



No Panacea Garden

Sigmund Tobias



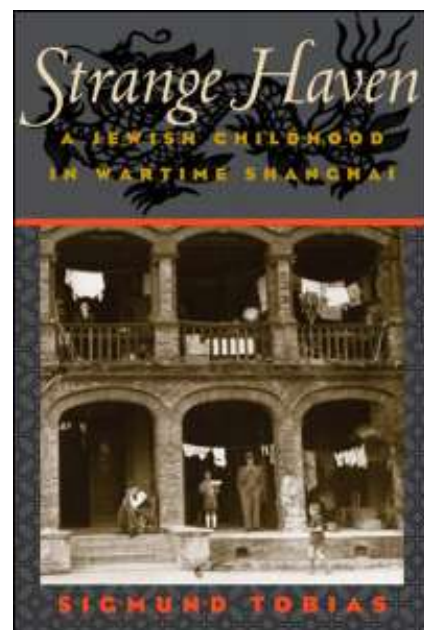
Summarizing what I learned during 57 years in educational psychology and educational research is daunting. During that period, I spent 34 years at the City University of New York (CUNY)—four at Brooklyn College, 30 at the City College of New York (CCNY), five at Fordham University, seven at the Institute for Urban and Minority Education at Teachers College, Columbia, four in “retirement,” and seven more years, and counting, at the State University of New York at Albany. Nevertheless, daunting as the task is, being able to write what I wanted to without editorial constraints was too much fun to ignore. Previously, the only times I had similar freedom was in an unpublished novel written during a sabbatical, several (as yet unproduced) one act plays, and my memoir (Tobias, 2009a, see right) describing how my family survived the Holocaust by fleeing to China.

This chapter concentrates on my professional, rather than personal, life, and ends with six major lessons learned; other lessons are mentioned throughout the

chapter. My learning was affected by events in my life, the institutions I attended and served, and my research collaborators, colleagues, and students. These notes focus on how these experiences were intertwined in the major and minor lessons I learned during my career.

Arrival in America

I arrived in New York in 1948 at age 15 having travelled from Shanghai by myself. The American Jewish Joint Distribution Committee housed me in a Jewish orphan home in Yonkers until they could figure out what to do with me. This was a problem because it was not clear when, or whether, the immigration laws then in place would allow my parents to join me. After a few months, I was placed with a foster family in Brooklyn and attended a high school there.



On my first school day, I was interviewed by the Principal to discuss my class placement. This was complicated because I had no secular education for about

five years. Instead, during that time I studied in the Mirrer Yeshiva - which also fled to Shanghai. That Yeshiva has been described as the pinnacle of Talmudic learning, and Talmud was all I studied six days a week; the Mirrer had no secular education program. My English was reasonably fluent from prior secular schooling in Shanghai and I was an avid reader, so the Principal placed me in the 6th term, where I belonged chronologically.

I was anxious about doing well and studied hard until the first midterm testing period. It turned out that my lowest midterm test score was 97% correct. I realize now that the intellectual skills I acquired from studying the Talmud in the Mirrer Yeshiva, are similar to what Anderson (1981) called procedural knowledge. They were much more important than learning facts, i.e. Anderson's declarative knowledge. Facts are easier to teach and learn than procedural knowledge, but not as useful for future learning or in life. Evidently, the intellectual skills I learned from the Talmud were applicable to the secular subjects I had not studied for five years.

The difficulty demonstrating similar applications of intellectual skills in laboratory studies is puzzling because so much anecdotal evidence suggests that it occurs frequently. Perhaps resuming my secular studies was facilitated by an eagerness to learn. Contemporary thinking (Goldstone & Day, 2012) suggests that students' orientation to and expectations of transfer predict whether it occurs. In any case, these experiences also stimulated my later work on metacognitive processes.

After the midterms I took a job working 20 hours a week in a vegetable market. Of course, I then had less time to study and both my anxiety and my grades declined. These experiences led to a couple of bad habits. First, cramming, and subsequently working late into the night just before deadlines, were problems dogging my academic career. Now that I am partially retired it's amusing that I'm actually early on most deadlines. The second bad habit was committing to more projects than one should, and then having to work long hours,

even on holidays and weekends, to meet those commitments.

A year later my parents joined me in America. They worked six and a half thirteen hour days a week running a small grocery store in a poor Brooklyn neighborhood, where I helped out until starting college. After high school graduation, I worked full time as an office boy in a social agency while attending CCNY in the evening. I took two classes on Monday and Wednesday evenings, two on Tuesday and Thursday; and two more during summer session. I had no idea what I was studying for, except that there was a lot to learn. I could not have afforded to attend college if CCNY had charged tuition.

After a few years at CCNY I took an evening division class on personality taught by Kenneth Clark. Frankly, we learned little about personality theory because Clark often rushed into class upon returning to Manhattan from Washington where he testified before the Supreme Court in what became the famous Brown decision on school integration. He often reported on his testimony, including the day his former teacher Henry Garrett testified for the South.



Prof. Clark was elected President of the APA in 1971.

He also brought Ralph Ellison (author of *Invisible Man*) to class one night for a haunting class on what it felt like to be a

black man in contemporary America. We knew that we had a ringside seat on history in the making, even though it was not known until later that the Brown decision indicated that Clarks' testimony was pivotal in the Court's decision integrating schools in the United States. It was a memorable class in a memorable time.

At City College I socialized with an interesting group of people, many fellow European refugees, who were very sophisticated about artistic, cultural, and political matters that were foreign to me. I struggled to keep up, and many years later realized how right social psychologists were in maintaining that students' bull sessions outside of class were much more important in shaping their values than what happened in class. In order to hold my own with these students I followed the news intently, read the New York Times, attended foreign films, and bought inexpensive student tickets to summer concerts. For me, CCNY truly became "Harvard on the Hudson". Educators should note the importance of the campus atmosphere in shaping students' values. If appreciation of the arts, civic engagement, and social justice are valued educators should develop avenues for student participation in these activities on campus.

My interests gradually centered on history and psychology and the latter became my major. After graduation I continued at CCNY's School of Education for an MA in school psychology, and later received my Ph. D. in clinical psychology at Teachers College, Columbia University. While I have enjoyed my career in psychology, I sometimes wonder what it would have been like had I accepted an offer from a history professor to get me a fellowship for graduate work in history.

Many of my social and behavioral science courses at CCNY were given by excellent teachers, including of course Ken Clark's class, and I am grateful to them for stimulating my curiosity about their fields. I learned from my fellow students, largely without faculty help, how to navigate the maze of requirements at CCNY, and the

selection of future graduate programs. Later, as a college instructor, I tried to help students think about their future and whether they were interested in graduate work. It is an important responsibility and one that was, and is, often neglected on urban campuses, especially for part time students attending school in the evening.



CCNY Quadrangle

In 1959 I assumed my first professional position at Brooklyn College's Educational Clinic, a child guidance agency attached to the Education Department. The clinic was psychoanalytically oriented, as was I at that time, and our duties included offering clinical services to children in the community. Clinical activities were often followed up by discussions with classes who had observed us. I was also assigned to teach a graduate class in remedial reading, in which I had all of one semester's experience, and worked hard to prepare my lectures. I also taught an undergraduate course dealing with learning, evaluation, and mental health issues for extra compensation, and did about six-to-eight hours of clinical work on the side. Even though I enjoyed my clinical work, I enjoyed teaching more.

In 1962 the Clinic conducted a study to follow-up previously seen clients, and participating in that project became an important part of my work. I helped design rating scales for the data collection and was

primarily responsible for the data analysis; I learned FORTRAN to prepare statistical programs to analyse the follow-up data. More time than necessary was spent on programming; the programmer's challenge of developing a strategy whose adequacy could be tested immediately by debugging was too much fun to resist. It is an accurate indication of my changing interests that I cannot recall anything specific about the follow-up study, but still remember some aspects of the computer programs I wrote. My later interest in educational technology was probably stimulated by my FORTRAN programming.

Teaching Educational Psychology at CCNY

In 1963 I left Brooklyn College and the Educational Clinic for a teaching appointment in educational psychology at CCNY. I loved full time teaching and worked hard to learn more about educational psychology to make my courses relevant for future teachers. Somehow I always knew that I would enjoy teaching yet am puzzled that it never entered my mind to prepare for a teaching career.

