ph.D. degrees would be in the realm of the University of California system, not the state colleges. Like many faculty members, when they saw someone interested in Ph.D. studies, my teachers at Valley State were eager to help. Based on my research interests, which were still quite unformed, some suggested Stanford. So, I applied. It was fairly close to family in southern California, but far enough away to be an adventure.

The Graduate School of Education at Stanford accepted me. What a thrill that was. I had no idea what Stanford was. It did not occur to Anne and me that we could drive up there and check it out, so we had no idea what the campus was like, and we had even less an idea about Palo Alto. Joanne Whitmore (later to become a dean of education) was an advanced doctoral student and she called me to offer me a research assistantship. I had not yet received notification I was admitted, but my costs would be covered. By the end of my formal higher education, I had received a wonderful education at essentially no financial cost to

me. My total student debt when I left Stanford was about $2,000, much of that a National Defense Student Loan, partially forgiven by serving as a child care teacher in Los Angeles Public Schools.

We arrived on the Stanford campus in September 1971 to find it in chaos. Not long before, riots had beset the Hoover Center and it was boarded up. The campus was in turmoil over the firing of a tenured professor, H. Bruce Franklin, who had been presumed to be involved in the riots. This created considerable discussion about academic freedom. My advisor was Pat Sears, and in the first quarter the few students who had a child development interest met in seminar with Pat and Bob Hess. It was frightening. The very first day in seminar, we introduced ourselves to each other, and I proudly announced I had been named outstanding M.A. graduate from school psychology at Valley State, and I had two peer-reviewed articles. Pat asked where I had published the articles. "*Journal of Learning Disabilities* and *Psychology in the Schools*," I said. "Very nice" she said, "Don't ever publish there again." This was my first true exposure to the academic status game. At least this is what it felt like at the time. But there was a more benign message—be planful about what you publish and where you publish it. Crafting a career ought to be strategic, not merely opportunistic. This was a lesson that I have understood from that first seminar, and although I personally find it is somewhat difficult to follow, I try to help my junior colleagues understand.

Be planful about what you publish and where you publish it. Crafting a career ought to be strategic, not merely opportunistic.

The level of academic work at the Stanford Graduate School of Education was like nothing I had encountered previously. Everyone seemed smarter than I was, and the faculty and students alike had an intensity about them that was uncommon. I came to realize that this was really my first encounter with a highly selective organization, and it took me some time to recalibrate my approach to work. I was intense and a hard worker, but I was not an outlier like I had been in my M.A. program. I was in the middle of the pack. In my first quarter, I enrolled in Eleanor Maccoby's seminar in child development and the reading covered a major part of the *Mussen Manual*—both volumes (Mussen, 1970). It seemed to me that this was a year's work, not 10 weeks. Yet I survived and even began to flourish.

My research assistantship came from Pat Sears, who was one of the faculty members working at a very large center, the Stanford Center for Research and Development in Teaching (SCRDT). I had no idea then how these large enterprises worked and I never learned exactly how SCRDT worked. The Sears project was one of several funded under Nate Gage's overall direction in the Program on Teacher Effectiveness in SCRDT, with the goal of uncovering teaching behaviors that predicted student learning. It was the heyday of the process-product research approach to research on teaching championed by Gage. Our field site was a set of schools in East Palo Alto, at that time an area that had rapidly changed over from white working class to black working class. Compared with Palo Alto across the freeway, nestled up against the coastal range and home to the "Farm" (Leland Stanford built his university in memory of his son on the family farm where he bred race horses, hence the nickname for the Stanford campus), East Palo Alto could not have been more different. While my aspiration was to be comfortable in the rarified atmosphere that Stanford provided, in many ways I felt more kinship with the poor community to the east.

Our task was to conduct behavioral observations of teachers, counting various behaviors that were thought to support students' emotional development. Sears's work was on self-esteem, and our project was to examine effective teaching that lead

to better self-esteem in their students. We administered a battery of assessments of the children including self-esteem measures that Sears had developed, and then we computed enormous correlation matrices looking for teacher behaviors that correlated highly with children's self-esteem. This work was not entirely theory-free, but it also capitalized on chance findings. This methodology was quintessential to the process-product approach at the time, and contributed to its passing as research on teaching developed more sophisticated theories and more advanced research approaches.

My fellow students at SCRDT included many people who became important educational researchers, and in many ways, we learned from each other as much as we did from our illustrious faculty mentors. My closest colleagues were Penny Peterson, Chris Clark, and Phil Winne. We worked intensely together and learned how to work as a team to accomplish sophisticated research. This was my first on-the-ground exposure to distributed cognition, but of course, I did not have that construct at the time to help me understand my experience. These collaborations, while stressful because we were taking on work that stretched our understanding of educational research and our grasp of research methodology, were exhilarating.

Pat Sears was not well and she retired in my second year as a doctoral student. I was grateful to be kept on as a research assistant, but I was now assigned to work with Dick Snow. What a remarkable change in circumstance. Where Sears was prickly and difficult, Snow was accepting and encouraging. Snow was aiming to move us past cataloging teacher behavior and its relationship to student outcomes, and instead see if there was a way to develop a stronger theoretical conception of these behaviors. At the time, he was working with Lee Cronbach on aptitude-treatment interactions and what ultimately was their major work in this area (Cronbach & Snow, 1977). My first assignment with Snow was to conduct a literature review on a cluster of teacher behaviors that had promise as indicators of teaching effectiveness. The research assistants divided up the territory, and I took on teacher variety and flexibility. These related constructs represent the *variety* of teaching behaviors used in lessons, assuming variety might produce greater engagement, and *flexibility* in the way teachers enact their behaviors depending on student reactions.

In Snow's course on individual differences, a major assignment was to propose a cognitive model of performance on some sort of academic task. It was an interesting and provocative assignment, for such models were just beginning to appear in the literature in the early 1970s. My thinking about that task led me to wonder about the factors that might govern teacher variety and flexibility. It occurred to me, and when I broached the topic with Snow he agreed, that teachers' cognitive models of students and the data they collect both formally and casually in class might influence how they might choose to engage with students and at what point during instruction they might decide to engage that way. This thinking, heavily influenced by a paper Snow (1968) published about Egon Brunswick and his conception of perception in natural settings, led me to a dissertation on how teacher perceptions of students might influence their judgments about students' academic and social-emotional states. At about the same time, I was working with Penny Peterson and Chris Clark (Peterson, Marx, & Clark, 1978) on teacher planning. I was developing a growing interest in the cognitive lives of teachers, and the field was similarly moving in that direction. It would be a line of work I would pursue for another 15 years or so.

I had been a graduate student for six years, two at Valley State and four at Stanford. It was time to move on. I had collected my dissertation data and had a good portion of my dissertation written. (It was handwritten in conjunction with an IBM Selectric typewriter. I even used a scissors and tape to cut and paste. I doubt

that students today even know that "cut and paste" was once literally what writers did. It was in a pre-digital era.) I started applying for jobs. Anne and I mapped out regions in North America we thought we might want to live and raise a family.

The program on Teacher Effectiveness at SCRDT was moving on to a new study. Nate Gage had spent a year in DC as a visiting fellow at the Department of Education and he came back with a raft of new ideas. The major activity he had engaged while there was to convene a very large group of education researchers to attend the Planning Conference on Studies of Teaching. It was a sort of Gordon conference for education. Lee Shulman was spending the year at Stanford, and he directed one of the committees at the conference, the committee on Teaching as Clinical Information Processing. Shulman asked me to serve as a graduate student assistant at the conference, and this further cemented my interest in teacher thinking as a research focus.

Over the years in my various capacities as an academic and in leadership positions recruiting and assisting new faculty to join our academic units, it has become abundantly clear that Murphy's Law ("everything that can possibly go wrong will go wrong") rules when academic moves are underway.

The new study was a very large randomized control trial (RCT), well before Whitehurst (2003) declared the RCT as the "gold-standard" for educational research. It was a monstrously complicated, field-based study in several classrooms in different school districts (Clark et al., 1979). It essentially occupied all of our team's time through the winter and spring of 1975. There were only occasional times when we could get away for job interviews. Oddly enough, both Phil Winne and I had the same day off, and we were both invited to interview for one position at the Faculty of Education at Simon Fraser University in British Columbia. It was a very weird occasion. We flew up together and interviewed in competition for one position. They liked us both, and we were offered and then accepted jobs.

Simon Fraser Years

Moving to Canada to begin my academic career was a true adventure. We had to vacate our student apartment at Stanford mid-summer, but our immigration paperwork was incomplete, so we moved into Anne's parents' cabin at Lake Tahoe as we awaited word. Our first child, Meredith, was born in the spring and we were not yet steady on our feet as parents of a little baby. Finally, we received our immigration papers and drove to British Columbia. Over the years in my various capacities as an academic and in leadership positions recruiting and assisting new faculty to join our academic units, it has become abundantly clear that Murphy's Law ("everything that can possibly go wrong will go wrong") rules when academic moves are underway. This is doubly the case for first jobs.

The climate of coastal British Columbia is unlike anything either of us had experienced. It is an understatement to say it rained continuously. We had found a small house to rent at the far eastern end of the metropolitan Vancouver area. The house was in a beautiful setting across from a horse pasture and at the feet of the western slope of a large mountain peak. Storms would blow in from the west and push against that mountain, dropping buckets of rain. The ground was constantly soaked and when the sun would occasionally push through, it would instantly raise an impenetrable fog. And I mean instantly—within a few minutes the pasture and its horses would disappear and a bone chilling vapor would encompass everything. Our two years living in that house was a real-life lesson in physical geography. Ultimately, we became acclimatized to the grey rainy skies and fog, but neither of us really loved it.

My teaching assignment included a large lecture-format introductory course in educational psychology. I also taught courses on classroom management and assessment. My graduate teaching initially focused on research methods and measurement. All of these were more or less staples for educational psychologists, but the courses that were more focused on classroom issues needed someone with real K-12 classroom teaching experience. That was not me and I was woefully mismatched.

I really didn't know how to teach. Stanford had done a terrific job of preparing me to do quality research in education, but it did not prepare me to be an academic. While at Stanford, I had served as a volunteer TA for Rich Shavelson who was teaching an educational psychology course for the Stanford Teacher Education Program. The role of the TAs was to grade the numerous tests that were required because the course was designed on a mastery learning model. And for one year while at Stanford I took an additional job as an instructor at San Mateo Community College, teaching general psychology and child development. California even granted me a lifetime community college teaching credential because I had a M.A. But California didn't care if I knew how to teach, just that I had a graduate degree in the field I was to teach. In both of these previous experiences, I was largely self-taught. Shavelson had each TA present one lecture and his feedback simply verified that I was anxious and ill prepared to teach.

