ROOM TO LEARN

Elementary Classrooms Designed for Interactive Explorations

Pam Evanshen, EdD, and Janet Faulk, EdD

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Finally, we say, "Thank you!" to our husbands Brian and Dalton for their support, patience, and encouragement.

INTRODUCTION

The ultimate goal of teaching is to engage learners in meaningful work that leads to understanding. Working toward this goal often results in a shift in the teacher's role from one that is teacher centered to one that is more child centered and focused on active learning. We hope this book, which includes the environment rating scale *Assessing the Pillars of the Physical Environment for Academic Learning* (APPEAL), will support educators in developing positive physical classroom environments in which all children are actively engaged in learning. The intention is for educators to use this book as a tool to support their learning and development.

HOW THIS BOOK IS ORGANIZED

Chapters 1 and 2 highlight research that explores the benefits of designing physical classrooms to emphasize child-centered learning. Chapter 1 includes the philosophical foundation associated with the theories of Jean Piaget, Lev Vygotsky, and John Dewey, and with best practices that reflect developmentally appropriate practice. Chapter 2 highlights the instructional foundation for engaging children in active learning opportunities as promoted by Jerome Bruner.

Chapter 3 introduces APPEAL, a tool that can assess the design and use of the physical classroom environment for supporting student engagement in the learning process. This tool presents six domains, or pillars, of the physical environment that are associated with learning.

Chapters 4 through 9 describe in detail the six pillars that make up the APPEAL Rating Scale. They include key points about each pillar, which are based on research. Explicit descriptions of each of the pillars of the scale, coupled with vignettes and specific examples, will help teachers understand how to support learners in the classroom environment.

Chapter 10 contains suggestions for the use of APPEAL for professional development and research. It includes recommendations for teachers in the elementary (K–5) setting, school leaders, consultants, university faculty, and researchers who want to use the tool.

Chapter 11 describes general procedures for administering APPEAL and provides Summary Profile Forms.

The Technical Appendix presents data associated with the validity and reliability of the instrument and is useful for researchers who may want to use APPEAL to gather data about the use of the environment to support student learning.

As lifelong educators we are inspired to advocate for high-quality physical classroom environments in which all children can be actively engaged in learning. This book is designed to support those who wish to consider the major impact the environment has on teaching and learning.

The APPEAL evolved as a result of administrators and teachers working together to evaluate the physical design of elementary classrooms. This preliminary work focused on determining how the physical environment of the classroom can be used as a tool for teaching and learning and how to improve the environment to support the engagement of all learners (Brooks and Brooks, 2001; Copple and Bredekamp, 2009; DeVries et al., 2002; Dunn, Dunn, and Perrin, 1994; Fosnot, 2005; Gandini, 1998; Hart, 1998; Jensen, 2008; King-Sears, 2007; Kovalik and Olsen, 2005; Rushton and Larkin, 2001; Singer and Revenson, 2006; Wolfe, 2001). A research review and subsequent collaboration with elementary-school teachers and administrators in public schools resulted in the identification of six domains of the physical environment that are related to teaching and learning. *A Room to Learn: Rethinking Classroom Environments* (Evanshen and Faulk, 2011) and the accompanying "Primary Educator's Environment Checklist" were the results of this process.

After receiving feedback through consultations with teachers and administrators using the checklist, we realized a need to explicitly describe and quantify the indicators of the checklist.

To guide the development of a rubric for assessing the physical classroom environment, we engaged in an additional extensive review of the literature related to physical classroom environments (Berris and Miller, 2011; Campion, 2004; Copple and Bredekamp, 2009; Dorman, 2002; Dyck, 2002; Katz, 1998; Khalid and Azeem, 2012; Klem and Connell, 2004; Martin, 2006; Maxwell and Chmielewski, 2008; Rushton and Larkin, 2001; Tanner, 2008; Taylor, 2008; Veitch and Arkkelin, 1995; Voelkl, 1995; Tarr, 2004; Winterbottom and Wilkins, 2009).

As speaker and trainer Alexander den Heijer says, "When a flower doesn't bloom, we fix the environment in which it grows, not the flower."

CHAPTER ONE

The Philosophical Foundation

The organization of an elementary classroom reflects the teacher's understandings about the ways children learn, as well as her beliefs regarding the structures that will support children in that learning. As we reflect upon the quality of the classroom environments that educators create for children, it is helpful to look at the work of theorists and school-reform practitioners, particularly Jean Piaget, Lev Vygotsky, and John Dewey, who wrote about this very subject. The work of these theorists addresses three themes that are relevant to young children's learning:

- Characteristics of the learner
- Presentation of information and materials available in the classroom environment
- Strategies used as structures for learning

Piaget, Vygotsky, and Dewey provide insights into the importance of the learner and the structures for learning. They also give us a sense of the "why" for implementing educational practice that reflects active student engagement.

JEAN PIAGET

PIAGET'S IDEAS ON THE CHARACTERISTICS OF THE LEARNER

Swiss developmental psychologist Jean Piaget's theory of cognitive development helps to explain how children create knowledge. Piaget identifies two stages of cognitive development that relate to children at the elementary level: *preoperational* and *concrete operational*. The preoperational stage is the period from two to seven years of age, when children develop language and begin to use symbols and mental imagery but cannot yet think in a logical way. The concrete operational stage is the period from seven to twelve years, when children develop the ability to reason logically about concrete objects and events. As children move through these stages, they develop cognitive networks of increasing complexity. Piaget recognized that young children encounter learning through their senses, manipulation of objects, play-based experiences, and real-life experiences. He determined that their thinking progresses through a series of iterations about the stimuli around them called *assimilation* and *accommodation.* Assimilation is the process by which the child gathers ideas, information, perceptions, and experiences into existing mental models. Assimilation occurs when children "add on"

to their established ways of thinking. For example, a young child may learn the word *dog* for the four-legged animal that lives in her house. As she assimilates information about other animals she sees, she may call any four-legged animal she encounters a dog. Accommodation, on the other hand, is a new way of looking at information and requires more of a cognitive shift because it takes place when concepts don't fit into the current paradigm. For example, as the child develops and she encounters cats, she will accommodate the differences between cats and dogs and form a new schema for *cat*.