Education, then and now, needs to do a better job of reaching out. We hear a lot about the low pay and the frustrations of teaching, but too little about its rewards. Teachers' unions and Schools of Education ought to provide accessible materials to highlight the joys of arousing students' curiosity, the excitement of helping them understand new concepts, and, especially, preparing them for life-long learning. Speaking of life-long learning, it became clear to me that preparing to teach complex subjects has the wonderful by-product of improving my own understanding of the material. New knowledge is accumulating at such a rapid rate that we all need to learn how to adapt to new and unexpected developments - the subject of my current research, to be described later.

Although I continued a clinical practice of up to six hours per week, I maintained a heavy teaching load (four classes, and another in evening session for

extra compensation, plus two more during the summer). I began to agree with complaining students that much of what was taught in educational foundations courses was distant from the classroom. In teacher preparation programs it is vital to relate what is taught to the life of the classroom, and inexcusable to teach content that has little relevance to it. I was pleased when former students, now teachers, returned for graduate work and reported that they found my undergraduate courses helpful in their teaching.

I also found that I very much enjoyed doing research. I had published a few papers before moving to CCNY but took research much more seriously after the move. I attended at least three professional conventions every year, those of the American Psychological (APA) Association - especially sessions of the Division of Educational Psychology, which elected me President later in my career, the American Educational Research Association (AERA), and the Northeastern Educational Research Association, where I also was elected President later on. I learned a lot from these meetings that I had missed doing my Ph. D. in clinical psychology. I strongly recommend that those entering the field attend as many meetings as possible to learn about developments that will not appear in journals for a year or two, and to meet other researchers and the big names in the field.

New knowledge is accumulating at such a rapid rate that we all need to learn how to adapt to new and unexpected developments.

At that time programmed instruction was very much in vogue, and I did some research, supported by small grants from the U.S. Office of Education, in that area hoping that programmed materials might reduce reduce teachers' workload and enable them to individualize instruction. I had learned from the individual attention I received in

the Yeshiva in Shanghai how valuable individualization was.

My most important study (Tobias, 1973) during this period examined the effects of some individual difference variables in interaction with the sequence in which an instructional program was presented, i.e., comparing a logical to a random order. Previous findings had indicated that sequence did not affect learning. My study found quite convincingly that when students' prior knowledge was high, it didn't matter how the material was organized because students' prior topic knowledge compensated for any lack of organization. When prior knowledge was low, however, material sequenced carefully made a huge difference. This study is not frequently cited because examining sequence was not its primary purpose. Still, I was pleased that it ended the series of findings suggesting that sequence made little difference in learning. These results also contributed to my general hypothesis (reviewed in Tobias, 2009b) that prior knowledge is a critical variable in adapting instruction to student characteristics.

Leaves of Absence at LRDC and Florida State

I was fortunate that the U.S. Office of Education selected me to participate in a program to stimulate research among mid-career faculty. With that support I spent the 1968-1969 academic year at the *Learning Research and Development Center* (LRDC) at the University of Pittsburgh. LRDC was, and is, one of the country's major educational research centers and was very important to my developing career.

There were few people at CCNY with research interests similar to mine, whereas they were everywhere at LRDC. In addition to interacting with Bob Glaser, Director of LRDC, and many other colleagues at Pitt, I ran one study there, and wrote up others completed previously. I also got the chance to meet and interact with many renowned scholars (e.g., Bob Gagne, Jack Carroll, Jim Greeno) who were at LRDC occasionally. It is difficult to describe

exactly what I learned from these interactions, but what really counted was that the distinguished researchers got to know me. After my year there they and other big names who had heard about me, agreed to participate in convention presentations I was organizing and, in turn, they occasionally invited me to participate in sessions they prepared.



Learning Research and Development Center (LRDC) today.

I had never realized how important it was to be familiar with these people. Until then, I was unknown and doubt whether any of the big names would have answered my phone calls. After LRDC that changed. I became a known researcher. I recognize now the importance of networking to a developing career and have encouraged my graduate students to join me at meetings so that I can introduce them to the researchers with whose work they were familiar.

I spent the 1971-1972 academic year on leave at the Center for Computer Assisted (CAI) Instruction at Florida State University. The Center had programmed some of my research materials for use on their computers, a major effort at that time because they included complicated graphics. Shortly after my arrival I ran my first, of

several, CAI studies. I had used these materials in programmed versions at CCNY, and having the Center invest resources to prepare them for CAI provided consensual validation for their usefulness as research vehicles.

At the CAI Center, some of my time was spent preparing research proposals. I had written proposals before, but doing so regularly was a good learning experience and increased my facility in writing proposals to support my own research. It is a skill that all serious researchers must acquire in order to attract funding to support graduate students working with them, have adequate funding to attend research conferences, buy equipment, and maintain clerical and secretarial support. One of the things I learned at the CAI Center was to get in touch with people at the agencies issuing a request for proposals before submitting a formal application. Such a communication often provides insight into what the agency needs that did not make its way into the request for proposals, and sometimes researchers can get some feedback concerning their plans for an application.

My year at the CAI Center was very productive. I found myself on the program four times on the same day at the 1972 AERA convention. Of course I enjoyed the exposure, but four presentations on one day were a bit much.

There were big differences between the cultures at CCNY's School of Education and both LRDC and the CAI Center. Of course both institutions, like all others, had their share of faculty gossip. In one

department the wives of every professor had previously been married to a different member of the same Department, leading to a good deal of amusement among colleagues in other departments. However, a large proportion of meetings at these institutions dealt with people's research, articles being prepared, proposals written, research results analysed, or developments in the field. Attendance at these sessions varied from four to 40. In addition there were frequent talks by visiting researchers. It was a pleasure to be a part of such a culture, and something I missed upon returning to CCNY.

One of the reasons, among many, for the difference in cultures between CCNY and the other institutions is that at City some faculty had lucrative practices as psychotherapists, or engaged in other consulting activities. Those who consulted for more than the one day a week permitted by regulations rarely saw their responsibilities to the students and the College as their primary affiliation and the heart of their intellectual life. It is difficult to have a community of scholars if some people have their eye on the clock in order to rush off for consulting work. It is also unfair to their colleagues and students.

The differences between faculty devoted to teaching or research became clearer to me. Involvement in research is an assurance that teaching was reasonably up to date; later, even when I had grants to buy out my whole teaching schedule, I elected to give at least one course each term. I recall unpleasant occasions when my Department asked me to observe and evaluate the

teaching of colleagues prior to their re-appointment. Some of these colleagues were admired by students but not involved in research. My observations indicated that their classes often covered material that was 20 to 50 years out of date. Similarly, I remember a faculty meeting devoted to a topic with an ample



scholarly literature only to find that the discussion concerned an article in the *New York Times Magazine*. While faculty who conduct research may not be the most admired teachers, their knowledge of the field is likely to be more current than faculty who neglect research and the work needed to stay up to date.

Observing colleagues' teaching at CCNY and interacting with them also showed me how resistant to change some of them were. Many felt that they had the knowledge needed to teach their classes. They had little motivation to adapt to newly developed ideas. Another example from the early 1980s vividly illustrates this point. One senior faculty member made fun of a student's research on metacognition, indicating that such a construct was a figment of her imagination. Clearly he, and many of his peers, did not have the motivation to read contemporary research journals that would have helped them adapt to new developments.

CUNY Graduate Center

A doctoral program in educational psychology was formed at CUNY's Graduate Center in mid-Manhattan and a small faculty recruited, augmented by colleagues from various CUNY campuses. I joined the program when I was directing some applied projects at CUNY's Center for Advance Study of Education (Tobias, 1977b, 1978a, 1980a, 1981, Tobias & Everson, 1977). I enjoyed two aspects of the applied work. Some projects dealt with revising curricula in vocational education where advances in technology had dated selected curricula. Even though I knew little about vocational education and the demands of a rapidly changing workplace, the idea of revising curricula to keep up with changing times and technology intrigued me. Having previously studied questions dealing with computers and instruction, I was impressed by computers' ability to separate content from presentation, allowing each to be readily updated or otherwise modified separately, without requiring major changes or disruptions in the other.

My more basic research rarely had immediate implications for improving student's lives in schools whereas the applied projects had a fairly rapid impact.

