

# **The Model of Domain Learning**

Understanding the Development  
of Expertise

*Edited by*  
**Helenrose Fives and  
Daniel L. Dinsmore**





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# THE MODEL OF DOMAIN LEARNING

*The Model of Domain Learning* is the first edited volume to provide a comprehensive overview of the Model of Domain Learning (MDL). Unique in its emphasis on development, this model examines both the cognitive and motivational forces behind expertise in academic domains. Chapters written by a variety of scholars, including those responsible for the model's evolution, are tied together by commentaries that synthesize these varied perspectives. With dedicated sections focused on the foundations, current applications, and future potential of the MDL, this book is indispensable as an introduction to the theory and research associated with this topic and as a cutting-edge resource for established scholars.

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# FOREWORD

*C. Stephen White*

George Mason University

This is an essential and must-read book for anyone interested in how we learn academic content. This volume provides an exemplar of how a theoretical model and corresponding trajectory of research have developed and generated results that inform the broader educational community about the academic development of students. The volume centers on a theoretical model, the Model of Domain Learning (MDL), which was conceptualized by Patricia A. Alexander to consider how we learn domain knowledge. Written 20 years after the original MDL was theorized, this volume could not be timelier regarding how academic development is viewed in an educational climate that emphasizes didactic teaching in response to high stakes assessment and accountability in both K-12 and higher education.

The MDL, conceptualized in the late 1980s and early 1990s, focuses on learning as academic development with an emphasis on individual differences. Throughout this volume, chapter authors explain and synthesize research based on the principles and components of the MDL. These principles and components include the dimensions of knowledge (Chapter 2, Murphy et al.), strategic processing (Chapter 3, Dinsmore et al.), and interest (Chapter 4, Jetton) in relation to a developmental framework. Specifically, the MDL provides a structure for examining how one's knowledge, strategic processing, and interest change as one learns knowledge within a particular domain. The model is dynamic and includes a series of three stages that individuals move through within a domain of study. Readers of this volume will encounter sophisticated thinking about academic learning related to learning domains or subject matter knowledge.

As Patricia Alexander's first doctoral student, I was fortunate to be a participant in research that related to the foundation for the MDL. This research focused on individual differences and strategy use in young children through the study of analogical reasoning. Since my research drew from traditional age



and stage theory and considered the values and pitfalls of developmental stages, I was heartened to learn how development was first considered in the MDL and how the principle of development continues to evolve over time. As the stages are defined, compared, and contrasted throughout the different chapters, I found it noteworthy that overall development of academic learning in the MDL is approached as dynamic and fluid. Moreover, the developmental stages of acclimation, competence, and proficiency/expertise are clear themes across chapters. Authors refer to numerous studies that provide examples of how the stages have been applied in different knowledge domains and elaborate on corresponding ideas that have been generated from MDL research. It is intriguing to me how the authors portray time in the MDL. For example, the amount of time it takes to arrive at a stage such as proficiency can be highly variable and the coming together of factors that contribute to academic development “exist in the moment as well as over time.” Similarly, all of the authors note that development as conceptualized by the MDL is focused not strictly on knowledge but also on how one learns it. While developmental movement in the MDL was originally considered to be hierarchical and non-recursive, it is proposed in this volume that the movement is “tangled” with learners going through “strange loops” during knowledge acquisition within a particular subject or domain (Chapter 2, Murphy et al.). This provocative thinking about development provides a flexible and responsive approach to the academic learning of students of any age.

The evolving nature of the MDL is included as another intriguing theme the authors in this volume speak to when describing how research studies using the model have incorporated model testing and model revision. Chapter authors point out that the MDL has grown by incorporating classical and recent development from fields such as reading/literacy, cognitive psychology and educational psychology. Several chapters include systemic literature reviews of MDL studies that have employed a variety of research methods from different fields of study that illustrate how the MDL has been tested and revised. For example, the model has been tested and applied using exploratory, confirmatory, experimental, and quasi-experimental statistical techniques along with more qualitative approaches such as think-aloud protocols. All of the authors position the MDL in the broader literature and demonstrate how the interrelatedness of strategies, interest, and knowledge has contributed to model revision across research studies in the past 20 years.