End-of-course evaluations at Simon Fraser provided an opportunity for my students to be frank about what I could and could not do well in class. It was sobering, so I quickly had to learn how to teach, and thankfully, I was able to do so with help from colleagues and a serious consideration of what I was doing. I got better, my student evaluations improved, and I began to think that I could teach and teach well. Simon Fraser University was coming to realize that some instructional training was needed for teaching assistants across the university, and I eventually was recruited by the dean to help out. That effort led to a series of instructional studies (Martin, Marx, Hasell, & Ellis, 1978; Marx, Martin, & Ellis, 1979; Marx, Martin, Hasell, & Ellis, 1978; Winne & Marx, 1980) in higher education, providing me with a deeper understanding of teaching and learning in universities that would become helpful in my later administrative career.

One thing I had learned about myself in graduate school was that I very much preferred working with teams than as a solo scholar. I had a solid personal friendship with Phil Winne who had moved to Simon Fraser with me and we worked well as a research team. There we met Jack Martin, an intensely serious psychologist with a decidedly philosophical bent. Martin was to be the driving force in the creation of a graduate program in counseling that would have more of an instructional than a therapeutic orientation (Martin, 1987). He was joined by Brian Hiebert and later Adam Horvath. I taught a course on instructional psychology for the program and over the years, my collaborations with these three outstanding scholars taught me how my ideas might serve to advance thinking in a field related to classroom teaching and learning. Along the way with these colleagues, I was able to publish in journals that otherwise I would not have considered in my orbit (e.g., *Canadian Counsellor, Biofeedback and Self-Regulation, Journal of Consulting and Clinical Psychology, Canadian Journal of Counselling*).

Collaborations are always challenging, but to be effective they require compromise among participants. Without compromise, such work is not collaborative, it is merely some variation on work-for-hire, even if there is no exchange of money.

It was the mid-1980s that I was beginning to develop a deeper understanding about how personal

approaches to work feed into career trajectories. In my case and as I expressed above, I have found that I very much like to work with others. Collaborations are always challenging, but to be effective they require compromise among participants. Without compromise, such work is not collaborative, it is merely some variation on work-for-hire, even if there is no exchange of money. Common wisdom in the academy is that young researchers should stake out a territory and work to develop a clear voice in that research community. I did that in my very early years as an assistant professor, as I labored on my program of instructional research and studies of teacher thinking. But I found it hard to resist the intellectual companionship of others in my local community, and as our joint work veered in directions away from my main program, a detached observer might think that I had lost my compass. For example, with Adam Horvath I published articles entitled *The development and decay of the working alliance during time-limited counselling* (Horvath & Marx, 1990) and *Thinking about thinking in therapy: An examination of clients' understanding of their therapists' intentions* (Horvath & Marx, 1990). It turns out that this work and others that Horvath and I completed was related to my interest in how teachers make decisions about what to do and with whom to do it. Like teachers, counselors and therapists also need to be flexible in their interactions with their clients. The cognitive aspects of these related helping professions might just share some features, and they just might present similar puzzles in attempts to determine effectiveness for positive student or client outcomes. For career enhancement, the problem is that the journals and the readership of the journals are almost non-overlapping, thus diminishing potential focus for scholarly impact.

Like teachers, counselors and therapists also need to be flexible in their interactions with their clients. The cognitive aspects of these related helping professions might just share some features, and they just might present similar puzzles in attempts to determine effectiveness for positive student or client outcomes.

I worked at Simon Fraser for 15 years, and through most of those years, I had a close collaboration with Phil Winne. Temperamentally, we are very different, but we shared a passion for educational research and a penchant for innovative research methods that energized us both. Without question our shared experience as doctoral students helped us bridge to new work as assistant professors. It was an enormously productive partnership, establishing a solid foundation for my academic career to follow and a lifelong friendship. We published many studies and conceptual chapters. We won grants together and our careers were well on their way. We were both trained in quantitative methods, and we were pretty good at it. In 1979, we were awarded a grant from the then-US National Institute of Education even though we were at a Canadian University (Virginia Richardson, born in Canada, was our program officer—maybe her roots had something to do with our grant).

In one of our studies for that grant, we videotaped lessons and then immediately conducted interviews with the teacher, asking her to stop the tape at any point where she had an intention for students to be thinking in a particular manner. A few minutes later, we selected students from the class and in small groups we played back the sections of the tape the teacher had identified, asking the students: How did your teacher want you to think at this point? The data were qualitative. Neither of us had been trained to analyze such data, but we had learned from reading Ericsson and Simon (1980) that such data were valuable in helping understand cognition in real settings. We typed each verbal turn in all of these interview transcripts onto IBM 80 column computer cards (older readers will

remember these, they are 8.5 in by 4 in and accordion folded with perforated seams). The resulting card dataset must have weighed 50 pounds. We spent an entire summer in empty rooms around the building reading and coming to understand these verbal protocols. Computer-based qualitative analysis systems such as *Nvivo* were not yet available, so we did it all on our own. After that study (Winne & Marx, 1982), I felt more qualified to consider myself a mixed methods researcher.

Sabbaticals are amazing tools to reenergize and reflect.

After receiving tenure, I took my first sabbatical at the University of Arizona. By this time, our second child, Justin, had arrived, and we were looking forward to my first sabbatical and that wonderful opportunity for reinvention that sabbaticals provide. Anne worked on her master's degree in higher education in the College of Education, and David Berliner, who was on the faculty there at the time, offered to put an additional desk in his office for me to use. It was a great year and very productive. Sabbaticals are amazing tools to reenergize and reflect. I did both. Phil and I took the opportunity to finish some papers and reports, and I read in areas that I had not previously, including sociological studies of the classroom. I had read almost exclusively in the educational psychology literature about teaching and classroom learning, and my perspective was too narrow. Berliner asked me to write a piece (Marx, 1983) on student perceptions in the classroom for the *Educational Psychologist,* and I used that opportunity to broaden my understanding of classrooms as learning communities. It would turn out that this new reading would influence my thinking for years to come. In particular, I developed a newer and broader understanding of the contexts that influence teachers and students, including the ways in which participants bring the world into the classroom through their cultures and social backgrounds. I would learn this lesson more completely later in my career when I moved to the University of Arizona and came to understand the brilliant cultural psychology of Luis Moll (Moll, Amanti, Neff, & Gonzalez, 1992).

After returning from sabbatical, I embarked on a study using some of the new frames to understand classrooms (Marx, 1985). But I also took my first job in academic administration, serving as the director of graduate programs in education at Simon Fraser. The work had its rewards (it was my first exposure to an office that had desktop computers, which conveniently were all stolen one night—as it happens by a university security guard!). The Faculty of Education at Simon Fraser does not have departments. At the time it was organized around mission-critical activities: undergraduate, professional, and graduate programs. Directors did not have full department head duties because there were no academic personnel responsibilities, but they did have budgetary authority for their domains. I served in this administrative role for four years, during which time I learned a tremendous amount about how higher education works at the unit level.

At about the time I was thinking about stepping down and returning to a regular faculty role, I was asked to direct a research team for an upcoming British Columbia Royal Commission on Education. In British parliamentary traditions, these independent investigative commissions are charged with writing a report to the government (in this case the British Columbia premier and legislature) about the sector under study. The teachers' union and the conservative government under the Social Credit Party had been in a decade-long open warfare over education policy, and the premier decided it was time to try to cool off the fighting. I was asked to chair the investigative team focusing on the learners in the province's schools. I worked closely with a talented school leader, Terry Grieve, and together we prepared a report for the commission (Marx, Grieve, & Rossner, 1988). We used oral history techniques to interview a carefully selected sample of K-12

students across the province. This turned out to be my second qualitative study, but this one had real policy impact rather than being directed toward an academic audience. We hired a scriptwriter from the CBC, and we used the profiles of students created from the analyses of the oral histories to create portraits of children written in the first person to bring alive the experiences of children in schools. We felt this was a more compelling way to introduce policy makers and the public to schoolchildren than the dry and static use of aggregate data presented in tables and charts. It worked—we had policy impact. One of the results was a regional CBC radio special that I did with that CBC writer called *Growing Up and Going Fast*. It was the most important effort I had had to that time in making research findings available to broader audiences. This experience hooked me for the rest of my career on the importance of making our work relevant and usable to the various publics we serve.

…regional CBC radio special that I did with that CBC writer called *Growing Up and Going Fast*. It was the most important effort I had had to that time in making research findings available to broader audiences. This experience hooked me for the rest of my career on the importance of making our work relevant and usable to the various publics we serve.

As the 1980s drew to a close, I received a call from Phyllis Blumenfeld and Paul Pintrich at the University of Michigan. They knew I had some experience in academic administration, and the School of Education there, under the leadership of their new dean, Cecil Miskel, was undergoing a major restructuring. They were creating a new unit, the Program in Educational Studies, sort of a department, but not quite. Would I be interested in coming to Michigan and serving as the chair for the new unit? I applied, and they hired me, so in the summer of 1990, we sold our house, took our children out of school, and drove to Ann Arbor.

Michigan Years

The impact of the transition from Simon Fraser to the University of Michigan was not unlike the transition from Valley State to Stanford. When I arrived at Simon Fraser in the summer of 1975, the university was celebrating its 10th anniversary. It was the brash new, "peoples" university in distinction to the University of British Columbia across town. UBC was the grand old established university with high social status and authority, and Simon Fraser was open to the masses. Now with my arrival at Michigan, I was again exposed to the power and status of an elite and selective university. But the unique attractions of Michigan were not entirely obvious in the School of Education.

By the mid-1980s, the Michigan School of Education was in trouble. The early 1980s had been witness to rapid inflation and the U.S. economy was unsettled. State cuts to higher education were ravaging campuses across the country and the Michigan Board of Regents had developed a more balanced plan for funding that over time would reduce reliance on state aid and increase revenue from tuition, grants, and philanthropy. A review of the School of Education revealed that it was ill prepared for this new reality, and a serious effort was initiated on campus to decide what to do about the perceived low quality of the graduate program. Yet the history of the university's concern for K-12 education stretched back to 1879, when the university's regents created a chair for the science and art of teaching. This was the first chair in a U.S. university devoted entirely to K-12 education. Abandoning the school of education in the context of that history seemed inappropriate, but the school nonetheless was placed in a sort of receivership with close oversight by the Rackham Graduate School. Carl Berger became a caretaker dean in transition, and in 1988, the school hired Cecil Miskel to serve as dean and remake the school of education.

Clifford and Guthrie's (1990) argument for the importance of education schools in research universities devotes a case study to this story (pp. 210-217).