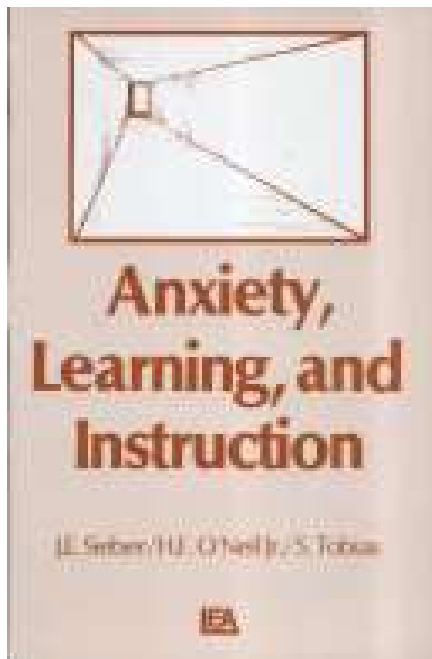
Nonetheless, I continued working on basic research projects and was often able to use resources remaining from applied work to support this research. Although the applied work was housed at the Graduate Center, I continued to teach one course each term at CCNY. I became actively involved in the doctoral program in educational psychology and was program head for the learning from instruction track of the program and, for one year, also became Deputy Executive Officer, similar to an Associate Dean, of the program.

I was fortunate to receive support for my basic work when the applied projects were completed. I conducted this research on the CCNY campus because there were no undergraduate students who could participate in the research at the Graduate Center. It became increasingly difficult to spend time at the Graduate Center because I learned a lot by watching and speaking to undergraduates who participated in my research studies at CCNY. This and other factors decreased my involvement in the Center's doctoral program.

Research Reviews, Theoretical Formulations, Professional Activities

The results of the sequence study described earlier, among others, eventually led to research reviews that advanced this general hypothesis for adapting instruction to student's characteristics (Tobias, 1976; 1982; 2009b): when students had little prior knowledge, substantial instructional support (such as guidance, active responding with feedback, providing materials of appropriate difficulty, etc...) was needed for them to succeed. When prior knowledge was high, however, only minimal support was required. This formulation has been supported by succeeding research. It led me to think about what aspects of instructional methods promoted learning and to suggest (Tobias, 1982) that stimulating deeper, reflective, and frequent cognitive processing of instruction

were critical for improving learning, transfer, and retention of knowledge and skill.



I also studied adapting instruction to students' test anxiety. That research was probably stimulated by the anxiety I experienced in the secular school in Shanghai, before I entered the Yeshiva, and by my clinical background. I proposed a model in (Tobias, 1977a) of how test anxiety affected learning from instruction that was also substantially supported by continuing research. The model maintains that students' preoccupations with anxiety-related cognitions absorb some portion of their cognitive capacity, leaving less for learning. Updates of the model were made later (Tobias, 1979, 1980b), but my anxiety research declined when it became clear that test anxiety could easily be reduced by short term interventions (Ergene, 2003). What's the point of painstakingly adapting instruction to test anxiety when it can be reduced

so effectively by short term behavioral procedures?

I became involved in research concerning the effects of metacognitive knowledge on students' interests. Contemporary thinking then was that prior knowledge had little effect on topic interest. That did not seem reasonable to me. My review of the literature (Tobias, 1994) indicated that the presumed absence of relationship between these constructs was attributable to a number of problems in the design and measures used in studies reporting low interest-prior knowledge relationships. The review indicated that there was a strong, essentially linear relationship between interest and prior knowledge that accounted for about twenty percent of the variance.

I was appointed Editor for Educational Psychology of *Instructional Science*, an international journal. The Provost reduced my CCNY responsibilities by 25% to support the editorial role. I note that administrators can stimulate a research atmosphere on campus by supporting such efforts, and senior college officials should choose administrators who will support and stimulate a scholarly atmosphere. The reputation of universities is enhanced by the faculty's scholarly achievements, and

students attending universities that value research will be more familiar with current developments in their fields than those graduating from institutions where scholarship is less supported or valued. In my six years as Editor I learned a lot that was helpful in guiding students and editing a number of books and a *Newsletter* later. I was also amused to see how often there was little consensus among reviewers in their evaluations of manuscripts.

After I was designated a Fellow of both APA's Divisions of Educational and later School Psychology, the



members of the Division of Educational Psychology elected me President of that group. In the latter phases of my career, I felt more closely connected to the discipline and to colleagues at other institutions than to those at CCNY. Fortunately, economical communication by phone and email made stimulating interactions with colleagues around the country, and the world, as easy as walking down the hall to talk to colleagues. I also continued to attend and present at two or three conventions every year and attended sessions conscientiously to compensate for the intellectual stimulation missing on my campus.

Concentrating on scholarly work was not easy because the survival of my Department at CCNY was often at stake during difficult financial times. I served on the Executive Committee of the Department for many years to help manage crises during times of financial stress. After a lot of time spent on such school and faculty politics nothing much changed in the school or among my colleagues, and there was nothing to show for all that effort. When the financial crises eased I pulled back from these activities and concentrated on what mattered most, my teaching and research.

I was invited to spend seven consecutive summers at the Navy Personnel Research and Development Center (NPRDC) in San Diego. Much of the U.S. Navy's research on instruction was conducted there, and I consulted on different projects, ran a colloquium series by inviting well known researchers, and also started sessions in which NPRDC staff presented their projects. Even though there were no NPRDC funds available to support it, I started a cocktail hour in my apartment complex so that speakers and NPRDC staff could continue the discussions begun at colloquia. Creative and productive ideas were stimulated by such casual interactions. I was pleased to learn that there was more interaction among NPRDC staff during my seven summers there than at any other time. Again, administrators might note that devoting resources to invite prominent scholars for colloquia in a cordial social

milieu pays off in having a stimulating and intellectually lively atmosphere.

Leaving City College

In 1993 CUNY experienced additional financial problems. To economize, it offered an early retirement incentive to senior faculty. I learned that three of our newest and ablest colleagues would be retrenched unless there were five retirements from my Department. Tenure does not protect faculty if the University has insufficient funds. CUNY's retirement plan made it difficult to determine exactly how much my pension would amount to; the best estimate was that it would cover about 70% of my salary. I could not face myself sitting comfortably on a faculty line while three of the ablest people would be let go and, after discussing the matter with my wife, reached the decision to retire on the next day.

I found myself on the program four times on the same day at the 1972 AERA convention . . . I enjoyed the exposure, but four presentations on one day were a bit much.

The most unpleasant experience during my years at CCNY was when CUNY shut down for two weeks because the New York State legislature refused to fund the University. Faculty were urged to apply for unemployment insurance, to show the legislature that there were also costs attached to not funding the University. Faculty felt humiliated to apply for unemployment compensation. I felt this acutely after a survey published a few years earlier indicated that I was among the five most frequently published scholars in the most respected outlets.

Parenthetically, when I read the article about being among the most productive scholars, the Chair of the Secondary Education Department happened to be in my office. I was beaming with pleasure and showed him the article. He glanced at it, threw it back on my desk

saying, “Big deal, Gagne isn’t even mentioned. Who cares?” I realized then, as often before, that I should leave CCNY but that had been impossible because of aging relatives, and my mother in law’s six years of serious illness.

The two week shut down of the University was made even more memorable by a call received at home from Dick Atkinson, an eminent experimental psychologist and pioneer in the field of computer assisted instruction, who was then the Director of the National Science Foundation. I was Program Chair for one Division of the AERA convention that year and asked Dick, whom I had met casually, to give an invited talk. Atkinson declined the invitation, but we spent the next hour discussing the CUNY shut down. He was concerned about the message the University’s closing sent to graduate students preparing for academic research careers. The paradox between applying for unemployment compensation while being consulted about the impact of CUNY on future academics was dramatic. Similar unpleasantness may occur in the careers of colleagues because budget cuts for education are often the first option considered by conservative politicians. It is important for universities to build political support by highlighting the contributions academic research makes to health, national defense, the economy, and improving the quality of life.

I left City College with very mixed feelings. It had served me well, and I enjoyed teaching students who were looking to education as a way out of poverty, much the way I had. On the other hand, it was a pleasure to escape faculty meetings that took up valuable time and rarely dealt with scholarly matters. It was also a relief to leave behind an attitude of disinterest in serious research, and a preference for the revealed wisdom of anecdotal evidence among many education faculty and administrators. Finally, my name had been raised for Distinguished Professor. I found that I had more support for this honor in other Schools at the College than in the School of Education.

After leaving CCNY I began to have the most productive period of my academic life. I continued my research, undertook some consulting arrangements, and eventually joined other universities. “Distinguished” or “Eminent” were added to all my succeeding appointments. It was pleasant that the titles were offered by the other institutions, and while I negotiated about some aspects of the succeeding appointments I never had to do that for the honorific title. It was a welcome validation of my work.