The ideas captured in the chapters on knowledge, strategy use, and interest demonstrate the recursive nature of the MDL. These chapters provide an in-depth examination of definitional issues and treatment of the three stages of acclimation, competence, and proficiency. Contributions of these chapters include discussion of methodological issues when reviewing findings that support or do not support the MDL. Additionally, these chapters (as well as the others) provide well-articulated and supported suggestions and possibilities for

future MDL research. The chapter dedicated to strategy use also contrasts the MDL with competing strategic processing models, conveys how strategy use changes during academic development, and discusses how the development of strategic processing may influence academic performance. While much of the MDL research has concentrated on academic development, a number of the chapters remind us of the importance of affective factors, which in the MDL are outlined as motivation and interest. The construct of interest in the MDL, framed as individual and situational interest, is shown to be crucial to learning in a domain. Moreover, authors elaborate on the importance of supporting students' interest as they move through the stages of acclimation, competence, and expertise. I found the idea that the MDL "approaches interest not only as a means to improve learning and education but also as an important outcome of education" (Chapter 7, Peterson & Haverback) to be highly significant and applicable to any learning context.

What excites me about this book is the study of the MDL in different domains. Several chapters include a history of MDL research beginning with studies in reading/literacy and moving into more linear knowledge domains such as science. While reading the chapters focused on different knowledge domains, I realized I was experiencing components of the MDL such as the impact of interest. For example, I found myself developing individual interest in findings from MDL research such as the importance of reading and learning from text as an avenue to becoming an expert in a domain. Findings from MDL research indicate that those who become "expert learners" (Chapter 5, Fox & Parkinson) in an academic domain read expertly in the domain, which is supported by individual interest in the domain and the tendency to "aim at deep-level processing when reading domain related text." Similarly, I discovered thought-provoking connections between the MDL and learning from technology-based systems. It was stimulating to read that navigating technology based systems is key to learning from them and that navigational quality is closely related to positive learning outcomes from nonlinear reading environments (Chapter 6, Lawless). Additionally, as expertise develops in a domain, "learners become more strategic and efficient in their navigational endeavors." Authors of chapters that include the study of MDL in different domains carefully craft connections between research studies in the different domains and the principles of the MDL. Having spent the majority of my higher education career as a professor in early childhood/elementary teaching and teacher education, the positioning of K-12 students and teachers within the MDL and considering teaching as a professional domain of practice that is typically ill structured and complex particularly resonated with me (Chapter 9, Mills & Fives). Although the MDL does not address the types of practical knowledge needed for professional success in a domain such as teaching, it is compelling to contemplate the application of the MDL in the development of expertise in professional domains of knowledge.

This volume reveals the complexities of academic development as conceptualized by the MDL from 20 years of research. Each of the volume authors clearly articulate that past MDL research is only the beginning of a comprehensive and robust trajectory of research that has generated results that can be applied across knowledge domains. Each of the chapters provides viable and fresh possibilities for continuation of MDL research in established knowledge domains as well as in new and diverse domains. The authors provide numerous ideas on how the MDL can be extended and applied in more longitudinal investigations that draw from new methodological approaches to “measure how learners’ knowledge, strategy use and interest fluidly and dynamically intermingle to foster progression toward academic expertise in a given field.” Furthermore, greater consideration of contextual factors such as home and school influences and greater delineation of the MDL components are recurring research suggestions from chapter authors. It is indeed exciting and motivating to envision the potential of MDL research for further description of how we learn domain knowledge across the lifespan. Readers of this volume are likely to change how they see academic development and are in for an invigorating and intellectually stimulating experience.

# PREFACE

This edited volume has been at least 30 years in the making. The Model of Domain Learning (MDL) provides a developmental explanation for human learning toward expertise. Patricia A. Alexander developed this theory in collaboration with her former doctoral students, Jonna M. Kulikowich and Tamara Jetton. In 1997, “Mapping the multidimensional nature of domain learning: The interplay of cognitive, motivational, and strategic forces,” was published as an overarching explanation of the theory that articulated the nuanced and complex processes that underlie the development of expertise or proficiency (Alexander, 1997). Moreover, as opposed to prior dichotomous models of expertise that compared experts to novices, the MDL articulated the development of expertise as an ongoing, time-intensive process through which individuals’ knowledge, strategic processing, and motivation serve as key interactive mechanisms that facilitate expertise development. With the work and dedication of Patricia and her students, the model has evolved and been empirically tested. The importance of this perspective on learning has garnered its place in the fields of educational psychology and expertise development. We, the editors of this volume, were among those students.