The first thing Miskel did was to restructure the school from several units to two major programs: higher and adult education, and educational studies. The educational studies program was to be home to all of the P-12 focused instructional and research programs, including teacher education. I was brought to campus to serve as the inaugural chair for educational studies. I served as program chair for eight years. Like my role as director of graduate programs at Simon Fraser, this new role was a bit odd and half-baked. Miskel did not want to create full-fledged departments with all of the bureaucracy that would entail, including the creation of solid walls between units that might stifle collaboration. So again, I was in a leadership role without all of the resources and autonomy that it could provide. Yet, Miskel was a brilliant and courageous leader, and we crafted a working relationship that ultimately would serve the school and the educational studies program well.

To be sure, there were many talented and energetic faculty members at Michigan who would drive the changes that were needed. My first few years were devoted to bringing disparate groups of faculty members together, creating an operational model of governance through program committees and in some cases closing programs and creating others. It turned out that Cecil was right not to create conventional departments. Over my 13 years at Michigan, I had affiliations with four program areas: The Combined Program in Education and Psychology, an interdisciplinary program housed at the School of Education but governed more directly by the Rackham Graduate School; the graduate program in science, mathematics and technology; the graduate program in teaching and teacher education; and the undergraduate teacher education program. I advised students, supervised dissertations, and sat on dissertation committees in all three of the graduate programs, exposing me to many, many talented and even brilliant graduate students. It would have been much more difficult to do that had we been structured by departments and the territory building that comes from such structures.

By the mid-1990s, we had modernized the teacher education program (with leadership from great scholars such as Deborah Ball, Phyllis Blumenfeld, Elizabeth Moje, Helen Harrington, Karen Wixson, and others) and completely revamped our doctoral program with a new Ph.D. and the elimination of the Ed.D. Miskel was a superb faculty recruiter (I was to learn how to do this from him and it served me well later in my career), and soon we would add more amazing faculty to our roster. All of this was oriented toward creating a school of education for which the university would be proud and supportive. In large measure we succeeded, at least as measured through imperfect indices such as *US New and World Report* ratings.

We moved from essentially being a locally focused school to become a nationally and internationally focused school. The upside was our ability to recruit amazing new doctoral students, secure much more federal grants, and rise in ratings. The downside was the challenge to staying connected to K-12 issues and to the wisdom that such connections can afford. This is a perennial challenge for schools and colleges of education at major research universities. Our mission by necessity requires us to conduct research and offer instructional programs to support and lead schools in their endeavor to educate our children. Yet our research and scholarship must pass muster at the highest level of rigor and originality. These are not entirely antagonistic goals, but they must be held in balance through careful, thoughtful, and humble guidance. The middle ground that Miskel tried to navigate was to support research and scholarship that was closely aligned with problems of practice, and to

generate research and development strategies that were both rigorous and useful.

My responsibilities as program chair would be demanding. We had hundreds of students in our programs, a growing stable of grants and contracts, and we were recruiting new faculty to both junior and senior ranks. I am sure Cecil would have been happy if I had done a good job in these arenas. But my view of myself was that I was still a teacher and a researcher, so I was not willing to give up doing that work. Before arriving at Michigan, I had been friends with Phyllis Blumenfeld and Paul Pintrich. We were not close friends, but I knew Phyllis reasonably well and I was beginning to know Paul. I immediately came to know Paul and his amazing strengths. We were both hockey fans and we would spend many nights at Yost arena watching the exciting Michigan hockey team and we would always attend the Great Lakes Invitational Hockey tournament at the Joe Louis Arena in Detroit in Decembers. Paul taught me motivation theory in a way I had not previously understood and together we wrote a review article that would critique conceptual change theory and link it to motivation theory (Pintrich, Marx, & Boyle, 1993). Having conducted research on classroom teaching and learning for so many years, I was knowledgeable about motivation theory, but working with Paul on this piece deepened my understanding that would help in the next phase of my research.

Moving to Michigan for me was like getting to meet an entirely new group of exciting kids on the playground. This move provided me with a new social context for learning and an intense and compelling new network of collaborators. In my first year, as I was navigating my new administrative career, I was to link up with a fabulous group consisting of Phyllis Blumenfeld, Annemarie Palincsar, Joe Krajcik, and Eliot Soloway. We, a group that had just come to know each other a bit, had the chutzpah to apply for a science education center grant through the NSF. Of course, we failed, it should have been self-evident that we would not succeed given our lack of track record as a group. But to the bold go the spoils … eventually. We reworked the conceptual framework for that application and published it in the *Educational Psychologist*. In my first three years at Michigan I was to work with colleagues to produce what would become my two of the three most cited publications in my career. Both the work with Pintrich and with Blumenfeld and colleagues contained the word *motivation* and my education about the link between motivation theory and classroom instruction would be underway.

Paul and I were not to continue a close working relationship after that paper, but my work with Blumenfeld and others was a different story altogether. I was not exactly sure where we were headed, but it was clear that the Blumenfeld, Krajcik, Soloway, and Marx team (sounds a bit like a real estate sales group) contained some magic. A year after our failed center grant application, Phyllis returned from a trip to Washington D.C. saying that she had found an NSF grant competition that we ought to try. We did, and the resulting project, *Enhancement of Project-Based Science*, was the catalyst that

sparked a run of research and development that, for me, was breathtaking.

From winning that first grant until I left Michigan in 2003, we had a wonderful, productive and fulfilling collaboration. We were working on middle school science education reform, at least as reform was defined during the 1990s by the investments NSF was making in state, regional, and urban STEM reform. Joe Krajcik is a visionary science educator and Eliot Soloway is a creative, almost frenetic computer scientist. Along with Blumenfeld and I as psychologists, we undertook an ambitious R & D agenda. That first grant was to build a technology-based teacher professional development model to support project-based learning in science. We thought we could work with teachers to create local curriculum. We learned that, although some teachers could develop useable curriculum materials, the demands of teachers' work left little time for even gifted teachers to do the extra work needed to develop materials that were congruent with the theories underlying project-based learning, infused with sound science content, and capable of use in other teachers' classrooms.

Pursuing that project, along with Joe's connections among the science education community in Michigan, led us to Detroit Public Schools and what was to turn out to be a powerful collaboration with Juanita Clay-Chambers, at the time a science curriculum coordinator, and who eventually would rise to become the chief academic officer of the district. Juanita was an amazing urban educator with courage, wisdom, and political knowhow. Eventually, we would craft a collaboration in which Juanita would win grants with subcontracts to our team at Michigan, and we would win grants with subcontracts to her team in Detroit. We built an infrastructure of people and relationships that would last a decade or more. At one point, we had leased a fleet of half a dozen cars from the UM motor pool for our team to make the daily trek from Ann Arbor to Detroit. We even succeeded in having one of our cars stolen from a parking lot at one of Detroit's high schools.

Eliot named his group in computer science the Center for Highly Interactive Computing in Education (hi-ce) and we took that name for our group. It was a clever idea and at least in our early years, we had a strong focus on technology use in science education. As we came to appreciate what was needed to understand how technology enhanced science education reform might operate in schools, we formed an agenda around a number of related topics: technology development, curriculum development, assessment, teacher professional development, literacy, and management and policy. This expanded agenda was enabled by additional faculty who collaborated with us on various projects. Some (e.g., Bob Bain, Betsy Davis, Elizabeth Moje) affiliated with us for defined projects. Others, (e.g., Barry Fishman) joined us for more extended efforts. Collectively, we were able to activate a "big science" approach to educational research in urban settings.

As we progressed in our ideas and took on a more ambitious R & D agenda, we returned to the idea of a center grant. In this case, we joined forces with a talented group at Northwestern University that included Louis Gomez, Brian Reiser and Danny Edelson. Together we would link two strong research universities (Northwestern and Michigan) to their nearby urban school districts (Chicago and Detroit Public Schools). We named our effort the Center for Learning Technologies in Urban Schools (LeTUS—yes, it is pronounced *lettuce*).

Through our work in hi-ce and LeTUS, we learned a new way of managing the trajectory of our work. I had been a reasonably productive educational researcher up to my engagement with our Michigan team, managing the flow of work like most mid-career scholars in education. I had a set of ideas that animated the flow of work, applying for grants from time-to-time and directing some dissertations that would fill in some of the gaps in the work.

Occasionally, I would be asked to write a chapter for someone's edited book and I would submit manuscripts to journals, carefully picking these journals to ensure the right audience for my work. This workload generally followed an intended sequence of studies, one emerging from another as my understanding grew. And, of course, because I liked to work collaboratively, I would take detours into related areas of research that would enliven my intellectual life and provide access to new and different ideas.

Our new approach was very different, emerging from the ebb and flow of work toward our ultimate educational goals, rather than from the design of specific and separate studies. Our goal was to try and understand how to enable students in urban districts—code for minoritized kids living in poverty—to get access to and success with ambitious science curriculum. What we were trying to do was to help poor kids of color gain access to the ambitious curriculum of the richer social strata of our highly stratified and inequitable country. We were not social justice researchers, but our work was in many ways highly consistent with the goals of social justice researchers (Cammarota, 2007).

What is important to understand here is that our agenda took on a very applied nature. We took our research questions from problems and challenges of educational practice. In order to achieve this goal, we needed to address what we thought was the full range of issues that enabled or constrained success. We learned two important lessons.

First, to be true to our goals, we needed a form of collaborative work that was just then emerging in educational research. We were not just academics doing a few studies. We were partners in an ambitious project. The constraints we were encountering led us to a number of realizations. One was that we would have to craft our research and development agenda in collaboration with our colleagues in the schools. To do that, we needed a new language and a new set of social arrangements to proceed. And we needed more than a strong dose of humility. We established new roles that would help facilitate work between the disparate cultures of the academy and the K-12 district. We created a role for a full-time research coordinator at the university (Steve Best) and the district created a parallel role for a full-time research coordinator (Deborah Peek-Brown). Working together, these two effective professionals would manage the flow of work between and among the many actors (at the university--faculty, post-docs, graduate students, professional staff; in the district—central office administrators, principals, teachers) engaged in our projects. As you might imagine, the logistics of this work were complicated and formidable, and we needed an efficient and economical approach to coordinate calendars and facilitate communications among the various actors and locations. We also needed working collaborations for people to meet and get their work done. That fleet of cars proved useful as we travelled up and down I-94 between Detroit and Ann Arbor (videoconferencing was in its infancy and not yet robust enough for extended collaborations, particularly with the school district where the infrastructure was not adequate). Meetings seemed interminable, but they were necessary to ensure communications flowed well and we addressed misunderstandings before they grew disruptive. All of this needed to rest on a foundation of trust that required honesty and a commitment to drop defenses when the inevitable conflicts arose. Obviously, developing trust took time and deliberate effort.

Our agenda took on a very applied nature. We took our research questions from problems and challenges of educational practice.