About this time, popular constructivist approaches to instruction were being sharply criticized, most notably in an article by Kirschner, Sweller, and Clark (2006). Because scepticism and debate are the soul of research and, because hearing clashing views is always exciting, I organized a debate between constructivists and their critics at the 2007 AERA meeting. The debate was well received and we formulated a book on the subject right after the session was completed (Tobias & Duffy, 2009). In addition to chapters by proponents and opponents of constructivist instruction, authors on one side of this issue posed questions to those on the other side, to

which the questioners responded; sometimes there were several cycles of this dialog. It was a debate in print and contributed to the good reception received by the book; incidentally, we were informed recently that the book will be translated into Korean.

Collaborators

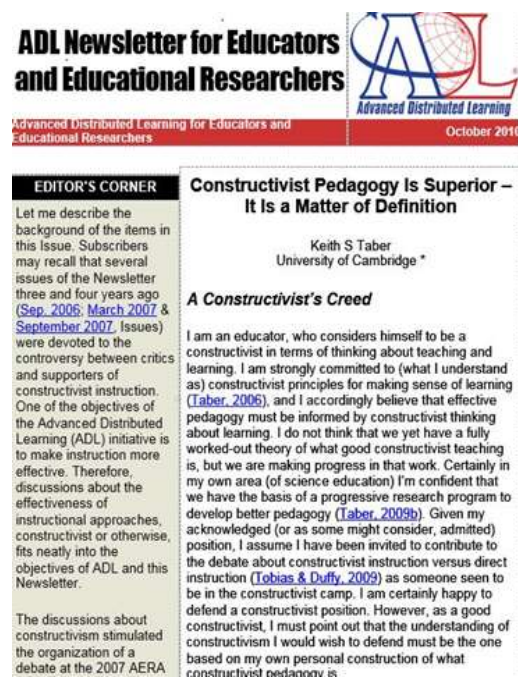
I have collaborated with many students and colleagues but have been especially fortunate in collaborations with Howard Everson and Dexter Fletcher. Everson, who had been my doctoral advisee and research assistant, became Vice President of the College Board, President of APA's Division of Educational Psychology, Professor in the Psychology Department at Fordham, and is presently Director of the Center for Advanced Study of Education at CUNY. We collaborated on a research program dealing with metacognitive knowledge monitoring.

In 1976 a doctoral student and I were kicking around some ideas about what contributed to students' poor reading skills. I reasoned that poor readers were probably unaware of what they knew and did not know, hence they could not easily repair comprehension problems. The study, conducted under my supervision, confirmed these expectations but the student never wrote it up for publication or presentation at a meeting. The research was conducted three years before the publication of Flavell's (1979) widely referenced article on metacognition. We did not call it metacognition, but it was a shame not to have the idea out there earlier.

Ten years later, Everson, other colleagues, students, and I worked on a program of research (Tobias & Everson, 2009) dealing with metacognitive monitoring of prior knowledge. As in the student's unpublished research our general hypothesis was that good, compared to poor, students were more accurate in monitoring their prior knowledge than their lower achieving peers and 26 studies confirmed and extended that

hypothesis. It has been a pleasant friendship and productive relationship for both of us.

In my seven summers at NPRDC I found friendly and productive relationships with people in the military. Similarly, I have collaborated closely with J. D. Fletcher, Institute for Defense Analyses.¹ This surprised me, a peacenick, liberal, and card carrying member of the Democratic Party - affiliations not known for closeness to the Defense Department. Fletcher's interest in training fits well with my work on learning from instruction in education. My major disagreements with him over more than 15 years have been that often each of us feels that the other should be first author on publications. I lost that argument all too often because while projects with Fletcher accounted for perhaps 70% of my recent work, they were only 20% of his.



ADL Newsletter for Educators and Educational Researchers
Advanced Distributed Learning for Educators and Educational Researchers
October 2010

EDITOR'S CORNER

Let me describe the background of the items in this issue. Subscribers may recall that several issues of the Newsletter three and four years ago (Sep. 2006; March 2007 & September 2007. Issues) were devoted to the controversy between critics and supporters of constructivist instruction. One of the objectives of the Advanced Distributed Learning (ADL) initiative is to make instruction more effective. Therefore, discussions about the effectiveness of instructional approaches, constructivist or otherwise, fits neatly into the objectives of ADL and this Newsletter.

The discussions about constructivism stimulated the organization of a debate at the 2007 AERA

Constructivist Pedagogy Is Superior – It Is a Matter of Definition

Keith S. Taber
University of Cambridge *

A Constructivist's Creed

I am an educator, who considers himself to be a constructivist in terms of thinking about teaching and learning. I am strongly committed to (what I understand as) constructivist principles for making sense of learning (Taber, 2005), and I accordingly believe that effective pedagogy must be informed by constructivist thinking about learning. I do not think that we yet have a fully worked-out theory of what good constructivist teaching is, but we are making progress in that work. Certainly in my own area (of science education) I'm confident that we have the basis of a progressive research program to develop better pedagogy (Taber, 2009b). Given my acknowledged (or as some might consider, admitted) position, I assume I have been invited to contribute to the debate about constructivist instruction versus direct instruction (Tobias & Duffy, 2009) as someone seen to be in the constructivist camp. I am certainly happy to defend a constructivist position. However, as a good constructivist, I must point out that the understanding of constructivism I would wish to defend must be the one based on my own personal construction of what constructivist pedagogy is.

ADL. The ADL initiative, Fletcher's brain child (see Fletcher, this series), has well over six million instructional objects available online for training (Fletcher, Tobias, & Wisher, 2007) and education; data about students' learning and personal characteristics can be stored by the objects for succeeding research. ADL's purpose is to create such objects and make them accessible

¹ See J. D. Fletcher's *Acquired Wisdom Series* essay, forthcoming in 2016.

for reuse in other courses, thereby substantially reducing development costs. For example, once an instructional object dealing with the law of supply and demand is available, it does not have to be reprogrammed for other courses. ADL's ultimate goal is to assemble education, training, or decision aiding materials in real time and on demand from the global information grid, making them available anytime, anywhere.

Over 70% of ADL's instructional objects have equal applicability to training in civilian and military contexts, and to education. It is, therefore, a shame that these objects are hardly known in education, even though there are quite a number of them specifically intended for educational uses (Schlais & Wirth, 2007). I tried to raise the profile of ADL in the educational community by publications, presentations at meetings, and by editing the *ADL Newsletter for Educators and Educational Researchers* that was freely available online (<http://research.adlnet.gov/newsletter/academic/>). It has been a slower process than expected, probably because training and education researchers pay insufficient attention to each other's work.

ADL's instructional objects work on any computer platform, will continue to do so with future upgrades, and will ultimately be retrievable from Personal Learning Associates that are no bigger than today's cell phones. These features required a heavier emphasis on software engineering than on learning. Despite that, it is still a surprise that closely related fields such as education and training which use similar methods and procedures, though their aims may differ (Tobias & Fletcher, 2000), have so little contact with each other. Hopefully these fields, which have much to gain by collaboration, will interact more closely in the future.

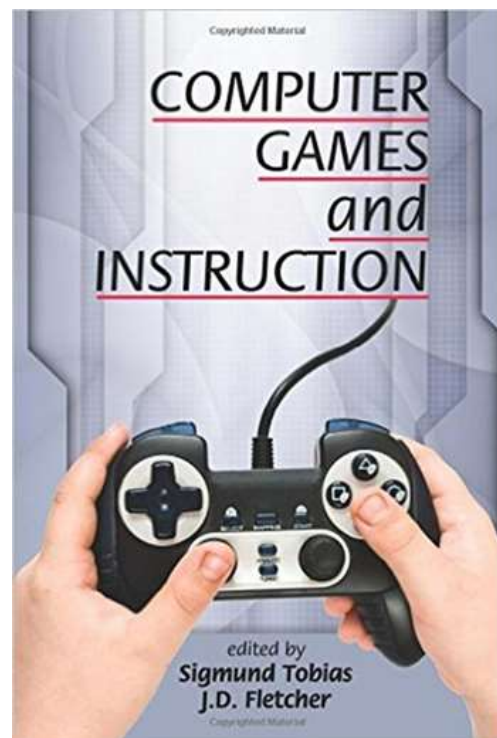
My interests in computer science, cognitive psychology, and training, shared with Fletcher and other collaborators, make it fun to kick ideas around in person, by phone, or email. Colleagues have helped me enormously to find resources to support my

research and involve students in it. Most of my present work, described below, has been in collaboration with these colleagues and students.

