

Behavior Analysis in Higher Education

Applications to Teaching and Supervision

Edited by

Andresa A. De Souza

University of Missouri-St. Louis

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Series in Education



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List of Acronyms

AAC	Augmentative and alternative communication
ABA	Applied behavior analysis
ABAI	Association for Behavior Analysis International
ABC Analysis	Antecedent, behavior, consequence analysis
AI	Artificial intelligence
APBA	Association of Professional Behavior Analysts
AR	Augmented reality
BAC	Blood alcohol concentration
BACB	Behavior Analysis Certification Board
BARS	Behaviorally Anchored Rating System
BCaBA®	Board-Certified Assistant Behavior Analyst®
BCBA®	Board-Certified Behavior Analyst®
BHCOE	Behavioral Health Center of Excellence
BST	Behavioral skills training
BT	Bloom's taxonomy
CAI	Computer-assisted instruction
CAPSI	Computer-aided personalized system of instruction
CASP	Council of Autism Service Providers
CBI	Computer-based instruction
CHEA	Council for Higher Education Administration
CSUN	California State University, Northridge
DEI	Diversity, equity, and inclusion
EAB	Experimental analysis of behavior
EBI	Equivalence-based instruction
EBP	Evidence-based practice
EBT	Evidence-based treatments
ECBC	Evaluating complex behavior change
GLOs	Global learning outcomes

GPA	Grade point average
IBCs	Interlocking behavioral contingencies
JOBM	Journal of Organizational Behavior Management
LMS	Learning management systems
MBLB	Multiple baseline across behaviors design
MHC	Model of hierarchical complexity
MSWO	Multiple stimulus without replacement
MTO	Many-to-one (training structure)
NCCA	National Commission for Certifying Agencies
OBM	Organizational behavior management
OBM Network	Organizational Behavior Management Network
OSTI	Operant supervisory taxonomy index
OTM	One-to-many (training structure)
PDC	Performance Diagnostic Checklist
PI	Programmed Instruction
PIP	Potential for improving performance
POM	Performance Objectives Matrix
PSI	Personalized System of Instruction
RFT	Relational Frame Theory
RPM	Responses per minute
S Δ	Stimulus delta
SAFMEDS	Say All Fast Minute Every Day Shuffled
Sd	Discriminative stimulus
SIM	Simultaneous protocol
SSD	Single-subject design
STC	Simple-to-complex protocol
USDE	U.S. Department of Education
VCS	Verified Course Sequence
VR	Virtual reality

Contributors

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Abstract

The field of behavior analysis has expanded over the past few decades, with increasing numbers of programs in higher education. Despite the expansion, there are few concentrated resources for those who study, teach, and supervise at the undergraduate and graduate levels in the field. Therefore, the purpose of this edited book is to support higher education instructors and instigate graduate programs to incorporate formal college teaching training into their curriculum.

The current book has 15 chapters organized into four major sections. In the first section, *History and the Use of Technology*, we present an overview of the foundational backgrounds of behavior analysis in higher education from its inception to the current times. Chapter 1 provides a revision of the creation, the enthusiasm, and the fall of teaching machines and programmed instruction in education. Chapter 2 provides an important contribution to the historical and present-day overview of teaching machines in programmed instruction as developed by behavior analysts. Chapter 3 describes the history of educational practices from ancient to modern times. Chapter 4 engages readers to consider how the use of digital technology is helping realize the potential of behavioral approaches to education, ushering in a renaissance period. Section 2, *Teaching Strategies and Assessment*, includes four chapters. Chapter 5 helps readers distinguish between associations and conceptual learning, while at the same time noting their similarities in planning for teaching. Chapters 6, 7 and 8 provide important extensions of relevant work in the fields of equivalence-based instruction, interteaching, and complex behavior change (respectively) that are important considerations in the realm of higher education. Section 3, *Behavior Analysis in Training and Supervision*, includes important contributions related to a family model of graduate training in experimental analysis of behavior (Chapter 9), strategies to develop the complex performance and verbal behavior skills necessary in higher-education training (Chapter 10), considerations related to graduate program fieldwork and practica (Chapter 11), and the relevance and considerations about organizational behavior management (OBM) in graduate programs (Chapter 12). The book wraps up with Section 4, *Professional Foundations in Applied Behavior Analysis* including chapters pertaining to teaching ethical conduct (Chapter 13), how to embed intercultural responsiveness into graduate coursework and supervision (Chapter 14), and a final chapter (15) on how to prepare for accreditation processes.