We (Dan Dinsmore and Helenrose Fives) had the opportunity to meet up again at EARLI-2015 in Cyprus. Both of us were presenting our own research and took the time to reflect on our early training as doctoral student-siblings. Patricia runs her academic life as a family, with each student a child, and their students, grandchildren, all surrounded by Alexander family adoptees, friends, and close associates. We, the editors of this volume, are the middle children, and spanned the years from 1997 to 2011. Helenrose completed her doctoral studies at the University of Maryland with Patricia just as Dan was planning to start. As we talked about our respective experiences in the family, the importance of the MDL to our scholarship (sometimes central and other times



peripheral) emerged for both of us as a theoretical touchstone to understand learning and development. This conversation led to the realization that the MDL would soon turn 30 years old and was overdue for a critical, thoughtful, and developmental review. As middle children, wanting to please, we had little choice but to propose this volume ... and then wrangle the rest of the family to participate in this scholarly reunion, where the original theory is revisited, retold, and expanded.

The presence of the Alexander family in this volume begins with our introduction. C. Stephen White (aka The First) provides an illustrative foreword to this book. As Patricia's first student, Steve has again led the way for the rest of the family and provided us with a sound example of how to evolve from student to scholar. Our older siblings provided the foundations for our family and, with Dan, offer the four foundational chapters of this book. In Chapter 1 of this volume, Kulikowich and her student Hepfer provide an insightful explanation of the model from its infancy to current perspectives. The three components of the MDL, knowledge, strategic processing, and interest, are examined individually in Chapters 2–4. P. Karen Murphy with her post doc Carla Firetto and student Mengyi Li provide a detailed explanation of the role of knowledge in the MDL. Dan and some slightly younger siblings Courtney Hattan and Alex List provide a meta-analysis of research on strategic processing in the MDL. Tamara Jetton provides an explanation of interest in the MDL and extends this work by providing a new perspective on interest as a developing construct. A dear friend of Patricia and an "aunt" in our family, Diane Schallert, in collaboration with Michelle Buehl, another of Pat's students, provide commentary for this set of chapters. This commentary highlights the importance of the MDL as a theory of learning and offers critical recommendations for future development of this work.

The authors of the second section of this volume focus on a core perspective of the MDL, the *domains* in which expertise develops. Emily Fox and Meghan Parkinson, two of Patricia's more recent students, discuss how reading sometimes *is* and simultaneously *is not* a domain of study, and how this can be conceptualized in the MDL. Also in this section, two other domains often not recognized as domains in their own right, technology and learning in K-12 classrooms, are explored by a grandchild, Kimberly Lawless (technology), and another sibling, Emily Grossnickle Peterson, with adoptee Heather Haverback (learning and teaching in K-12 classrooms). Lawless contextualizes existing literature on learning with technology by reframing it using the MDL to explain empirical results. Peterson and Haverback discuss the merits of using the MDL as a perspective on learning in secondary classrooms in which they highlight the concept of learning as the process of academic development. Commentary on this set of chapters is provided by Ralph Reynolds, another dear friend of Patricia's, along with his own graduate student, Dessy Stoycheva. They provide a rich perspective on the nature of theory and use it to favorably evaluate the MDL as a scientific theory.

The third, and final, section of this volume focuses on extensions of the MDL. The first of these extensions, written by Patricia, Murphy, and Yuting Sun, one of Patricia's current students, focuses on individuals' changing knowledge and beliefs as they progress through the stages of expertise. In the next chapter, Chapter 9, Helenrose and her first graduate student, Tammy Mills, address how teacher learning/development can be considered a domain. Finally, Patricia concludes with a chapter suggesting ways in which her own theory can continue to grow and evolve some 30 years after the original. Commentary on this set of chapters is provided by another dear friend, Lucia Mason. Mason identifies three themes across the chapters in the last section of this volume, the role of knowledge and belief, the interplay of the MDL components, and the notion of classrooms as contexts for academic development.

If not clear already, family has generated this project. A fiercely loyal, but highly critical (in the good way) family of scholars who are greatly indebted to Patricia A. Alexander and to our siblings who support, question, and push us all to further, deeper, and more meaningful work. In the section below, we have invited the contributing authors to offer their own reflections on their contributions to this volume and how Patricia has influenced their work.