Present Projects

My present work, in addition to this *Acquired Wisdom* project, falls into two areas, computer games, and cognitive readiness for dealing with the unexpected.

Computer games. Interest in the use of computer games for instruction is rapidly growing. Such games are important because people of all ages love to play them (Tobias & Fletcher, 2011a), and there are a number of games lending themselves readily to educational purposes (Games & Squire, 2011; Squire, 2011). Especially interesting are suggestions that computer games may be particularly beneficial for students from lower socio-economic backgrounds (Dai & Wind, 2011; Tobias & Fletcher, 2011c) who have difficulties learning in school. We hope to stimulate further research to support the utility of games for instruction. In addition to publishing an edited book about games (Tobias & Fletcher, 2011b) we have monitored that literature for almost 10 years (Fletcher & Tobias, 2006; Tobias, Fletcher,



& Wind, 2012; Tobias, Fletcher, Bediou, Wind, & Chen, 2014). We have also completed an article summarizing the work of a decade in this area (Tobias, Fletcher & Chen, 2015).

Dealing with the unexpected.

Cognitive readiness to deal with unexpected events (Fletcher & Wind, 2012) is an essential 21st century skill. Upon graduation students will probably find that a good deal of what they learned has become dated, and they will need to adjust to these unanticipated changes by updating their knowledge and skills. The military is also often faced with unexpected situations, from conducting relief after natural disasters, such as earthquakes and tsunamis, to fighting insurgencies no one anticipated.

The unexpected occurrence of such events makes it impossible to prepare anyone to deal with them effectively. It is, therefore, important to understand how people deal with the unexpected before developing training programs to increase the effectiveness of individuals' approaches to such situations. We have developed a procedure to study adapting to the unexpected experimentally (Tobias & Fletcher, 2010a) and have started research in this area (Tobias & Fletcher, 2009, 2010b; Tobias, Fletcher, Wind, & Lafave, 2011; Chen & Tobias, 2014). Once a clearer understanding of the construct is attained it becomes possible to study how individuals may be trained to deal with unexpected events, or how to select individuals who function well in such situations so they can be assigned to deal with them.

Lessons Learned

I learned six major lessons from my experiences in educational psychology and educational research, in addition to those mentioned above *en passant*.

I. The Positive Effects of Failure.

Early in my career I was impressed by the role knowledge of response correctness (KRC) had in student learning. Observation of students convinced me that there were large differences among them in the need for

KRC, so I developed a scale to measure it. It had items like: *Correct answers to tests should be provided immediately after the test. Bus drivers should announce the location of stops. Elevators should display directories of occupants on each floor,* and the like. I fiddled with the scale until the reliability was above .90 in pilot studies. In a validation study participants were asked to construct responses to interesting items of medium difficulty like: *The first atomic bomb was dropped over which city? In which country are the greatest number of diamonds found?* The answers were covered by tabs and participants told to rip off the tab if they wanted to know the correct answers.

In a field where phenomena are affected by numerous variables that cannot be controlled, some failure is inevitable. Trying to find the reasons for failing can be as useful as following up a success.

I expected, of course, that the number of tabs ripped off would correlate highly with scores on the need for KRC scale. After a year's work the correlation turned out to be -.02. The results were so crushing that the exact year in which this study was run is still repressed and, despite being a pack rat, copies of items, or data cannot be found. While thinking about this, to me then, colossal failure I realized that people's need for KRC probably varied by how well they knew different subjects. I had little need for KRC in the research literature with which I was familiar, or in current events, or developments in the world of opera. In mathematics, physics, or biology, however, my need for KRC was substantial. That failure made me realize the importance of prior knowledge, and later in my career led to lots of studies, research reviews, and theoretical formulations about the importance of prior knowledge in adapting instruction to students.

The minor lesson learned was that reliability means nothing in the absence of construct validity. The major lesson is also

obvious. It is important not to be deterred by a research failure. In a field where phenomena are affected by numerous variables that cannot be controlled, some failure is inevitable. Trying to find the reasons for failing can be as useful as following up a success.

II. The Value of Teaching

Observations. My teaching was evaluated twice a year until I received tenure. On my first evaluation, two friends observed my teaching and saw the worst lesson I ever gave. Since the evaluators were friends, I deluded myself into thinking I was relaxed and not at all anxious about the observation. The denied anxiety interfered with my thinking, the coherence of my lecture, and the ease with which I usually generated illustrative examples. I learned that it was possible to function reasonably well with anxiety when I was aware of it; denying it, however, was very debilitating.

Having one's teaching observed is an evaluative situation, similar to test anxiety, and it is reasonable to be anxious about it. New instructors should prepare more carefully than usual, or use whatever other anxiety coping mechanisms work for them, when they are evaluated because they need to give a good lesson despite the anxiety. Denying anxiety is the worst thing they can do, since – even though it is denied – the anxiety will continue and will interfere with the effectiveness of their teaching.

III. Limited Applicability of Psychoanalysis and the Medical Model to Education. Even though I have personally been helped by psychoanalysis, I doubt the value of both psychoanalytic theory and the medical model for education. The core principle of psychoanalysis, i.e., that the underlying causes of behaviour have to be identified, may be helpful for middle class angst but not for teaching. It does not matter whether students do not learn in school because of their repressed anger at mothers, fathers, or anyone else- instructors still have to teach their students and enhance their capabilities. Knowing the causes for

students' behavior is not much help in that difficult work.

The medical model of providing treatment once a problem develops also has limited applicability to education. It is much more valuable to invest resources to prevent the occurrence of learning problems than to remediate them. While directing some applied projects in Health Occupations Education (Tobias, 1981), I learned that the most important developments in medicine, from the perspective of improving the health of the population, were such mundane things as purifying the water supply and sanitary disposal of garbage. What do we have in psychology that is even a tiny bit as useful in preventing the development of problems? It is much more important to teach effectively during initial instruction than to rely on remedial or therapeutic efforts later to compensate for ineffective instruction.

Deemphasizing remedial efforts may sound heartless, but I do not advocate eliminating remedial specialists, school counsellors, or psychologists. Instead counsellors, psychologists, and other mental health personnel should concentrate on preventing the occurrence of problems rather than treating them once they have developed. For example, teaching techniques to reduce conflict, or express anger in constructive ways (Marcus, Deutsch, & Coleman, 2006) can have a larger positive impact on the mental health of whole schools than individual or group counselling. Similarly, brief individual and group test anxiety reduction programs originated in behavioral psychology, augmented by study skills training, have been consistently found to be effective (Ergene, 2003), and will improve the lives of more students than any intensive psychotherapy.

IV. The Importance of Improving School Learning. During the 1960s and early 1970s, funded programs often ended with results indicating that, what were then called, "underprivileged," students felt better about themselves, or had higher levels of aspiration. Unfortunately, results often also indicated that school achievement was

stubbornly unaffected by some of these interventions. The project evaluators often reported, sometimes eloquent, conclusions about the value of the intervention in improving the important “intangibles,” while acknowledging only obliquely that school achievement was unaffected.

There are many problems with such project evaluations (Tobias, 1978a), the main one being that the results should have been *labelled as failures*. It is in the joint interests of evaluators and project directors to make results look good so that future projects will be funded. Unfortunately, implying or suggesting that such failed projects are partially successful makes it seem as if positive outcomes on the intangibles are almost as important as increases in achievement. Of course, they are not. Such positive outcomes are often based on observations, rating, or attitude scales of questionable reliability and validity, while the achievement measures are highly valid. While there are lots of problems with multiple choice achievement tests, the results would probably have been similar had they examined student essays or portfolios. Improving school learning is difficult and cannot be accomplished easily. Sugar coating a failure delays the search for more effective interventions.

V. Developing Research Cultures.

Faculty and administrators interested in developing research cultures should try to hold as many faculty meetings devoted to scholarly issues as they do to administrative matters. In places where a research culture does not yet exist, faculty could read and then meet to discuss important developments in state of the art scientific or professional publications. Wise administrators should provide resources for light libations at these meetings to create a collegial atmosphere. Furthermore, if possible, administrators should support signs of faculty involvement in research by rewarding them in some way.