Second, we could not simply do studies that investigated one or two variables at a time. We needed a research methodology

that aligned with the rough-and-tumble of work in real classrooms embedded in neighborhood schools that worked within the political and policy world of an urban school district. We came to design research methodology as it was developing in response to similar realizations of other researchers (Kelly, 2004; Kelly, Lesh, & Baek, 2014). We needed a research and development agenda that would ultimately come to reveal understandings about a range of issues: instruction, curriculum development, literacy, technology, assessment, and management and policy. To craft a strategy to communicate our work to the scholarly community, we would have to parse the work into manageable pieces. We had designed a continuous system of data collection about, for example, teachers and teaching, curriculum design and implementation, technology design and use (including infrastructure needed in the schools), student learning and motivation, how literacy issues supported student learning through inquiry, and school management issues that arose in the course of the work. Ultimately, we would package the data to answer specific questions, but we rarely designed individual studies for these questions; they were addressed through this process of parsing our very large and growing data set. The exception was dissertations for which students would design their own studies in the context of the larger project. We presented talks at conferences and published papers on all of these topics, selecting meetings, journals and books that would reach the sometime disparate audiences for our research. Table 1 shows examples of these publications by topic and the books and journals in which they appeared. I include here only publications for which I was an author; there were many more.

The publications in Table 1 and the many more that our group produced certainly made important contributions to the field. I did a Google Scholar search in April, 2019 for the term "project-based learning." In the decade prior to our work (1980-1989) there were 123 hits, but 30 years later in the decade from 2010-2019 there were 27,000. To be sure, many others conducted research in this arena, and there was a more general attraction to the idea across K-12 education (Larimer, Mergendoller, & Boss, 2015). Without question, however, the work our group did from about 1990 until 2003 or so was very productive. In addition to our more customary scholarship, we educated scores of teachers in Detroit and Chicago in inquiry-based teaching of science and we informed many administrators of the value that these approaches to teaching could provide their students. Some of our teaching cadre moved into leadership positions (one even became interim superintendent many years later in Detroit). Many more students passed the high-stakes science assessment used in Michigan at the time (Geier et al., 2004). Several of our curriculum units were later to be published for more general use in middle schools around the country.

I learned from this work that educational researchers have an ethical obligation to the participants in our research. To me, this obligation is more than the formalized ethics of our field or to the now cumbersome and bureaucratized process of institutional review boards. I came to believe that participants should be able to benefit from their hard work in collaboration with us. They are not "subjects," they are colleagues. Whether they are students in schools, teachers in classrooms, or administrators in offices, they all must be committed to the benefits that a good education affords, and our obligation to them is to advance that agenda.

I served the role of educational studies program chair for eight years, and then in 1998 Cecil stepped down as dean. We had a great working relationship, and I had little interest in trying to reconstruct that with a new dean, so I stepped down from my chair role at the same time. I spent the next five years at Michigan working on hi-ce and LeTUS projects, and new ones that our group developed. Some of my colleagues at

Michigan suggested I stand for the dean position after Cecil stepped down, but I needed to regenerate energy after my eight years in administration. But by 2002 or so, I began to reconsider, and when I saw the dean's job open at the University of Arizona, I decided to apply. Anne, a native Californian, had grown tired of midwestern weather and the endlessly flat landscape and was eager to return to the west. We had spent a year in Tucson when Anne worked

Table 1

Some Publications from the Project-Based Science Research Project

Topic	Citation
Curriculum	• Marx, & Freeman, 1996, *Sourcebook for Watershed Education* • Krajcik, Blumenfeld, Marx, & Soloway, 1999, *Inquiry into Inquiry: Science Learning and Teaching* • Singer, Marx, Krajcik, & Clay Chambers, 2000, *Educational Psychologist* • Mamlok-Namman, Dershimer, Fortus, Krajick, & Marx, 2005, *Making it Relevant: Context Based Learning of Science* • Blumenfeld, Marx, & Harris, 2006, *Handbook of Child Psychology* • Marx, 2008, *Elementary School Journal* • Harris, Marx, & Blumenfeld, 2008, *21st Century Learning: A Reference Handbook* • Harris, & Marx, 2009, *Psychology of Classroom Learning: An Encyclopedia* • Harris, & Marx, 2010, *Better Evidence-Based Education*
Teaching	• Krajcik, Blumenfeld, Marx, & Soloway, 1994, *Elementary School Journal* • Blumenfled, Krajcik, Marx, Soloway, 1994, *Elementary School Journal* • Marx, Blumenfeld, Krajcik, Blunk, Crawford, Kelly, & Mills, 1994, *Elementary School Journal* • Blumenfeld, Marx, Patrick, Krajcik, & Soloway, 1997, *International Handbook of Teachers and Teaching* • Marx, Freeman, Krajcik, & Blumenfeld, 1998, *International Handbook of Science Education* • Blumenfeld, Krajcik, Marx, & Soloway, 2000, *New Teachers for a New Century* • Best, Fishman, Marx, & Foster, 2000, *Proceedings of the Society for Information Technology in Teacher Education* • Best, Marx, Fishman, & Peek-Brown. 2000, *Proceedings of the Society for Information Technology in Teacher Education* • Margerum-Leys, & Marx, 2002, *Journal of Teacher Education* • Margerum-Leys, & Marx, 2002, *Journal of Educational Computing Research* • Kubitskey, Fishman & Marx 2002, *Proceedings of the International Conference of the Learning Sciences* • Brunvand, Fishman, Marx, & Maybaum, 2002, *Proceedings of the International Conference of the Learning Sciences* • Fishman, Marx, Best, & Tal, 2003, *Teaching and Teacher Education* • Margerum-Leys, & Marx, 2004, *Journal of Teacher Education* • Brunvand, Fishman, & Marx, 2005, *Association of Teacher Educators, Yearbook XII*
Technology	• Soloway, Krajcik, Blumenfeld, & Marx, 1996, *CSCL: Theory and Practice of an Emerging Paradigm* • Krajcik, Soloway, Blumenfeld, Marx, Ladewski, Bos, & Hayes, 1996, *Journal of Computing in Mathematics and Science Teaching* • Krajcik, Soloway, Blumenfeld, & Marx, 1998, *ASCD Yearbook: Learning and Technology* • Marx, Blumenfeld, Krajcik, & Soloway, 1998, *Teaching and Teacher Education*

	• Soloway, Norris, Blumenfeld, Fishman, Krajcik, & Marx, 2000, *Communications of the ACM* • Singer, Krajcik, & Marx 2000, *Proceedings of the Fourth International Conference of the Learning Sciences* • Soloway, Norris, Curtis, Jansen, Krajcik, Marx, Fishman, & Blumenfeld, 2001, *Learning and Leading with Technology* • Soloway, Norris, Blumenfeld, Fishman, Krajcik, & Marx, 2001, *Communications of the ACM* • Fishman, Kupperman, Marx, & Soloway, 2001, *Journal of Educational Computing Research* • Fishman, Marx, Blumeneld, Krajcik, & Soloway, 2003, *Journal of the Learning Sciences*
Literacy	• Moje, Collazo, Carrillo, & Marx, 2001, *Journal of Research in Science Teaching* • Moje, Peek-Brown, Sutherland, Marx, Blumenfeld, & Krajcik, 2004, *Bridging the Literacy Achievement Gap*
Management/ Policy	• Marx, Blumenfeld, Krajcik, & Soloway, 1996, *Educational Researcher* • Marx, 2000, *Educational Psychologist* • Blumenfeld, Marx, Krajcik, Fishman, & Soloway, 2000, *Educational Psychologist* • Marx, & Harris, 2006, *Elementary School Journal* • Bowyer, Gerard, & Marx, 2008, *Designing Coherent Science Education* • Marx, 2012, *Journal of Research in Science Teaching*
Learning	• Blumenfeld, Soloway, Marx, Krajcik, Guzdial, & Palincsar, 1991, *Educational Psychologist* • Blumenfeld, Marx, Krajcik, & Soloway, 1996, *Elementary School Journal* • Krajcik, Blumenfeld, Marx, Bass, Fredricks, & Soloway, 1998, *Journal of the Learning Sciences* • Crawford, Marx, & Krajcik, 1999, *Science Education* • Schneider, Krajcik, Marx, & Soloway, 2002, *Journal of Research in Science Teaching* • Fortus, Dershimer, Krajcik, Marx, & Mamlock-Naaman, 2004, *Journal of Research in Science Teaching* • Marx, Blumenfeld, Krajcik, Fishman, Soloway, & Geier, 2004, *Journal of Research in Science Teaching* • Geier, Blumenfeld, Marx, Krajcik, Fishman, & Soloway, 2004, *Proceedings of the Sixth International Conference of the Learning Sciences* • McNeil, Lissotte, Krajcik, & Marx, 2006, *Journal of the Learning Sciences* • Geier, Blumenfeld, Marx, Krajcik, Fishman & Soloway, 2008, *Journal of Research in Science Teaching*
Assessment	• Harris, McNeill, Lizotte, Marx, & Krajcik, 2006, *Assessment in Science: Practical Experiences and Educational Research* • Kubitskey, Fishman, Margerum-Leys, Fogleman, Brunvand, & Marx, 2006, *Assessment in Science: Practical Experiences and Educational Research*

on her master's degree and we knew we liked the region and appreciated the desert lifestyle. And I began itching to find new colleagues to learn from.

Arizona Years

In my years at Michigan I helped Cecil Miskel navigate a turn-around in the School of Education and I learned more than a little from that experience. I had heard that the College of Education at the University of Arizona had experienced a series of challenges and was not on a positive trajectory. Cecil and I had recruited Gary Fenstermacher, who had once served as dean at Arizona, and Virginia Richardson

(the same Virginia Richardson who had supported my first large grant with Phil Winne many years previously). Gary had even written a short chapter about his difficulties and challenges at Arizona (Fenstermacher, 1995). After I accepted the Arizona job, I talked with Gary and he assured me that I could be successful there. So, although I had a preview of the challenges that awaited me in Tucson, I was ready to take them on.

I opened this article with a comment about learning from failure and how, if you don't learn from the failure, you experience a double failure. I had ample opportunities to confront that very experience in my 14 years as dean. Deans of education have a tricky job. At large, research intensive universities like Michigan and Arizona, it is uncommon for the ed school to have power and prestige. Even ed schools that are very successful at grants and contracts pale in comparison to the medical, science, and engineering colleges. Moreover, as conventional higher education-based teacher education has lost ground to alternative certification routes and in the wake of the great recession, enrollments in teacher education have dropped (Sutcher, Darling-Hammond, & Carver-Thomas, 2016). These trends jeopardize the instructional mission of ed schools. Although all presidents of these universities on occasion will speak to the importance of the ed schools and the role they play in serving the P-12 education mission of their states and regions, at the end of the day the status hierarchy in the broader society is inherited by the university in its status system. The status and prestige of teachers lies in the middle of the pack, well below high status professionals like physicians, lawyers, physicists and astronomers, and engineers, but higher than social workers and librarians (Dolton & Marcenaro-Gutierrez, 2011; Ingersoll & Collins, 2018). In my mind, entering a leadership role in an ed school unarmed with this understanding of how social status operates is a recipe for disaster.