History of Development of the Book

As a new faculty member, the first author embarked on learning about the world of instructional design and behavior analytical technologies of teaching. With an increasing interest in this area of application, she organized, chaired, and co-authored a symposium focused on higher education teaching and supervision during the 46th Annual Convention of the Association for Behavior Analysis International, which was supposed to be in Washington, DC, in 2020 but was held online due to COVID-19 pandemic. Coincidentally, the symposium focused on strategies for online instruction. However, the submission and acceptance of the symposium happened in 2019, before online instruction became a necessity as opposed to simply a viable option. The second author, who has over two decades of experience teaching and publishing in areas related to online teaching and assessment from a behavior analytic perspective, served as the discussant for the symposium. Albeit the sudden and unusual shift to online delivery of an ABAI conference, the symposium was well attended and commented on. About one month later, the first author was contacted by a representative from Vernon Press with the invitation to submit a book proposal on a related topic. We (the editors) met with the publisher to gain more information about the process and determine the viability of such a book. While we don't know the exact features of the symposium that prompted the publisher to reach out to us, we understand that the online focus in the context of the global state of affairs drew the publisher's eyes to this topic. We thus embraced the task with both our combined passion for higher education excellence and the technologies of behavior analysis. As we brainstormed topics to invite for potential chapters in this book, we considered the importance of dissemination of the trajectory and application of behavior analysis in higher education. We also had a goal of inviting a cross-section of contributions that would be diverse in terms of career spans, geographical location, and other relevant intersecting identities. Finally, we added an invited chapter on accreditation following the recent changes announced by the Behavior Analyst Certification Board with respect to the need for future applicants to earn their degree from an accredited program. With these changes being phased in over the next decade, this chapter seemed an important addition.

Foreword: Teaching Behavior Analysis with Behavior Analysis: The Long-Running Project Continues to Improve

William L. Heward
The Ohio State University

Behavior analysis offers society a scientific approach to understanding and changing behavior. Applied behavior analysis (ABA), the practical wing of behavior analysis, is defined in part by its focus on socially significant behavior—behavior that makes a difference in people’s lives. At its heart, ABA is and has always been about helping people improve the quality of their lives (Gambrill, 2012; Wolf, 1978). Today’s applied behavior analysts are enhancing lives in an ever-widening range of domains that impact the human experience from A to Z (Heward et al., 2022).

In their Preface to *Behavior Analysis in Higher Education: Applications to Teaching and Supervision*, co-editors Andresa A. De Souza and Darlene E. Crone-Todd contend that “the future of this scientist-practitioner discipline is bright” (p. 5). I agree wholeheartedly. Behavior analysts who implement behavior change interventions that enhance people’s lives or advance the discipline’s research base enjoy satisfying and meaningful careers. Teachers who help future behavior analysts learn the conceptual, empirical, and practical tools needed to apply, extend, and advance this life-improving science experience equally satisfying and socially important careers.

My introduction to behavior analysis and behaviorally based techniques for teaching it came in 1968 when I took Richard Malott’s Introduction to Psychology class as a freshman at Western Michigan University (WMU). The class met five days per week, and a top grade required learning the content of five books and teaching a rat to do some pretty cool stuff.¹ Study objectives guided daily reading assignments, each class session began with a short quiz,

¹ One of those books consisted of mimeographed drafts of chapters of what would become Whaley and Malott’s (1971) *Elementary Principles of Behavior*, a text that introduced thousands of future behavior analysts to the science.

and participation in class earned bonus points. Those contingencies combined with the immediate consequences the rat provided for my fledgling attempts to shape lever pressing and get it under stimulus control not only got me to semester's end with an "A," they left me wanting to learn more about this fascinating discipline.²

The courses I would later teach as a professor at Ohio State University (OSU) included instructional methods experienced as an undergraduate at WMU. Those and other behaviorally based teaching and skill development techniques became key components of OSU's doctoral program that prepared leadership personnel for special education whose work was guided by the philosophical, empirical, and technological principles of behavior analysis (Heward et al., 1995).

While the basic principles that underly effective teaching in higher education (or anywhere else) remain unchanged (e.g., Engelmann & Carnine, 1982/1991; Skinner, 1968, 1984), the tools available to contemporary designers and deliverers of curriculum and instruction in higher education behavior analysis programs can help train the most capable, effective, and compassionate behavior analysts the world has seen. And the world needs them. Achieving the ABA's promise and potential to improve the human experience and help solve society's tough problems will require the contributions of thousands of scientist-practitioners working collaboratively on multidisciplinary teams for decades to come.