I recall being invited by Dick Clark (then at the School of Education at Syracuse University and now at the University of

Southern California) to participate in an innovative program intended to raise the research atmosphere at his institution. Clark invited about a dozen well known researchers to visit the campus and give a University-wide talk, a talk to the School of Education, and then meet for a long session with graduate students. While such a program sounds expensive, the creative way Dick designed it can make it cost effective. The students with whom we met were registered for a graduate course. From the University’s perspective, having a well-known professor give that course would have been more expensive than the costs of this program. The students and the University were happy with the program’s effects. Speaking for myself, the visit was a stimulating experience, as was learning about a project well worth copying elsewhere.

*There are no panaceas that will
easily improve learning for
everyone, because good instruction
is hard work and difficult to do.*

VI. No Panaceas. The late Dick Snow, a friend and colleague at Stanford, once commented that research on instructional innovations seemed to him like a random walk through the panacea garden. I have become sceptical of any instructional development, theory, or instructional method that is expected to improve learning for all students in all subjects. I have lived through prior panaceas like programmed and computer assisted instruction, multimedia education, computer games, and educational movements such as progressive, competency based, open corridor, and inquiry education, and the current panacea- constructivist instruction- from all of which I learned something. *There are no panaceas that will easily improve learning for everyone*, because good instruction is hard work and difficult to do. Anyone who tells you something different is either naïve, or a skill for whatever they are hawking.

We (Fletcher & Tobias, 2012) have overviewed research on various iterations of educational technology and found that the evidence suggests, after half a century's work, that CAI has modest benefits, i.e., an effect size of .35 (Tamim, Bernard, Borokowski, Abrami, & Schmid, 2011). That is, such instruction "can increase learning from roughly the median to about the 65th percentile (Fletcher & Tobias, 2012 p. 15)." That conclusion is based on *1055 studies*. The size of the learning improvement is pretty stable since another review (Sosa, Berger, Saw, & Mary, 2011) reported virtually the same effect size (.33); previously Kulik (1994) and Fletcher (1991) reported very similar data. Such improvement is more modest than anticipated by enthusiasts for CAI, but at least a stable, positive effect has been reliably replicated.

I wish we had similar findings in other areas of educational technology, educational psychology, or educational research. The magnitude of the effect for other instructional procedures is unclear, but my guess is that if the outcomes are positive, the size of the effect will be modest. Learning in schools is affected by a host of complex personal and situational variables, by interactions with teachers, students, and family, by the organization and complexity of the subject matter, to mention the major variables- of course there are yet others. Furthermore, these variables may well work additively or interactively, making accurate predictions about their effects very risky. If anyone promises huge effects for any present or future panacea, the results should be reviewed very carefully.

Final Word

In 1964 Hilgard thought he was writing the obituary of Gestalt psychology (Bower & Hilgard, 1981) because it had generated so little research compared to stimulus-response approaches to learning. Amusingly, Hilgard was probably writing the chapter (1964) a year or two before it was published just as the paradigm shift to a cognitive orientation was beginning and Gestalt psychology was an important

forerunner of cognitive psychology. While Gestalt psychology has waned in popularity cognitive psychology, its intellectual descendent, became the major approach in the field for many years, and still has many adherents despite the contemporary predominance of the constructivist paradigm (Tobias & Duffy, 2009).

*Progress will be slow, but it will
come if we continue working hard
and creatively to bring it about . . .*

Hilgard's 1964 chapter illustrates two things. First, it is always dangerous to pronounce the demise of a paradigm. New knowledge is developing so rapidly that a moribund paradigm may unexpectedly come to life, or the waning paradigm may give birth to a vibrant descendant. Second, the best criterion for the vitality of a paradigm is the amount of research stimulated by it. Any inadequacy in accounting for phenomena or predicting them will be readily revealed for paradigms that stimulate research leading either to their modification or abandonment.

My work has ranged over a number of areas and I have been eclectic in advocating any paradigm, though a unifying theme has been investigating learning from instruction. Studying such learning is exciting because everyone goes to schools of some kind and improving school learning is important for the transmission of knowledge and skills from one generation to another so that people can function more effectively in their environments. Clearly, there is a lot to learn, because our ignorance is much greater than our knowledge.

I have enjoyed my work despite the panaceas that come and go while the problems of improving school learning remain. The difficulties of facilitating school learning are increasing because we are not doing very well educating poor children (Berliner, 2009) and, unfortunately, there will be more such students because poverty is increasing in the United States. Progress will be slow, but it will come if we continue working hard and creatively to bring it about.

Post Script

Three of the seven distinguished researchers whose autobiographical chapters (Berliner, 2016; Sternberg, 2016; Sweller, 2016) I edited, and one that is in process (Gordon, in press), indicate that they were poor or indifferent students early in their academic careers. That is also true of me; so five of the first seven scholars in the *Acquired Wisdom* series were poor students. I did not explicitly mention my studying difficulties in this chapter because they had already been described in my memoir about how my family found safe haven from the Holocaust in Shanghai, China, during World War II (Tobias, 2009). It may be useful to examine my difficulties and how they relate to educational practice and concepts in the contemporary educational psychology literature.

I was a very slow student in the secular school started by refugees in Shanghai, and the tutoring I received in two subjects was not helpful. My written work was laborious and grossly inadequate, and I had pretty well accepted being a slow student. It did not surprise me, or anyone else, that this ineptitude was inconsistent with my reading fluency in Hebrew, Yiddish, English and German; I would probably be diagnosed as dyslexic in today's schools.

In the early 1940s the Mirrer Yeshiva (rabbinical seminary) also found refuge in Shanghai; the Mirrer's were known for their intense study of the Talmud that forms the basis of sacred and secular Jewish law. My memoir describes how one day senior students from the Yeshiva started asking me about what I had learned in Hebrew school. I answered the first few questions easily, searched a bit as they became more difficult, and then gave answers that were little more than educated guesses to really difficult questions. Finally, a question was posed with which I could not deal at all, and admitted as much. One of the most

respected scholars participating in my informal oral examination said it was not a fair question for a 10-year old and noted that the questioner would have trouble answering it adequately. He turned away and complimented me for having "a good head."

This was the first time anyone had ever said that about me since I started in the secular school and, of course, it was music to my ears. Yeshiva students then began urging me to join them in full time study in the Yeshiva. After that I pestered my parents insistently until they finally allowed me to abandon secular schooling and study Talmud full time, and I became one of the better young students in the Yeshiva.

Several aspects of studying in the Yeshiva are of interest to schooling generally. The most important was that at the age of 10 I was intoxicated by the subject matter studied. The opening issue posed in the first volume of Talmud I studied dealt with two people who found a garment and claimed full ownership of it. While the situation dealt with a garment, it could be generalized to anything that two people find to which they both claim full separate ownership. This question was examined from a variety of different perspectives including references to similar issues in the Torah, the five books of



Students and teachers of the exiled Mir Yeshiva, Beth Aharon synagogue in Shanghai, 1942. (Public domain)

Moses. I was excited to be studying such a consequential subject involving important decisions in the lives of people rather than the curriculum in the secular school, which held little interest for me. I found succeeding subjects in the Talmud equally exciting and usually spent at least eight hours on six days a week studying Talmud, taking most Saturdays off for extended Sabbath prayer services and rest.

The second feature of Yeshiva learning that I liked was that I had a study partner, my friend Siegfried Loebel, during all my time there. We would go over the material, discuss the arguments, and sometimes enlarge upon them. A further important feature for me was that study in the Yeshiva did not require any writing; we read and discussed the Talmud with each other, with our teachers, or with other students. Obviously, not writing was a relief after my difficult penmanship in the secular school.

Finally, shortly after starting in the Yeshiva, two senior students encouraged me and my study partner to ask them for help with anything that came up. It was clear that they meant it, because they told us not to be deterred if they seemed preoccupied with their own studies, and both Loebel and I took advantage of their generous offer when we hit an impasse in understanding the Talmud. Eventually, after the Holocaust and several other developments, I lost the unshakable faith needed to continue studying in the Yeshiva and resumed my secular education when I emigrated into the United States.

From my experience, the most important caution for educators is that labeling students as slow can be harmful to them. Labels can be imprecise at best and may well be quite wrong, as they were for five of the seven scholars mentioned above. These experiences also highlight several important themes in contemporary educational psychology. Cooperative learning remains a perennial topic in instruction, as is the importance of arousing student interest which is frequently endorsed by all approaches to instruction and often validated by empirical research. More recently using

materials specifically relevant to the lives of students has been advocated by constructivist approaches. Surprisingly, however, I am not aware of any empirical studies that examine learning differences when the same content is taught in a context relevant to students or in a more neutral context. I hope someone will take the trouble to study this question empirically.