Perhaps this all sounds like a buzz-kill, but as a leader of an ed school, not understanding the realities of campus power and politics can easily lead a dean to ruin, and in the wake of that ruin, disruption and stress on the faculty, students, and staff of the unit. Thus, dispassionate observation is a necessity, and planful and strategic engagement is a requirement. Here I don't necessarily mean strategic planning in a conventional sense, although that might be useful given the infatuation central administrators have with business models as approaches to university management. I mean strategic in the sense of having a clear vision for what an ed school can and should do, and how our research, teaching and service missions can engage that vision. Perhaps most importantly, such an understanding also enables foresight in faculty recruitment and retention. Talent is essential.

Marx (pictured bottom left) surrounded by family

I arrived on campus in late summer 2003. The college had been led by an interim dean

for two years, following the step-down of the previous dean amid much conflict and rancor among the faculty and staff. There was an associate dean for academic affairs, who was willing to serve for my first semester and then return to her faculty role, and an assistant dean for teacher education. The dean's office staffing was lean and I had no idea how to staff it in any other way. I was to figure out all of that later. To begin, I met with all the departments and for the first couple of months, I would wake up early and every morning read a faculty dossier and an article or two (some faculty members had no recent article for me to read—a clear sign that something was amiss). By October I was familiar with the strengths and weaknesses of the faculty.

I needed a permanent associate dean, so I asked every tenure line faculty member who that should be. The overwhelming consensus was that it should be Luis Moll. Given his remarkable scholarly career, I doubted that he would be interested, but he was and I announced his appointment. That was followed within a few days by a call from the VP for human resources. "What did you do to make the decision for selecting your associate dean?" she asked. I told her what I did and then asked why she was asking, and more importantly, why was it her business. It turns out there were rules about how to go about this process, and what I did was not by the book, although at least it met the spirit of the policy. There had been a complaint that I was acting autocratically and was not engaging in a spirit of shared governance. The complaint came from someone who wanted the job, but not one faculty member I talked with mentioned that faculty member as a possibility—other than that particular faculty member. This was my first of thousands of run-ins with odd and arcane bureaucratic mechanisms I didn't like.

I learned very quickly that, when someone told me that I could or could not do something because there was a rule, I would ask them who owned that rule. Was it a department, college, provost, president, regents, or state rule? It turns out that many, many rules are the result of some practice or policy from the distant past and no one can remember its origin. Some are practices initiated by someone not in a policy making role, who simply has their own opinion of how things ought to operate and enough local power to make it happen. My first few years on the job was a constant search for old and idea-killing rules that I would discard with satisfaction.

After a couple months on the job, I discovered that the basement of the building was occupied by graduate students from the department of astronomy and administrators from something everyone called the "racetrack program." (It so happens that the racetrack program at Arizona is rather important, with one of its graduates, Bob Baffert, training triple crown winners in 2015 and 2018.) The astronomy students had a large room that they had filled with cots, tables, sofas, refrigerators, and other signs of homesteading. I wanted that space and they didn't seem to need it. I wasn't entirely sure what was happening in that room, but it was not occupied by the computers and fancy monitors I thought were astronomers' standard issue. The racetrack program turned out to be an outreach program from the College of Agriculture and Life Sciences, whose closest building was across campus. Eventually I was able to evict my tenants, but not before the university's director of real estate was to tell me that I was not in charge. "But at Michigan, deans controlled space in their buildings," I said. "Not here! Welcome to Arizona," she replied. It turns out authority and responsibility are not universally aligned in higher education leadership. Context matters enormously, a lesson Luis Moll was to teach me repeatedly. For effective leadership, deans need to learn the local parameters of authority, and if need be, work to change these parameters in order to provide a foundation for success.

Over my 14 years as dean of education at Arizona, I made many mistakes. My sense

is that mistakes and good decisions are positively correlated, not negatively correlated. The more times you actually make actionable decisions, the higher the chances are that they will be wrong as well as right. People who try to be right all the time will be paralyzed into indecision, which is a bad attribute for leadership. I learned to care little about mistakes. Just apologize and move on. However, I was to encounter two major failures. The lessons learned from these failures stand out in relief from the many ups and downs of my academic life. Both came from efforts to reach farther than the resources and talents that I had available.

The first of these failures came from discussions I had with a philanthropist in our city. He had enormous success in his life as a real estate developer and, active in his church and the county interfaith council, he had opportunity at a time prior to my arrival to listen to a lecture by the dean of MIT's Sloan School of Management. The dean's message was that those who have enjoyed success in life have an obligation to pay back, and P-12 education was key to a region's success. Bill Estes, whose wife was an alum of the UA college of education, understood the value of a good education. He had read an article in the *New York Times* that claimed charter schools in New York that were affiliated with universities were more successful than non-university affiliated charters. He approached the dean of science and me to see if we would be interested in collaborating on such a venture if he provided the necessary funding. We agreed and the Wildcat School was born.

As fate would have it, Bill suffered a brain aneurism before the school opened, and although he lived for another couple years, he was not able to work on the project. The CFO from his firm stayed active and provided financial support, but our challenges were ultimately to prove insurmountable. The dean of science participated for a period, but soon lost interest and withdrew. I was to take substantial criticism for this effort from the district superintendents in our region, although I was able to survive the criticism and maintain good working relationships with them.

We learned a lot about the underbelly of charter school operation. In Arizona, there are a number of "successful" charter schools and charter systems. Arizona charter schools are not permitted by law to reject students who wished to enroll. If demand exceeds supply, students are admitted through wait lists or lotteries. But it was common knowledge around town that in some charters, parents of weaker students were advised that their student would not likely succeed, and if they chose to enroll, additional support and resources were not provided to enable success. Students would then transfer to nearby district schools. Thus, as a friend once put it, "they fired the students, not the teachers."

My sense is that mistakes and good decisions are positively correlated, not negatively correlated. The more times you actually make actionable decisions, the higher the chances are that they will be wrong as well as right.

We decided to try and focus our programs on traditionally underserved students, and our special education and school psychology program at the university helped us with services so we could help. Few charter schools provided any special education, so before long we had a disproportionately large special education population. Moreover, in Arizona, students are given a 10-day suspension in advance of expulsion for a serious misbehavior. They can transfer during that ten-day period and the receiving school is required to accept them if it has room. But if they are expelled, the receiving school has the option of not enrolling them. As a consequence, families of children with serious conduct and behavior disorders move their students prior to the expulsion order so they can remain in school. Our charter school soon had a large

number of such students who created a challenging and sometimes chaotic setting. At the end of the day, this is no excuse. We should have been more successful, but we never could quite manage to do it well, and we closed. My superintendent friends were not shy in telling me that they had told me so!

My second major failure was an applied research project made possible by a voter-initiative in early childhood health and development. In the mid-2000s a statewide ballot initiative to support early child development gained energy and support. I talked with the prime mover behind the initiative about what I thought the role might be for the colleges of education at the three state universities (University of Arizona, Northern Arizona University, and Arizona State University). The initiative would be structured in a highly decentralized manner with over 30 regional policy councils making decisions about local program priorities in the context of a state-wide set of goals. With that structure, I suggested that a primary university role might be research and evaluation services. The initiative, to be funded by a tax of $.80 on packages of tobacco products, was supported by the voters and a new state bureaucracy was created with its own funding source independent of the state legislature.

I assembled a team of researchers and evaluators across the three universities and we wrote a proposal in response to their single-source, non-competitive RFP. They did not want us to propose evaluation designs for their program components, but rather they wanted us to do two things. First was a biennial assessment of school readiness among 5-year-old children, using a cross-sectional sampling design. The second, and much more expensive, was to be a longitudinal design beginning a couple years after their programming began, to assess the long-term effects of system inputs. It was a monumental effort, requiring assessment teams across the state in order to sample regions and to engage the three universities, with the University of Arizona as the hub.

The Board was never entirely happy with the way the work unfolded, particularly after they received our report from our first round of the readiness study (Marx, Yaden et al., 2010; Yaden et al., 2011). Arizona is a poor state (median state household income about 80% of the national median) with majority-minority demographics (larger populations of Latinx and Native American children and smaller populations of Black children relative to other states) in the years from birth to kindergarten entry. Arizona is likely to become majority-minority sometime in the next decade, almost a generation earlier than the entire country. We have abundant evidence that poverty and minoritized status are associated with poorer developmental trajectories in early childhood, and the Board expected to see dismal data when we submitted our report. To be sure, we found some alarming data in certain areas but, overall, our findings did not paint a terrible situation. The board and the agency leadership simply did not believe our findings, even though our sampling design produced a good representation of the young children in the state. As the executive director put it, "Did you only assess kids in Scottsdale?" (Scottsdale is a highly affluent community east of Phoenix.) We suspected later that the political argument for the initiative, based as it was on our poor state economy and a need to save the children, needed data that were more alarming than we had presented. We had run into a political buzz saw, and we did so unaware that it was coming.

To be sure, we had our own problems. This was a huge effort, operating as we were across the state with faculty from three universities and data collection teams working in regions. The board wanted us to start data collection as soon as they funded us, and we had little time to develop a very large, server-based relational database needed to run the entire enterprise. It was a management nightmare and without question we made some huge mistakes.

Ultimately, they did not continue funding us. Some of us have been mining those data, so they did not go entirely unused. Our interdisciplinary team (Chris Cutshaw, public health; Adriana Cimetta, quantitative methods and program evaluation; and David Yaden, early literacy) has used these data in a manner not unlike how researchers use some of the nation's large early childhood data sets (Barbu, Marx, Yaden, & Levine-Donnerstein, 2015; Barbu, Yaden, Levine-Donnerstein, & Marx, 2015; Cimetta, Marx, Yaden, Alkhadim, & Cutshaw, 2017; Holliday, Cimetta, Cutshaw, Yaden, & Marx, 2014; Yaden, Marx, Cimetta, Alkhadim, & Cutshaw, 2017). But the project never developed into the early childhood research engine we had hoped.