Behavior Analysis in Higher Education: Applications to Teaching and Supervision challenges higher education instructors to continually improve their effectiveness, acknowledges the diligence required, and offers strategies and resources for the pursuit. The book's fifteen chapters are authored by some of the best in the business. Contributing authors are behavior analysis researchers, scholars, and professors in higher education programs where tomorrow's behavior analysts are being trained. I'll briefly mention just a couple of the many topics they cover.

Chapters 1 and 2 provide deep dives and insights into the history and operation of Skinner's teaching machine and the evolution of programmed

² Behavior analysts have a long history of experimenting with ways to improve college-level instruction (Falcomata, 2018; Lloyd & Lloyd, 1992). Of particular note: Richard Malott's fifty-plus-year pursuit of ever-better methods to train science-based practitioners of behavior analysis at Western Michigan University (e.g., Malott, 1984; 1992; 2005; 2018). Malott's Behavior Analysis Training System (BATS) combines goal-directed systems design, behavioral systems engineering, performance management, and a skills-training model of education that fosters students' appreciation of the power of behavior analysis to do good and motivates them to learn and apply the discipline.

instruction. Early forms of programmed instruction shaped, primed, and prompted students' responses to fill-in-the-blank frames with one or two missing words. Contemporary programmed instruction supplements or replaces simple responses, small steps, and linear advancement through content with a variety of response types, alternate sequences of frames that enable students to progress through the material with the largest achievable steps, and opportunities to branch and extend into related knowledge and information. Artificial intelligence (AI) has the potential to create frames in real time based on a student's performance with respect to critical aspects of the content. This is exciting stuff.

No higher education behavior analysis program, no matter how expansive, intensive, and efficient, can teach everything a student might someday need or may want to learn. There will always be additional knowledge, skills, values, and artistry (Callahan et al., 2019) that *could* be taught during a class period, over the course of a semester, or within the entire time a student spends in a degree or certificate program. Instructional time and resources will always be limited. They must be used for optimal efficiency and in ways that enable and motivate students to explore and expand their repertoires.

Exploring various ways to squeeze the most learning out of each teaching moment is one of the most exciting areas of behavioral research in education today. Much of this work builds upon Murray Sidman's (1994) groundbreaking research on stimulus equivalence, which showed that under certain conditions, learners acquire new skills and verbal relations without direct instruction on those skills. The new skills emerge as a product of instruction on related skills. This research—described variously as matrix training (Langton et al., 2021), generative instruction (Johnson et al., 2021), equivalence-based instruction (see Chapter 6), and derived relational responding (Critchfield & Rehfeldt, 2020)—and applications of contingency adduction (a process in which “skills learned under one set of conditions are recruited under new conditions to serve a new or different function” (Lyang et al., 2004, p. 99) are yielding a variety of teaching tactics for generating emergent and discovery learning. Readers of this volume will learn how these methods can be applied with ever greater promise to higher education.

The 21st century behavioral and digital technologies described in this volume are exciting and promise yet-to-be-discovered advancements in student achievement. I encourage readers to implement and evaluate the strategies in their own teaching. There is no need to leave behind basic elements of effective instruction, such as providing frequent active student engagement with simple tools like guided notes (e.g., Austin et al., 2002; Biggers & Luo, 2020) and response cards (e.g., Clayton & Woodward, 2007; Kellum et al., 2001). Students reliably and overwhelmingly judge these low-

tech strategies as helpful and fun. But don't let actively engaged, smiling students fool you into thinking they are achieving desired learning outcomes. Providing high rates of active responding in a poorly designed lesson (i.e., a lesson with absent or weak content analysis and instructional design; see Chapters 2 and 5) is akin to taking your students for a ride in a 1960s Corvair: it's unsafe at any speed (Nader, 1965).

Malott (1984) began a chapter detailing what he had learned in 19 years of developing, applying, evaluating, and continually revamping a system for training behavior analysts by stating that the behavioral approach “doesn't work miracles, but it's still the best game in town” (p. 218). He concluded with these thoughts:

The approach is based on the assumption that is the responsibility of the teacher to do whatever is needed to assure that they graduate as many students as possible who will have a high level of mastery of the concepts and skills that will benefit society. As with behavioral approaches to other areas of human service and education, this often means that the college or university teacher must do much more than is normally expected. But my experience suggests that this can be a very rewarding activity, sustaining many years of enthusiastic participation (p. 245).

Instructors, from graduate teaching assistants to full professors, will find *Behavior Analysis in Higher Education: Applications to Teaching and Supervision* a valuable resource for improving the effectiveness, efficiency, and enjoyment of their work.

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