As Patricia's first doctoral student, I could never have foreseen the truly monumental impact her scholarship and teaching/mentoring has had on me and the many, many students and colleagues with whom she has worked. It is difficult to adequately explain the distinctive context of academia at Texas A&M University in 1981 when I, as a first semester doctoral student, met Patricia, who was a first semester Assistant Professor. When she began her higher education career, Patricia had to compete in a conservative, male-dominated (i.e., historically military) university and strive to establish herself as a scholar to be taken seriously as a nontraditional female. Her earliest years were not always easy ones in an environment where her research was not always valued by all of her colleagues. What is most significant for me is how she dealt with the challenges posed by colleagues with different agendas and priorities. As a consummate mentor, she modeled ways to overcome these challenges that always incorporated tenacity, taking risks, conducting and publishing research, requiring consistently high-quality work from her students, and maintaining the highest standards of performance for herself. In a short time period, Patricia became a genuine trail blazer who was recognized as a force with which to be reckoned. The research I participated in with Patricia helped shape the MDL and facilitated my understanding of the rigor and commitment required of one who is successful as a scholar and teacher in higher education. Her acceptance and support of students who did not fit the traditional academic culture and expectations of that time and place were apparent in her work with me and others who followed. Patricia truly provided a "safe space" for her students before that concept became a cultural part of many departments and colleges. I now realize that the safe space she provided is an all-encompassing characteristic of

her academic family. Moreover, while she was establishing herself as a scholar and teacher, she was concurrently establishing “the family.” I will always feel so very fortunate and everlastingly grateful for being a member of the earliest branch of the family. *C. Stephen White*

It was Summer 1992 in Alexandria, Virginia on a hot and humid afternoon. Honey was chewing gum balls and reading the newspaper in his living room rocking chair. Memaw was watching soap operas from the kitchen table and yelling at Honey for chomping too loudly in the next room. I was daydreaming about infinity while drinking a lager seated next to Memaw and awaiting to play our next game of cards. Honey and I were always a team, and Memaw always played with Patricia. But we could not play yet. Patricia was writing on a yellow tablet, paragraph after paragraph, and periodically using her eraser to break the momentum, looking up to gaze for a few seconds, only to descend into the prose once again. Seated at the dining room table with rays of light moving over her shoulders, Patricia was enveloped in an aura of creative insight. I was blessed to be there. These moments were the birth of the MDL. Thank you, Patricia, for inviting me to be there at the very beginning and throughout the MDL journey of more than 30 years with our many friends who we have met along the way. *Jonna M. Kulikowich*

It was an honor to be asked to contribute to this volume on the MDL, particularly the chapter on knowledge. As anyone who has knowledge of Patricia can tell you, she values this one construct above all others. Just as she believes the queen rules the chess board, Patricia holds that knowledge is power and is at the heart of academic development. Thus, we were thrilled for the opportunity to write about her most cherished construct. As mentioned by the editors, all of the authors on our chapter are members, however distant, of the Alexander Academic Family. I, P. Karen Murphy, am one of Patricia’s former students and her daughter-in-law, which makes me an academic plus member of the family. Most of you are probably wondering about how that came to be, but suffice it to say that I am an individual who makes the most out of every opportunity. So far, my zealous efficiency has paid dividends far beyond what I could have imagined. Carla Firetto is my postdoctoral fellow and has also worked with Patricia on her more recent research in relational reasoning, and Mengyi Li is my doctoral student, who recently defended her dissertation. In our own ways, each of us has been fortunate to be the recipient of Patricia’s abundant mentoring and friendship. What is overtly clear to all those that meet Patricia is that she is a brilliant scholar whose insights are not only quick but keen. She is an extraordinary synthesizer whose ability to see patterns in everyday life has enabled her to excel in the academy. Perhaps most of all, Patricia loves to ask questions and then drill down to the heart of one’s response. In fact, she so loves this activity that she devised a game she calls the “Family Game,” in which a