In retrospect, we ought to have pushed back on the agency's insistence that we get started immediately. We needed at least a year or even more to build the infrastructure for data systems, management, communications, staff training, and quality control. But our hubris blinded us to our limitations. After all, I had served in a number of administrative and academic leadership positions and was not without competence. I was the dean of a college with $30M annual expenditures, so surely, I could handle this added piece. But I was wrong about what we could accomplish and what steps needed to be taken in what order for us to succeed. None of my colleagues told me I was wrong, we were wrong. This failure was again a demonstration of overreach—attempting to do more than my colleagues and I were capable of doing.

Perhaps I am focusing too much on these two failures, but I do so with a very clear purpose. An academic life stretching over five decades cannot be full only of successes. All of us make mistakes. It is not in our nature as humans to expose them to an audience larger than the original witnesses, but generally we are pleased to reveal our successes to all who might listen. Thus, we get an unbalanced view of a career, and I was asked to write a discussion of how I might have accrued some wisdom. To be frank, I have learned as much, maybe more, from failures as successes. We know that publication bias toward positive results can skew a balanced accounting of progress in academic research (Begg, 1994; De Bruin, Treccani, & Della Sala, 2015). Publication bias, often referred to as the file drawer problem, occurs when findings that are not statistically significant tend not to be published (they are put in the file drawer), with journal reviewers and editors preferring to publish studies that show statistically significant results (Franco, Malhotra, & Simonovits, 2014). Failures in one's career are analogous to publication bias because we are prone to want to file away those failures. Thus, an academic memoir that does not balance descriptions of success with failures is the equivalent to publishing only studies with confirming results.

My years as a dean allowed me to revisit my early flirtation with policy-oriented research when I worked on the Royal Commission on Education in British Columbia. As a dean I was not to engage in policy research as much as I was able to sit at the table in the actual creation of policy or the development of regulatory mechanisms that flow from policy. I was motivated to do this because I learned from Jane West, former vice-president at the American Association of Colleges for Teacher Education, that "if you are not at the table, you will be on the menu." I was able to work with both democratic (Janet Napolitano) and republican (Jan Brewer) governors on policy and regulatory language regarding teacher labor force and evaluation issues. I was a member of the Negotiated Rules Committee for Titles II and IV of the Higher Education Act during the Obama presidency (a singularly frustrating committee assignment).

My one attempt at policy related research while at Arizona resulted from a highly visible fight between our state school superintendent and the Tucson Unified School District over the district's Mexican American Studies Program. The state superintendent hated the program, even to

the extent of calling a press conference on the sidewalk opposite the school district offices to condemn the program. (He was a master at political theater.) He managed to convince the legislature to pass a bill that focused only on this program and essentially ban it altogether. With three terrific colleagues in higher education (Nolan Cabrera, Jeff Milem, and Ozan Jaquette), we were able to access archival data for several cohorts of students from the district to determine if there was a relationship between program participation and later academic success. We were able to answer those questions affirmatively and presented papers at national research conferences and published in a national journal (Cabrera, Milem, Jaquette, & Marx, 2014). The findings from that research were ultimately to be used in a victorious court challenge to the legitimacy of the legislation.

If you are so inclined and like to work with others, find collaborators and proceed. You will learn much, you will find the need to negotiate and compromise, and you will have an opportunity to leverage your contributions beyond what you might imagine.

I learned the importance of advocating for education causes in my region and worked with partners from business groups to community foundations to support educational change. In Tucson I helped form a non-profit, Tucson Values Teachers (https://www.tucsonvaluesteachers.org/), to help recruit, reward, and retain teachers. I also helped to establish a networked improvement community that is a local affiliate of Strive Together (https://www.strivetogether.org/) called the Pima Cradle to Career initiative (https://www.c2cpima.org/). This work was highly collaborative with business organizations like the Southern Arizona Leadership Council and the Tucson Metropolitan Chamber of Commerce, that understood the importance of quality P-12 education for our community and were willing to work with academics like me to help make that happen. Back in the 1980s and 1990s when I was hard at work on building and sustaining my research program, I would never had imagined partnerships like these later in my career.

As I approached the 2016/17 academic year, it became clear to me that 14 years as dean was plenty, and I told the provost that I would step down at the end of the year. I did exactly that and Anne retired from her career in academic administration. We took a year's sabbatical, and I now am living the life as an academic once more. I teach undergraduates again after about 20 years away from such teaching. It is challenging and a lot different than it was nearly a generation earlier. I teach an undergraduate course face-to-face in the fall and on-line in the spring, so I am learning how to teach in a setting that did not exist the last time I taught undergraduates at Michigan.

Conclusion

I began with an effort to avoid the hubris that is possible when writing about one's self. I feel the need to reiterate that injunction after taking you through this abridged journey of my life. How does one reduce the lessons of about a half century of academic life to a few jottings at the conclusion of the tale?

It is true that I am committed to a life of social learning. I have enjoyed the benefits of distributed cognition, of learning from others as we tried to accomplish more than we could as individuals. So, one lesson is that, if you are so inclined and like to work with others, find collaborators and proceed. You will learn much, you will find the need to negotiate and compromise, and you will have an opportunity to leverage your contributions beyond what you might imagine.

You might think about stretching yourself beyond what you think you might be able to accomplish. If all we did was to attempt tasks that we know in advance we can accomplish, I doubt we would learn much that is interesting or new. Such a safe and restricted life of the mind seems ordinary and not worth the effort. I wrote earlier that "to the bold go the spoils … eventually." That might not be entirely true because, as you have seen, there is also the chance of failure. So sometimes to the bold goes disaster. Thus, risk is inherent in being bold. We all have our own threshold for risk. Some worry excessively at the start of an enterprise, others seems hardly to show concern. Measure your own risk tolerance as best you can, and then add a standard error or two before you embark. The consequence of over-concern is mediocracy.

Education scholarship is about helping us understand and improve the education enterprise. Individuals can choose to work only on the understanding goal, but the field cannot.

You have seen that I moved universities every 15 years or so. It is potentially disruptive to your family when you do that. When Anne and I made our move from Simon Fraser to Michigan our daughter was entering 10th grade and our son entering fifth grade. They hated us for that move. But all was well in the end. The two moves we made had great positive impact on Anne's career. Over time, the effects of our moves were to re-energize my career and more importantly, expose me to new learning that most assuredly would not have been possible had I not moved. That said, one never knows really what the outcome might be. More risk, to be sure.

When we moved to Michigan, I became more engaged in matters outside the academic life. This was to be magnified once I became a dean and served for as long as I did. I became involved in civic affairs as I negotiated the potential engagement of a college of education with its local community. I developed an appetite for impact.

I learned that when wandering around a social engagement with an adult beverage in hand, people wonder who you are. "What do you do?" they ask. "I am a professor of education," I reply. They immediately want to know why the American education system is the way it is. "We have a lousy education system!" they proclaim. "Why is that so and what are you going to do about it? You're a professor of education. Is it your fault, the fault of your colleagues, and the terrible teacher education programs you folks operate?" When first accosted this way, my response was defensive. "It is not so simple" I say, and then recite this or that finding from research or this theory or that theory that attempts to explain some part of the issue. I am an academic I would think. I don't run the schools. Other people do that.

After a while, I came to realize that these folks have a valid point. I work at a public university and in Arizona, faculty at the public universities are state employees. So, I learned to embrace the need for civic engagement. I urge you to think about that as you march along in your career. Education scholarship is about helping us understand and improve the education enterprise. Individuals can choose to work only on the understanding goal, but the field cannot. And if too many education scholars choose not to embrace the improvement goal, the field suffers and flirts with irrelevancy. Thankfully, education researchers are coming to realize the need for relevancy, and the field is moving positively toward research and theory that can help.

References

Barbu, O. C., Marx, R. W., Yaden, Jr. D. B., & Levine-Donnerstein, D. (2015). Measuring approaches to learning in preschoolers: Validating the structure of an instrument for teachers and parents. *Education 3-13: International Journal of Primary, Elementary, and Early Years Education. 44*(6), 698-714.

Barbu, O. C., Yaden, Jr. D. B., Levine-Donnerstein, D., & Marx, R. W. (2015). Assessing approaches to learning in school readiness: Comparing the *Devereux Early Childhood Assessment* to an early learning standards-based measure. *AREA Open*, *1*(3). https://doi.org/2332858415593923.

Begg, C. B. (1994). Publication bias. In H. Cooper & L. V. Hedges (Eds.), *The handbook of research synthesis* (pp. 299-409. Russell Sage Foundation.

Best, S., Fishman, B., Marx, R. W., & Foster, J. (2000). Comprehensive professional development reform efforts: Changing attitudes and practices about pedagogy and technology for science teachers with diverse needs. In D. A. Willis, J. D. Price & J. Willis (Eds.). *Proceedings of the Society for Information Technology in Teacher Education*, Charlottesville, VA: Association for the Advancement of Computing in Education.

Best, S., Marx, R. W., Fishman, B., & Peek-Brown, D. (2000). Professional development for systemic change: A strategic approach to scaling educational reform through professional development programs. In D. A. Willis, J. D. Price & J. Willis (Eds.). *Proceedings of the Society for Information Technology in Teacher Education,* Charlottesville, VA: Association for the Advancement of Computing in Education.

Blumenfeld, P., Krajcik, J. S., Marx, R. W., & Soloway, E. (1994). Lessons learned: A collaborative model for helping teachers learn project-based instruction. *Elementary School Journal*, *94*, 539-551.

Blumenfeld, P., Krajcik, J., Marx, R. W., & Soloway, E. (2000). Promising new instructional practices. In *New teachers for a new century* (pp. 47-78). San Francisco: McCutchan.

Blumenfeld, P. C., & Marx, R. W. (1997). Motivation and cognition. In H. J. Walberg & G. D. Haertel (Eds.), *Educational psychology: Effective practices and policies* (pp. 79-106). Berkeley, CA: McCutchan Publishers.

Blumenfeld, P., Marx, R. W., & Harris, C. (2006). Learning environments. In W. Damon, R. Lerner, A, Renninger, & I. E. Sigel (Eds.). *Handbook of child* psychology (6th Ed.) V. 4: Child psychology in practice (pp. 297-342). Hoboken, NJ: Wiley.

Blumenfeld, P., Marx, R. W., Krajcik, J., Fishman, B. & Soloway, E. (2000). Creating useable innovations in systemic reform: Scaling-up technology-embedded project-based science in urban schools. *Educational Psychologist*, *35*, 149-164.

Blumenfeld, P. C., Marx, R. W., Krajcik, J. S., & Soloway, E. (1996). Learning with peers: From small group cooperation to collaborative communities. *Educational Researcher*, *25*(8), 37-40.

Blumenfeld, P. C., Marx, R. W., Patrick, H., & Krajcik, J. S., & Soloway. E. (1997). Teaching for understanding. In B. J. Biddle, T. L. Good, & I. F. Goodson (Eds.). *International handbook of teachers and teaching* (pp. 819-878). Dordrecht, The Netherlands: Kluwer.

