



IN MEMORIAM

Barbara Y. White
Professor, Graduate School of Education
UC Berkeley
1949-2014

Barbara White, a distinguished member of the Graduate School of Education, died after a lengthy battle with cancer on October 20, 2014, shortly before her 65th birthday. She was born in Banbury, England, on November 12, 1949. She and her family remained in England until a move to Victoria, British Columbia, when Barbara was 8 years old. Barbara remained in Victoria, which she loved, through her undergraduate degree in mathematics from the University of Victoria in 1971.

After graduation, she moved to Australia to attend graduate school in developmental psychology at the University of New South Wales. Her interest was in designing instructional programs to help young students understand and enjoy math and science. As she became more deeply involved in her projects, she also decided, much earlier than her contemporaries, that computer technology represented untapped potential. With that interest solidified, Barbara left UNSW having completed all requirements for a Ph.D. except a dissertation. Continuing her education, she moved to the Massachusetts Institute of Technology, where she earned a Ph.D. in computer science in 1981.

Upon graduation, she took a position at Bolt, Beranek and Newman (BBN) in Cambridge, MA. Presaging her later work, one of her major projects at BBN centered around a computer- based Bin Model focusing on early arithmetic and multi- digit addition and subtraction. The model, with which the computer (a Commodore 64) animated the processes of carrying and borrowing, was extremely innovative. At BBN, she also began another computer- based program, ThinkerTools, designed to teach elementary grade and junior high school students force and motion principles of Newtonian Mechanics, along with general principles of scientific inquiry. One early and dramatic finding was that sixth- grade students using ThinkerTools outperformed high school physics students. She remained at BBN as a Senior Scientist until moving to Berkeley's faculty in 1989.

After her move to Berkeley, Professor White focused on expanding both the theoretical basis for her work and intensifying her work on curriculum development. Her research program has been a model of the ways in which theory and research can be brought to bear on, and implemented in, public school classrooms. It involves elegant and clearly specified theory, an understanding of the ways in which that theory can be realized in practice, rigorously designed experimentation – particularly difficult in classroom- based research – and insightful and state- of- the- art assessment approaches. Of note, the various aspects of the research were designed as a system, where the various components reinforced each other. One clear example is the way in which assessment instruments served to both highlight and exemplify the processes being taught.

One of the major tenets of Barbara's approach was to turn responsibility for their learning over to the students, rather than primarily imparting knowledge to them. In her micro- worlds, initial problem- solving

attempts were guided (“scaffolded”) heavily by the computer, with the guidance being reduced regularly over time, leading to independent performance. In the ThinkerTools work, students were placed in an environment in which working in pairs they would generate a theory or hypothesis about the ways in which forces interacted; they could then design experiments that were simulated by the computer so they could observe the outcomes and use that information to refine or alter their theories. After that, they were asked to reflect on their performance: whether they thought their experiments were adequate, how they might be refined, and what a next step might be. Again this process was repeated frequently, with the computer and teacher providing progressively less support.

In later iterations of the program, Barbara broadened her theoretical framework and included a major focus on metacognition – students’ awareness and control of their learning processes. She wanted students not only to carry out inquiry projects but also to become aware of what the specific processes were, why they were important, and to monitor their use. This knowledge about and control of mental processes – the area of metacognition – is known to be a particular problem area for students with learning difficulties. The broadened focus was thus compatible with another of her main goals, making science accessible to all.

As one example of this focus, in work with John Frederiksen, 7th to 9th grade students were asked to assess their own performance. To help them, Barbara and John provided a rubric to guide that assessment. Highlighting the instructional role of the assessment process, the rubric focused on important aspects of scientific inquiry. Of particular importance, the inclusion of this self- assessment feature resulted in eliminating differences between students: initially weak students asked to self- assess achieved performance equal to those who were stronger at the beginning of the intervention, in contrast to a matched group that did not engage in self- assessment.

In her most recent work, Barbara became more focused on the social context in which learning takes place, becoming a socio- cognitive theorist. She extended her learning and design principles to new content areas, and to ways of stimulating students to acquire generalizable habits of mind that facilitate performance across a disparate array of settings. To do this, she developed another piece of software, dubbed the Web of Inquiry, where students worked in groups and practiced enacting Cognitive (Theory, Evidence), Metacognitive (Planning, Reflecting), and Social (Collaboration, Communication) activities. This extension broadened student understanding of the interaction among these separate components, strengthened their independent performance, and helped them understand the general role of inquiry across diverse areas.

Beyond her considerable research accomplishments, Barbara was also a committed educator. Barbara’s work with her doctoral students was legendary. She employed the same principles she did with elementary school students, guiding them gradually to design their independent research agendas. Many of her publications were co- authored by students, on occasion a source of some frustration to them. Barbara was a perfectionist who also designed complex research. This resulted in lengthy papers. In fact on two occasions she commanded an entire edition of a major journal. One of her students remarked that their collaboration on a long monograph from her dissertation work took multiple years, a couple of babies, and several journal editors.

Barbara was also committed to teacher education. She, along with her colleague Alan Schoenfeld, developed a teacher credential program (MACSME – Master’s and Credential in Science and Mathematics Education). In addition to advising many students in this program, Barbara also played a major role in its administration and funding. Finally, while the GSE is primarily a graduate institution, Barbara also worked closely with undergraduates, involving them in her research groups through UC Berkeley’s URAP (Undergraduate Research Apprentice Program).

She is survived by her husband John Vaccaro, and stepdaughters Blythe and Claire.

Joseph Campione
Kathleen Metz