Interest has also become a major research topic and I have thought about it and published two papers (Tobias, 1994, 1995) in that area. Clearly, what attracted me to the Talmud was the engaging aspects of the subjects taken up. I worked hard studying Talmud after my interest was aroused by the materials. That is a useful reminder to educators about the importance of finding content that is appealing to students. Every student is interested in something. The trick, of course, is to relate that interest to the subject being taught.

Deep analyses of the meanings of texts and intense elaboration of that analysis by discussion were the principal instructional methods used in the Yeshiva, and evaluation occurred solely by oral interaction. That differed dramatically from the secular school in Shanghai where lecture, writing, and rote memorization were the principal instructional methods and written work was used for evaluation. In retrospect, I now realize that it was not an accident that adapting instruction to student characteristics and test anxiety were the major themes of my research for over a quarter of a century, as can easily be seen by scanning the references at the end of this chapter. Clearly, studying in the *Mirror Yeshiva* had a major, and positive, effect on my later academic career.

It is amusing that in my later years, especially once I had my own computer (all the way from the Apple II to more powerful PCs today), I enjoy writing tremendously and write fluently and easily on professional or more general subjects to frequently favorable reviews. My handwriting is still awful and even I often have trouble figuring out what I wrote a few days earlier. Educators might note that finding the right assistance or

technology to reduce specific problems of some students may turn slow students into capable ones. I would not be surprised if that is one of the reasons that a further major theme in my research has been the use of educational technology, which does much to enable such individualization – another perennial topic in education from Thorndike (1906) on.

Having senior students in the Mirror Yeshiva volunteer to help when needed was also important to my becoming a more capable student. In contemporary research such help relates to research on guidance during instruction. All approaches to instruction acknowledge that guidance is important, although constructivists and their critics differ about what constitutes effective guidance (Wise & O’Neil, 2009). I have not studied that area but my guess is that useful guidance helps students do for themselves what they could not accomplish without guidance, something Vygotski (1978) and his followers have called the zone of proximal development. Much research is still needed to convert the determination of that zone from the art it is today to being able to make empirically based prescriptions.

Despite the early experiences of the value of collaborative learning with my study partner in the Yeshiva I was the sole author on most of my early publications. That was probably because there were few people on my campus with similar interests, even though I had some collaborations with my colleague Hope Hartman (Everson, Tobias, Hartman, & Gourgey, 1993; Hartman, Everson, Tobias, & Gourgey, 1996) near the

end of my time at CCNY. Multiple authorships, especially extensive and very productive collaborations with Howard Everson, who had been my student, and Dexter Fletcher, co-editor of the *Acquired Wisdom* series, are much more common in my later publications. It was also a pleasure to work with and publish with capable students during most of my career.

It has become a truism that rewarding students facilitates learning. In the secular school in Shanghai printed stars were dispensed for good work. Students could receive from one to five either gold or silver stars. I rarely received any stars for anything. Therefore, being judged as capable by one of the ablest Talmudic scholars in the yeshiva was an incredible reward that helped change my life. Educators should note that in addition to finding subjects that interest students, it is important to get to know them well enough to learn what motivates them and reward their work. My guess is that such reinforcement is especially important for slow students who receive very little reward in schools, another subject deserving more thorough investigation. Educators should work to determine what such students are good at and find a way to relate that to the school’s curriculum. This sounds easy but is very difficult and time consuming for teachers burdened with too many students, too much administrative trivia, and far too little pay for the most important work in any society.

References

- Anderson, J. R. (1983). *The architecture of cognition*. Cambridge, MA: Harvard University Press.
- Berliner, D. C. (2009). Are teachers responsible for low achievement by poor students? *Kappa Delta Pi Record*, 46, 18-21.
- Berliner, D. C. (2016). [An unanticipated successful career](http://dx.doi.org/10.14507/er.v23.2078). In S. Tobias, J. D. Fletcher, & D. C. Berliner (Series Eds.), *Acquired Wisdom Series, Education Review*, 23. <http://dx.doi.org/10.14507/er.v23.2078>

- Chen, F., & Tobias, S. (2014, April). *Cognitive processes in adapting to unexpected changes: The role of metacognitive monitoring*. Paper presented at the annual convention of the American Educational Research Association convention, Philadelphia.
- Dai, D. Y., & Wind, A. P. (2011). Computer games and opportunity to learn: Implications for teaching students from low socioeconomic backgrounds. In S. Tobias & J. D. Fletcher (Eds.), *Computer games and instruction* (pp. 477-500). Charlotte, NC: Information Age.
- Ergene, T. (2003). Effective interventions on test anxiety reduction. A meta-analysis. *School Psychology International*, 24, 313-328.
- Everson, H. T., Tobias, S., Hartman, H., & Gourgey, A. (1993). Anxiety and the curriculum: The subject matters. *Anxiety, Stress, and Coping*, 6, 1-8.
- Flavell, J. (1979). Metacognition and cognitive monitoring: A new area of cognitive developmental inquiry. *American Psychologist*, 34, 906-911.
- Fletcher, J. D. (1991). Effectiveness and cost of interactive videodisc instruction. *Machine Mediated Learning*, 3, 361-385.
- Fletcher, J. D., & Tobias, S. (2006, February). Using computer games and simulations for instruction: A research review. *Proceedings of the Society for Advanced Learning Technology meeting*, Orlando, FL.
- Fletcher, J. D., Tobias, S., Wisner, R. A. (2007). Learning anytime, anywhere: Advanced Distributed Learning and the changing face of education. *Educational Researcher*, 36 (2), 96-102.
- Fletcher, J. D., & Tobias, S. (2011). Turning the corner in Educational Technology: Reflections on a half-century of research. *Educational Technology*, 51 (5), 14-20.
- Fletcher, J. D., & Wind, A. P. (2012). The evolving definition of cognitive readiness for military operations. In H. F. O'Neil, Jr., R. S. Perez, & E. L. Baker (Eds.), *Teaching and measuring cognitive readiness* (pp. 25-52). New York, NY: Springer.
- Games, A., & Squire, K. D. (2011). Searching for the fun in learning: A historical perspective on the evolution of educational video games. In S. Tobias & J. D. Fletcher (Eds.), *Computer games and instruction* (pp. 17-46). Charlotte, NC: Information Age.
- Gick, M. L., & Holyoak, K. J. (1983). Schema induction and analogical transfer. *Cognitive Psychology*, 15, 1-38.
- Goldstone, R. L., & Day, S. B. (2012). Special issue: New Conceptualizations of Transfer of Learning. *Educational Psychologist*, 47, 149-258.
- Gordon, E. G. (In press). On becoming an agentic African American scholar. In S. Tobias, J. D. Fletcher, & D. C. Berliner (Series Eds.), *Acquired Wisdom Series, Education Review*, 23.
- Hartman, H. J., Everson, H. T., Tobias, S., & Gourgey, A. (1996). Self-concept and metacognition in ethnic minorities: Predictions from the BACEIS model. *Urban Education*, 31, 222-238.
- Hilgard, E. R. (1964). The place of Gestalt psychology and field theories in contemporary learning theory. In E. R. Hilgard (Ed.), *Theories of learning and instruction. 63rd Yearbook of the National Society for the Study of Education*. Part 1 (pp. 54-77). Chicago, IL: University of Chicago Press.
- Kirschner, P. A., Sweller, J., & Clark, R. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential and inquiry-based teaching. *Educational Psychologist*, 41, 75-86.
- Kulik, J. A. (1994). Meta-analytic studies of findings on computer-based instruction. In E. L. Baker & H. F. O'Neil, Jr. (Eds.), *Technology assessment in education and training* (pp. 9-34). Hillsdale, NJ: Lawrence Erlbaum.
- Lesgold, A. (In press). It takes a village of mentors. In S. Tobias, J. D. Fletcher, & D. C. Berliner (Series Eds.), *Acquired Wisdom Series, Education Review*, 23.
- Marcus, E., Deutsch, M., & Coleman, P. T. (Eds.). (2006). *The handbook of conflict resolution* (Second Edition). New York, NY: Wiley.