person poses a deeply intellectual or socio-emotional question that each player, in turn, must answer. Then, the next person asks a question and the sequence begins again. We all can recall many, many nights in which the Family Game has extended for hours. One of the guiding rules is that each player must say the first thing that comes to her mind. No doubt this is an advantage for Patricia because she thinks very quickly on her feet. In truth, I [Murphy] have always been terrible at the game. Rather, I like to sit and ponder, discuss my thinking with others, muse some more, contemplate alternatives, and then after some time has passed, I may decide that I am still uncertain. My methodical approach to the Family Game drives Patricia absolutely crazy. In reality, I just want my response to be thoughtful and forwarded with a great deal of humility. We share this personal anecdote because it is important to us, as the authors of Chapter 2 on knowledge and the MDL, that Patricia and all of her coauthors understand that we have approached our task with the same diligence that I describe above. Any thoughts, questions, or issues we raise are done so with a deep, abiding sense of respect for all of the work that has gone into the MDL. So, to our dearest Patricia—scholar, mentor, friend, and family—thank you for your contributions to the field and to our lives. It is an honor to be part of your academic lineage and this volume dedicated to a major part of your life’s work.

***P. Karen Murphy, Carla M. Firetto, and Mengyi Li***

Being paired with Patricia as a mentor means you get to build domain knowledge, topic knowledge, strategies, and interest in our chosen field—all the things the Model of Domain Learning encapsulates. Without a doubt, Patricia enabled both of us to develop these. However, she leaves out her secret ingredient—one that is not in any of the subsequent chapters of this text. The unconditional love that Patricia demonstrates to every one of her students is anecdotally the reason we think so many of her students have been successful. We are both a bit leery of the use of the word “family” that gets overused in so many workplaces, but as we believe unconditional love is what defines family, we are truly lucky to be part of Patricia’s wonderful—and sometimes strange—family. Having met during our time as graduate students under Patricia’s mentorship and subsequently married, Patricia holds a special place in our lives. As we continue in our journey as academics and in our personal lives, Patricia is there as a sounding board and sage. We are forever indebted to Patricia and hope we have given Patricia back at least a small fraction of the love she has shown us. ***Daniel L. Dinsmore & Meghan Parkinson***

Patricia’s dedication to and love for her graduate students is unparalleled. She has the rare ability to harness students’ potential, providing opportunities for students to discover what lines of research are most intriguing to them, and then supporting students as they delve into their unique areas of interest. As a former public-school teacher, I came into the lab with fairly specific, yet



underdeveloped ideas regarding my areas of interest. Patricia guided me to use my teaching experiences as a catalyst for research projects. Through countless conversations, Patricia's relentless support provided clarity for my career as a researcher. Beyond Patricia's commitment to her students' academic success, she is unmistakably invested in us as people. From lab Thanksgivings to AERA dinners, Penn State road trips to attending weddings, she demonstrates a level of concern and investment that is unmatched in the academic world. We are truly family, and I am forever grateful for her guidance as I grow as a researcher and an individual. *Courtney Hattan*

It has never been a surprise to me that Patricia is known for, among many things, a model of expertise, the Model of Domain Learning (MDL). Working with Patricia throughout graduate school and as a young professor has provided me with a lens into what expertise looks like up close. For me, Patricia's expertise has always been distinguished by her deep knowledge of the philosophical origins of educational psychology, her incisive analysis of empirical work, and her strong articulation of learning, as it is experienced by real students in real classrooms. But, rather than a cold and distant authoritarian figure that some may associate with expert status, Patricia has always distinguished herself as an incredibly warm and endlessly caring mentor. In my experience, the secret to Patricia's expertise in mentoring is not fully reflected in the MDL. It is her generosity in sharing her knowledge and experience and using it to develop others that has enriched generations of students and the Alexander family, at large. It is this aspect of Patricia's expertise that I most seek to emulate in my own development as a scholar from competence to expertise. *Alexandra List*

Thirty years ago, I walked into a Chinese restaurant in College Station, Texas and met Patricia Alexander, the greatest researcher and mentor whom I have ever known. She was always willing to share her expertise and knowledge, and she encouraged her students to be their best. When I left her guidance as a new, assistant professor at University of Utah, I knew that she had imparted the skills and knowledge that I would need to excel in my career as a professor. The greatest gift that she gave me was that I could believe in myself as a researcher and teacher. I carry her love for her students, her laughter, and her zest for knowledge as I continue to mentor my own students. Thanks, Pat! *Tamara Jetton*

Patricia was the perfect mentor for studying reading. We already agreed on the fundamentals, right from the beginning. But my views were arbitrary and personally based, at least at the outset. Hers, as I learned from following her tracks into every corner of the reading literature, were deeply rooted in her research base and her principled, yet creative, explorations of theory. It seemed that for nearly every question or topic in reading that I set out to investigate, in