Blumenfeld, P. C., Soloway, E., Marx, R. W., Krajcik, J. S., Guzdial, M., & Palincsar, A. (1991). Motivating project-based learning: Sustaining the doing, supporting the learning. *Educational Psychologist*, *26*, 369-398.

Bowyer, J. B, Gerard, L. F., & Marx, R. W. (2008). Building leadership for scaling science curriculum reform. In Y. Kali, M. C., Linn, & J. E. Roseman (Eds.). *Designing coherent science education*. NY: Teachers College Press.

Brunvand, S., Fishman, B., & Marx, R.W. (2005). Moving professional development on-line: Meeting the needs and expectations of all teachers. In J. R. Dangel & E. Guyton (Eds.) *Association of Teacher Educators Yearbook XII*. Lanham, MD: Scarecrow Education.

Brunvand, S., Fishman, B., Marx, R., & Maybaum, J. (2002). Teacher expectations of on-line professional development. *Proceedings of the International Conference of the Learning Sciences*.

Cabrera, N., Milem, J., Jaquette, O., & Marx, R.W. (2014). Missing the (student achievement) forest for all the (political) trees: Empiricism and the Mexican American Studies controversy in Tucson. *American Educational Research Journal*, *51*, 1-35.

Cammarota, J. (2007). A social justice approach to achievement: Guiding Latina/o students toward educational attainment with a challenging, socially relevant curriculum. *Equity & Excellence in Education*, *40*(1), 87-96.

Cimetta, A. D., Marx, R. W., Yaden, D. B., Alkhadim, G. S., & Cutshaw, C. A. (2017). Latent variable structure and measurement invariance of a modified early literacy assessment. *International Journal of School and Educational Psychology, 6(3),* 208-222. 10.1080/21683603.2017.1322016

Clark, C. M., Marx, R. W., Stayrook, N. G., Gage, N. L., Peterson, P. L., & Winne, P. H. (1979). A factorial experiment on teacher structuring, soliciting, and reacting. *Journal of Educational Psychology*, *71*(4), 534.

Clifford, G. J., & Guthrie, J. W. (1990). *Ed school: A brief for professional education*. University of Chicago Press.

Coons, A. G., Browne, A. D., Campion, H. A., Dumke, G., Holy, T., McHenry, D., & Sexton, K. (1960). *A master plan for higher education in California, 1960-1975*. Sacramento: California State Department of Education.

Crawford, B., Marx, R., & Krajcik, J. (1999). Elements of a community of learners in a middle school science classroom. *Science Education. 83*(6), 701-723.

Cronbach, L. J., & Snow, R. E. (1977). *Aptitudes and instructional methods: A handbook for research on interactions*. Irvington.

De Bruin, A., Treccani, B., & Della Sala, S. (2015). Cognitive advantage in bilingualism: An example of publication bias? *Psychological Science*, *26*(1), 99-107.

Dolton, P., & Marcenaro-Gutierrez, O. (2011). *2013 Global teacher status index*. London: Varkey GEMS Foundation.

Ericsson, K. A., & Simon, H. A. (1980). Verbal reports as data. *Psychological Review*, *87*(3), 215.

Fenstermacher, G. (1995). From Camelot to Chechnya: The journey of an education dean. In L. S. Bowen (Ed.). The *wizards of odds: Leadership journeys of education deans*. Washington, D.C.: American Association of Colleges for Teacher Education.

Fishman, B., Kupperman, J., Marx, R., & Soloway, E. (2001). Linking urban Latino families to school using the web. *Journal of Educational Computing Research*, *25*(1), 35-49.

Fishman, B., Marx, R. W., Best, S., & Tal, R. (2003). Linking teacher and student learning to improve professional development in systemic reform. *Teaching and Teacher Education, 19*(6), 643-658.

Fishman, B., Marx, R. W., Blumenfeld, P., Krajcik, J., & Soloway, E. (2003). Creating a framework for research on systemic technology innovations. *Journal of the Learning Sciences*, *13*(1), 43-76.

First Things First External Evaluation. (2011). *Arizona Kindergarten Readiness Study*. Tucson, AZ: Department of Educational Psychology.

Fortus, D., Dershimer, R. C., Krajcik, J. S., Marx, R. W., & Mamlock-Naaman, R. (2004). Design-based science and student learning. *Journal of Research in Science Teaching*, *41*(10), 1081-1110.

Franco, A., Malhotra, N., & Simonovits, G. (2014). Publication bias in the social sciences: Unlocking the file drawer. *Science*, *345*(6203), 1502-1505.

Geier, R., Blumenfeld, P., Marx, R. W., Krajcik, J., Fishman, B., Soloway, E., & Clay-Chambers, J. (2008). Standardized test outcomes of urban students engaged in inquiry-based science curricula in the context of urban reform. *Journal of Research in Science Teaching*, *45*, 922-939.

Geier, R., Blumenfeld, P., Marx, R. W., Krajcik, J., Fishman, B., & Soloway, E. (2004). Standardized test outcomes of urban students participating in standards and project-based science curricula. In Y. B. Kafai, W. A. Sandoval, N. Enyedy, A. S. Nixon, & F. Herrera (Eds.), *Proceedings of the Sixth International Conference of the Learning Sciences*. Mahwah, NJ: Erlbaum.

Harris, C. J., & Marx, R. W. (2009). Authentic tasks. In E. Anderman (Ed.). *Psychology of classroom learning: An encyclopedia*. Detroit: Macmillan Reference.

Harris, C. J., & Marx, R. W. (2010). Teaching practices that matter in middle school science. Better evidence-based education. In R. Slavin (Ed.). (2014). *Proven programs in education: Science, technology, and mathematics (STEM)*. pp. 83-87, Thousand Oaks, CA: Corwin.

Harris, C. J., Marx, R. W., & Blumenfeld. P. C. (2008). Designing environments for learning. In T. L. Good (Ed.), *21st century education: A reference handbook*. Thousand Oaks, CA: Sage.

Harris, C. J., McNeill, K. L., Lizotte, D. L., Marx, R. W., & Krajcik, J. (2006). Usable assessments for teaching science content and inquiry standards. In M. McMahon, P. Simmons, R. Sommers, D. DeBaets & F. Crowley (Eds.), *Assessment in science: Practical experiences and education research* (pp. 67-88). Arlington, VA: National Science Teachers Association Press.

Holliday, M. R., Cimetta, A., Cutshaw, C. A., Yaden, D., & Marx, R. W. (2014). Protective factors for school readiness among children in poverty. *Journal of Education for Students Placed at Risk (JESPAR)*, *19*(3-4), 125-147.

Horvath, A. O., & Marx, R. W. (1990). The development and decay of the working alliance during time-limited counselling. *Canadian Journal of Counselling*, *24*, 240-259.

Horvath, A. O., & Marx, R. W. (1990). Thinking about thinking in therapy: An examination of clients' understanding of their therapists' intentions. *Journal of Consulting and Clinical Psychology*, *58*, 614-621.

Ingersoll, R. M., & Collins, G. J. (2018). The status of teaching as a profession. In J. Ballantine, J. Spade, & J. Stuber (Eds.), *Schools and society: A sociological approach to education* (6th ed; pp. 199-213). CA: Pine Forge Press/Sage Publications.

Kelly, A. (2004). Design research in education: Yes, but is it methodological? *The Journal of the Learning Sciences*, *13*(1), 115-128.

Kelly, A. E., Lesh, R. A., & Baek, J. Y. (Eds.). (2014). *Handbook of design research methods in education: Innovations in science, technology, engineering, and mathematics learning and teaching*. Routledge.

Krajcik, J. S., Blumenfeld, P., Marx, R. W., Bass, K.M., Fredricks, J., & Soloway, E. (1998). Inquiry in project-based science classrooms: Initial attempts by middle school students. *Journal of the Learning Sciences. 7*, 313-350.

Krajcik, J. S., Blumenfeld, P., Marx, R. W., & Soloway, E. (1994). A collaborative model for helping teachers learn project-based instruction. *Elementary School Journal*, *94*, 483-498.

Krajcik, J., Blumenfeld, P., Marx, R., & Soloway. E. (1999). Instructional, curricular, and technological supports for inquiry in science classrooms. In J. Minstrel & E. Van Zee (Eds.), *Inquiry into inquiry: Science learning and teaching*. Washington, D.C.: American Association for the Advancement of Science Press.

Krajcik, J. S., Soloway, E., Blumenfeld, P., & Marx, R. W. (1998). Scaffolded technology tools to promote teaching and learning in science. In C. Dede (Ed.), 1998 *ASCD Yearbook: Learning and Technology* (pp. 31-45).

Krajcik, J. S., Soloway, E., Blumenfeld, P. C., Marx, R. W., Ladewski, B. L., Bos, N. D., & Hayes, P. J. (1996). The Casebook of project practices: An example of an interactive multimedia system for professional development. *Journal of Computers in Mathematics and Science Teaching*, *15*, 119-135.

Kubitskey, B., Fishman, B. J., Margerum-Leys, J., Fogleman, J., Brunvand, S., & Marx, R. W. (2006). Professional development and teacher learning: Using concept maps in inquiry classrooms. In M. McMahon, P. Simmons, R. Sommers, D. DeBaets & F. Crawley

(Eds.), *Assessment in science: Practical experiences and education research* (pp. 107-118). Arlington, VA: NSTA Press.

Kubitskey, B., Fishman, B., & Marx., R. (2002). Professional development, teacher learning, and student learning: Is there a connection? *Proceedings of the International Conference of the Learning Sciences.*

Larmer, J., Mergendoller, J., & Boss, S. (2015). *Setting the standard for project based learning.* ASCD.

Luthar, S. S. (2015). Resilience in development: A synthesis of research across five decades. *Developmental Psychopathology: Volume Three: Risk, Disorder, and Adaptation* (pp. 739-795). John Wiley. https://doi.org/10.1002/9780470939406.ch20

Mamlok-Naamen, R., Dershimer, C., Fortus, D., Krajcik, J., & Marx, R. W. (2005). How do I design a cellular telephone that is safer to use? Development and implementation of an innovative curriculum—An international perspective. In D. Waddington (Ed.). *Making it relevant: Context based learning of science* (pp. 215-242). Kiel: Waxman.

Margerum-Leys, J., & Marx, R. W. (2004). The nature and sharing of teacher knowledge of technology in a student teacher/mentor teacher pair. *Journal of Teacher Education*, *55*(5), 1-16.

Margerum-Leys, J., & Marx, R. W. (2002). Teacher knowledge of educational technology: A study of student teacher/mentor pairs. *Journal of Educational Computing Research, 26*(4), 427-462.