- Mestre, J. P. (2005). *Transfer of learning from a modern multidisciplinary perspective*. Greenwich, CT: Information Age.
- Schlais, H. & Wirth, D. (2007). ADL instructional objects for educational use. *ADL Newsletter for Educators and Educational Researchers*.
<https://mail.google.com/mail/?shva=1#inbox/13e6a9b796b04b92>
- Sosa, G. W., Berger, D. E., Saw, A. T., & Mary, J. T. (2011). Effectiveness of computer- assisted instruction in statistics. A meta-analysis. *Review of Educational Research*, 81, 97-128.
- Squire, K. (2011) *Video games and learning. Teaching and Participatory Culture in the Digital Age*. New York, NY: Teachers College Press.
- Sternberg, R. J. (2016). Wisdom applied: The secret sauce that has allowed me already to have achieved immortality. In S. Tobias, J. D. Fletcher, & D. C. Berliner (Series Eds.), Acquired Wisdom Series, *Education Review*, 23. <http://dx.doi.org/10.14507/er.v23.2089>
- Sweller, J. (2016), The story of a research program. In S. Tobias, J. D. Fletcher, & D. C. Berliner (Series Eds.), Acquired Wisdom Series, *Education Review*, 23.
<http://dx.doi.org/10.14507/er.v23.2025>
- Tamim, R. M., Bernard, R. M., Borokowski, E., Abrami, P. C., & Schmid. R. F. (2011). What forty years of technology say about the impact of technology on learning: A second-order meta-analysis and validation study. *Review of Educational Research*, 81, 4-28.
- Thorndike, E. L. (1906). *Principles of teaching, based on psychology*. New York: A. G. Seiler.
- Tobias, S. (1973). Sequence, familiarity, and attribute by treatment interactions in programmed instruction. *Journal of Educational Psychology*, 64, 133-141.
- Tobias, S. (1976). Achievement treatment interactions. *Review of Educational Research*, 46, 61-74.
- Tobias, S. (1977a). A model for research on the effect of anxiety on instruction. In J. Sieber, H. F. O'Neil, Jr., & S. Tobias, *Anxiety, learning and instruction* (pp. 223-240). Hillsdale, NJ: Lawrence Erlbaum.
- Tobias, S. (1977b). Introduction. In S. Tobias (Ed.), *Statwide business education evaluation committee*. New York, NY: Institute for Research and Development in Occupational Education, Center for Advanced Study in Education, CUNY.
- Tobias, S. (1978a). Introduction. In S. Tobias (Ed.), *Statwide Business Education Review Committee, 1977-1978*. New York: Institute for Research and Development in Occupational Education, Center for Advanced Study in Education, CUNY.
- Tobias, S. (1978b). Educational evaluation: The missing feedback loop. *CEDR Quarterly*, 2(2), 14-16, 21.
- Tobias, S. (1979). Anxiety research in educational psychology. *Journal of Educational Psychology*, 71, 573-5.
- Tobias, S. (1980a). Introduction. In S. Tobias (Ed.), *Examination of the Health Occupations Education curriculum from futurist perspective: I*. Institute for Research and Development in Occupational Education, Center for Advanced Study of Education, CUNY.
- Tobias, S. (1980b). Test anxiety and instruction. (Chapter 13) In I. G. Sarason (Ed.), *Test anxiety: Theory, research, and application* (pp. 289-309). Hillsdale, NJ: Lawrence Erlbaum.
- Tobias, S. (1981). Introduction. In S. Tobias (Ed.), *Examination of the Health Occupations Education Curriculum from a futurist perspective: II*. Institute for Research and Development in Occupational Education, Center for the Advanced Study of Education, CUNY.
- Tobias, S. (1982). When do instructional methods make a difference? *Educational Researcher*, 11(4), 4-9.
- Tobias, S. (1994). Interest, prior knowledge, and learning. *Review of Educational Research*, 64, 37-54.
- Tobias, S. (1995). Interest and metacognitive word knowledge. *Journal of Educational Psychology*, 87, 399-405.
- Tobias, S. (2009a). *Strange haven: A Jewish childhood in wartime Shanghai*. Champaign, IL: University of Illinois Press.

- Tobias, S. (2009b). An eclectic appraisal of the success or failure of constructivist instruction. In S. Tobias, & T. D. Duffy (Eds.), *Constructivist instruction: Success or failure?* (pp. 335-350). New York: Routledge, Taylor and Francis.
- Tobias, S., & Duffy, T. D. (2009c). *Constructivist instruction: Success or failure?* New York, NY: Routledge, Taylor and Francis.
- Tobias, S. & Everson, H. T. (1977). *High school-community college articulation follow-up*. New York, NY: Institute for Research and Development in Occupational Education, Center for Advanced Study in Education, CUNY.
- Tobias, S., & Everson, H. T. (2009). The importance of knowing what you know: A knowledge monitoring framework for studying metacognition in education. In D. L. Hacker, J. Dunlosky, & A. Graesser (Eds.), *Handbook of metacognition in education* (pp. 107-127). New York, NY: Routledge, Taylor, and Francis.
- Tobias, S., & Fletcher, J. D. (Eds.). (2000). *Training and retraining: A handbook for business, industry, government, and the military*. New York, NY: Macmillan Gale.
- Tobias, S., & Fletcher, J. D. (2009, February). *Teaching adaptability and preparation for the unexpected*. Paper presented at the annual convention of the Eastern Educational Research Association, Sarasota FL.
- Tobias, S., & Fletcher, J. D. (2010a). A tool for research on cognitive readiness for adapting to the unexpected. *ADL Newsletter for Educators and Educational Researchers*. Issue 14. <http://research.adlnet.gov/newsletter/academic/201004.htm>
- Tobias, S. & Fletcher, J. D. (2010, February). *Cognitive readiness to deal with the unexpected and metacognition*. Paper presented at the annual convention of the Eastern Educational Research Association, Savannah, GA.
- Tobias, S., & Fletcher, J. D. (2011a). Introduction to computer games and instruction. In Tobias, S. & Fletcher, J. D. (Eds.), *Computer games and instruction* (pp. 3-5). Charlotte, NC: Information Age.
- Tobias, S., & Fletcher, J. D. (2011b). *Computer games and instruction*. Charlotte, NC: Information Age.
- Tobias, S., & Fletcher, J. D. (2011c). Computer games and instruction. The present and future. In S. Tobias & J. D. Fletcher (Eds.) *Computer games and instruction* (pp. 525-545). Charlotte, NC: Information Age.
- Tobias, S., Fletcher, J. D., Wind, A., & Lafave, M. (2011, February) *Dealing with the unexpected. A pilot study*. Paper presented at the annual convention of the Eastern Educational Research Association, Sarasota, FL.
- Tobias, S., Fletcher, J. D., Bediou, B., Wind, A.P., & Chen, F. (in press). Multimedia learning from computer games. In R. Mayer (ed.), *The Cambridge handbook of multimedia learning: Second Edition*. New York, NY: Cambridge University Press.
- Tobias, S., Fletcher, J. D., & Wind, A. (2013). Game based learning. In M. Spector, M. D. Merrill, J. Elen, & M. J. Bishop (Eds.) *Handbook of Research on Educational and Communications Technology* (4th Ed.) (pp. 485-504). Sponsored by the Association for Educational Communications and Technology. New York, NY: Springer.



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. Invitations to potential authors were accompanied by Tobias' chapter in this series for illustrative purposes.

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.



Acquired Wisdom

Edited by

Sigmund Tobias

J. Dexter Fletcher

David C. Berliner

University at Albany

Institute for Defense Analyses

Arizona State University

State University of New York

Alexandria VA

Tempe AZ


Advisory Board Members

Gustavo Fischman, Arizona State University

Arthur C. Graesser III, Memphis State University

Teresa I. McCarty, University of California Los Angeles

Kevin Welner, Colorado State University

 *Education Review/ Reseñas Educativas/ Resenbas Educativas* is supported by the edXchange initiative's Scholarly Communications Group at the Mary Lou Fulton Teachers College, Arizona State University. Copyright is retained by the first or sole author, who grants right of first publication to the *Education Review*. Readers are free to copy, display, and distribute this article, as long as the work is attributed to the author(s) and ***Education Review***, it is distributed for non-commercial purposes only, and no alteration or transformation is made in the work. More details of this Creative Commons license are available at <http://creativecommons.org/licenses/by-nc-sa/3.0/>. All other uses must be approved by the author(s) or ***Education Review***. ***Education Review*** is published by the Scholarly Communications Group of the Mary Lou Fulton Teachers College, Arizona State University.

Please contribute reviews at <http://www.edrev.info/contribute.html>.

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