Margerum-Leys, J., & Marx, R. W. (2002). When it works: A case study of teacher knowledge of educational technology. *Journal of Teacher Education.*

Martin, J. (1987). *Cognitive-instructional counseling.* Althouse Press.

Martin, J., Marx, R. W., Hasell, J., & Ellis, J. F. (1978). Improving the instructional effectiveness of university teaching assistants: Report II. *Canadian Journal of Education, 3*, 13-26.

Marx, R. W. (1985). Classroom organization and perceptions of student academic and social status. In I. Housego & P. Grimmet (Eds.), *Teaching and teacher education.* Vancouver, B.C.: Wedge Publications.

Marx, R. W. (2000). School reform and research in educational psychology. *Educational Psychologist, 35,* 161-163.

Marx, R. W. (2008). Science curriculum materials that support learning: New research that addresses continuing challenges. *Elementary School Journal*, *109*(2), 1-5.

Marx, R. W. (1983). Student perception in classrooms. *Educational Psychologist*, *18*, 145-164.

Marx, R. W., Blumenfeld, P., Krajcik, J. S., Blunk, M., Crawford, B., Kelly, B., & Mills, K. (1994). Enacting project-based science: Experiences of four middle grade teachers. *Elementary School Journal*, *94*, 517-538.

Marx, R. W., Blumenfeld, P. C., Krajcik, J. S., Fishman, B., Soloway, E. Geier, R., & Tal, R. T. (2004). Inquiry-based science in the middle grades: Assessment of learning in urban systemic reform. *Journal of Research in Science Teaching*, *41*, 1063-1080.

Marx, R. W., Blumenfeld, P. C., Krajcik, J. S., & Soloway, E. (1996). Enacting project-based science: Challenges for practice and policy. *Elementary School Journal, 97*, 341-358.

Marx, R. W., Blumenfeld, P. C., Krajcik, J. S., & Soloway, E. (1998). New technologies for teacher professional development. *Teaching and Teacher Education*, *14*, 33-52.

Marx, R. W., & Freeman, J. G. (1996). Project-based learning. In S. Cole-Misch, L. Price, & D. Schmidt (Eds.). *Sourcebook for watershed education* (pp. 172-174). Dubuque, IO: Kendall-Hunt.

Marx, R. W., Grieve, T., & Rossner, V. (1988). *The learners of British Columbia. Commissioned Papers: Vol. 2, British Columbia Royal Commission on Education.* Victoria, B.C.: Queen's Printers.

Marx, R. W., & Harris, C. J. (2006). NCLB and science education: Opportunities, challenges, and risks. *Elementary School Journal. 106*(5)*,* 467-478.

Marx, R. W., Freeman, J. G., Krajcik, J. S., & Blumenfeld, P. C. (1998). The professional development of science teachers. In B. Fraser and K. Tobin (Eds.). *International handbook of science education* (pp. 667-680). Dordrecht, The Netherlands: Kluwer.

Marx, R. W., Martin, J., & Ellis, J. F. (1979). The training of teaching assistants in Canadian universities: A survey and case study. *Canadian Journal of Higher Education, 9*, 55-63.

Marx, R. W., Martin, J., Ellis, J. F., & Hasell, J. (1978). Improving the instructional effectiveness of university teaching assistants: Report I. *Canadian Journal of Education, 3*, 1-12.

Marx, R. W., Yaden, D., Cimetta, A., Cutshaw, C., Taren, D., Swadener, B., … Prior, J. (2010). *What is "readiness" for school in Arizona? A snapshot of beginning kindergarteners* (Research Brief No. 1). Tucson, Arizona: University of Arizona, College of Education, First Things First External Evaluation.

Masten, A. S. (2015). *Ordinary magic: Resilience in development*. Guilford Publications.

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American Psychologist*, *56*(3), 227-238.

McNeil, K. L., Lissotte, D. J., Krajcik, J., & Marx, R. W. (2006). Supporting students' construction of scientific explanations by fading scaffolds in instructional materials. *Journal of the Learning Sciences, 15*, 153-191.

Moje, E. B., Collazo, T., Carrillo, R., & Marx, R. W. (2001). "Maestro, what is quality?" Language, literacy, and discourse in project-based science. *Journal of Research in Science Teaching, 38*(4), 469-498.

Moje, E. B., Peek-Brown, D., Sutherland, L. M., Marx, R. W., Blumenfeld, P., & Krajcik, J. S. (2004). Explaining explanations: Developing scientific literacy in middle school project-base science reforms. In D. S. Strickland & D. E. Alvermann (Eds.). *Bridging the literacy achievement gap: Grades 4-12* (pp. 227-251). New York: Teachers College Press.

Moll, L. C., Amanti, C., Neff, D., & Gonzalez, N. (1992). Funds of knowledge for teaching: Using a qualitative approach to connect homes and classrooms. *Theory into Practice*, *31*(2), 132-141.

Mussen, P. H. (1970). *Carmichael's manual of child psychology, Vol. I & II*. New York: Wiley.

Peterson, P. L., Marx, R. W., & Clark, C. M. (1978). Teacher planning, teacher behavior, and student achievement. *American Educational Research Journal*, *15*(3), 417-432.

Pintrich, P., Marx, R. W., & Boyle, R. (1993). Beyond "cold" conceptual change: The role of motivational beliefs and classroom contextual factors in the process of conceptual change. *Review of Educational Research*, *63*, 167-199.

Sears, P. S., & Sherman, V. S. (1964). *In pursuit of self-esteem: case studies of eight elementary school children*. Wadsworth Pub. Co.

Schneider, R., Krajcik, J., Marx, R .W., & Soloway, E. (2002). Student learning in project-based science classrooms. *Journal of Research in Science Teaching, 39*(5), 410-422.

Shils, E. (2008). *The calling of education: "The academic ethic" and other essays on Higher Education*. University of Chicago Press.

Singer, J., Krajcik, J., & Marx, R. W. (2000). The design and evaluation of classroom supports for seamless integration of a dynamic modeling tool. In B. Fishman and S. O;Connor-Divelbiss (Eds.), *Fourth International Conference of the Learning Sciences* (pp. 62-69). Mahweh, NJ: Erlbaum.

Singer, J., Marx, R. W., Krajcik, J., & Clay Chambers, J. (2000). Constructing extended inquiry projects: Curriculum materials for science education reform. *Educational Psychologist, 35*, 165-178.

Smith, P. A., & Marx, R. W. (1971). The factor structure of the revised edition of the Illinois Test of Psycholinguistic Abilities. *Psychology in the Schools*, *8*(4), 349-356.

Smith, P., & Marx, R. W. (1972). Some cautions on the use of the Frostig test: A factor analytic study. *Journal of Learning Disabilities*, *5*(6), 357-362.

Snow, R. E. (1968). Brunswikian approaches to research on teaching. *American Educational Research Journal*, *5*(4), 475-489.

Soloway, E., Krajcik, J., Blumenfeld, P., & Marx, R. W. (1996). Technological support for teachers transitioning to project-based science practices. In T. Koschman (Ed.). *CSCL: Theory and practice of an emerging paradigm*. (pp. 269-305). Hillsdale, NJ: Erlbaum.

Soloway, E., Norris, C., Blumenfeld, P., Fishman, B., Krajcik, J., & Marx, R. (2001). Handheld devices are ready at hand. *Communications of the ACM*, *44*(6), 15-20.

Soloway, E., Norris, C., Blumenfeld, P., Fishman, B., Krajcik, J., & Marx, R. W. (2000). K-12 and the Internet. *Communications of the ACM*, *43*(1), 19-23.

Soloway, E., Norris, C., Curtis, M., Jansen, R., Krajcik, J., Marx, R., Fishman, B., & Blumenfeld, P. (2001). Making palm-sized computers the PC of choice for K-12. *Learning and Leading with Technology, 8*(7).

Sutcher, L., Darling-Hammond, L., & Carver-Thomas, D. (2016). *A coming crisis in teaching? Teacher supply, demand, and shortages in the U.S*. Palo Alto, CA: Learning Policy Institute.

Whitehurst, G. J. (2003). The Institute of Education Sciences: New Wine, New Bottles.

Winne, P. H., & Marx, R. W. (1980). Matching students' cognitive responses to teaching skills. *Journal of Educational Psychology*, *72*, 257-264.

Winne, P. H., & Marx, R. W. (1982). Students' and teachers' views of thinking processes for classroom learning. *Elementary School Journal*, *82*, 493-518.

Yaden, D. B., Jr., Cimetta, A., Marx, R., Taren, D., Perry, N., Enz, B., … Prior. J. (2011, January). *Arizona Kindergarten Readiness Study* (Report No 1.) University of Arizona, College of Education, First Things First External Evaluation.

Yaden, Jr., D.B., Marx, R. W., Cimetta, A., Alkhadim, G. S., & Cutshaw, C., (2017). Assessing early literacy with Spanish-speaking preschoolers: The factor structure of The Phonological Awareness Literacy Screening Español. *Hispanic Journal of Behavioral Science*. *39*(2), 193-210. https://doi.org/10.1177/0739986316688877

About Acquired Wisdom

This collection began with an invitation to one of the editors, Sigmund Tobias, from Norman Shapiro a former colleague at the City College of New York (CCNY). Shapiro invited retired CCNY faculty members to prepare manuscripts describing what they learned during their College careers that could be of value to new appointees and former colleagues. It seemed to us that a project describing the experiences of internationally known and distinguished researchers in Educational Psychology and Educational Research would be of benefit to many colleagues, especially younger ones entering those disciplines. We decided to include senior scholars in the fields of adult learning and training because , although often neglected by educational researchers, their work is quite relevant to our fields and graduate students could find productive and gainful positions in that area.

Junior faculty and grad students in Educational Psychology, Educational Research, and related disciplines, could learn much from the experiences of senior researchers. Doctoral students are exposed to courses or seminars about history of the discipline as well as the field's overarching purposes and its important contributors. .

A second audience for this project include the practitioners and researchers in disciplines represented by the chapter authors. This audience could learn from the experiences of eminent researchers—how their experiences shaped their work, and what they see as their major contributions—and readers might relate their own work to that of the scholars. Authors were advised that they were free to organize their chapters as they saw fit, provided that their manuscripts contained these elements: 1) their perceived major contributions to the discipline, 2) major lessons learned during their careers, 3) their opinions about the personal and 4) situational factors (institutions and other affiliations, colleagues, advisors, and advisees) that stimulated their significant work.

We hope that the contributions of distinguished researchers receive the wide readership they deserve and serves as a resource to the future practitioners and researchers in these fields.

Education Review **Reseñas Educativas**

Resenhas Educativas

Connect with *Education Review* on Facebook (https://www.facebook.com/pages/Education-Review/178358222192644) and on Twitter @EducReview