Progressing through the developmental stages that Piaget identified involves the interaction between the processes of assimilation and accommodation. It is the way in which a child adjusts to her environment (Singer and Revenson, 1996). That adjustment results in new learning and deeper understandings.

HOW DOES PIAGET RELATE TO THE CLASSROOM ENVIRONMENT?

Based on Piaget's theory, the teacher provides active social learning opportunities that lead to and support children's cognitive development. Educators serve as facilitators who can guide the children's growth, appreciate their sense of wonder, and celebrate their curiosity. The instructional design of the classroom becomes one in which children are challenged to explore and actively participate in developing understandings.

There is evidence that the physical classroom environment plays an important role in children's construction of knowledge (Piaget, 1963). Historically, educators created a classroom design that consisted of a large amount of space designated for teacher work, large-group instructional areas, desks in rows, and little or no space or materials devoted to interactive construction of knowledge. This classroom design generated a pedagogical structure in which teachers instruct the learners. On the other hand, Piaget's theory encourages the organization of elementary classrooms to promote exploration and investigation of objects in the environment. Furthermore, it leads us to design classroom spaces that generate active engagement in problem solving using manipulatives and real-life experiences. In an environment inspired by Piaget's work, teachers ask questions to extend their students' thinking, offer opportunities for social learning, encourage the exploration of ideas, and celebrate learning through documenting and sharing the learning with one another and those who visit the classroom.

LEV VYGOTSKY

VYGOTSKY'S IDEAS ON THE CHARACTERISTICS OF THE LEARNER

Developmental psychologist Lev Vygotsky's social development theory emphasizes that social interaction plays a fundamental role in the development of cognition. He theorized that people learn first through person-to-person interactions and then individually through internalization processes that lead to deeper understanding (Vygotsky, 1978). Vygotsky developed a concept called the Zone of Proximal Development (ZPD); the ZPD is the difference between a person's actual developmental level and ability to solve a problem independently, and the person's potential level of development and ability to solve a problem with adult guidance or in collaboration with more capable peers (Vygotsky,

1978). A task within a child's ZPD is not so hard as to be frustrating but is just challenging enough that the child can learn a new skill when supported and assisted. The support and assistance, called *scaffolding*, that adults and/or more capable peers provide can advance children's knowledge. The physical environment can provide an additional level of scaffolding to help them reach higher levels of functioning (Maxwell, 2007).

HOW DOES VYGOTSKY RELATE TO THE CLASSROOM ENVIRONMENT?

When teachers plan the physical design of the classroom and the lessons to follow, the physical design of the room should allow for social interaction, a key component for cognitive development. Traditionally designed classrooms, where children work individually to complete assigned tasks, do not support Vygotsky's idea that the range of skills that children can develop with adult guidance or peer collaboration exceeds the range of skills children can develop when learning alone. Vygotsky believed that social interaction helps children construct knowledge; consequently, an effective learning environment would allow for child-to-child and adult-to-child interactions. Teachers need to be able to observe children, so that they can identify a child's ZPD for a specific skill and can respond appropriately by scaffolding or asking another child who has already achieved that skill to help scaffold.

JOHN DEWEY

DEWEY'S IDEAS ON THE CHARACTERISTICS OF THE LEARNER

John Dewey's theories on educational processes, developed in the early 1900s, are evident in a great deal of early education literature and are commonly found in many contemporary classroom settings. Inherent to Dewey's philosophy of education is the belief that knowledge results from experience. His philosophy of teaching and learning focuses on the continuous interaction between past experiences and current situations. Learning does not occur in isolation. According to Dewey, the education process is continuous, so that each experience affects the experiences that follow. Children respond to a learning opportunity based not only upon the structure and presentation of a lesson, but also in relation to their previous experiences with related concepts or lessons. For example, children who have had experience with a pet at home will likely have information to share—often in great detail!—when their class hears a book about a pet hamster.

Dewey recognized that each person has unique experiences and individual responses to those experiences. He also acknowledged that some experiences are detrimental to the developmental process while others are supportive of it. Dewey was convinced that the role of the teacher was not to stand and deliver instruction but to facilitate the learning process for children. He proposed that the teacher's goal should be to foster children's positive development to help them achieve their potential.

HOW DOES DEWEY RELATE TO THE CLASSROOM ENVIRONMENT?

Quality educational design, in Dewey's terms, is centered on personal knowing and offers multiple opportunities for nurturing the children's areas of interest. The effective teacher knows her learners

and can structure connected and authentic experiences that will support their development. Dewey's research leads educators to use classroom designs that foster experiential learning, where children are active participants who link knowledge with action. In this way, each learning experience results in the development of personal schemas. Through numerous connected experiences, the teacher guides the children to become independent learners.

Dewey valued the social dynamic of education and its role in supporting a democratic society. He recognized that experiential learning could be a unifying agent for society because children develop interdependence through their common experiences. Weiler (2004) relates that the schools built during the progressive movement, of which Dewey was a leader, reflected small communities and included opportunities for children to become integral, contributing members of their neighborhoods. To Dewey, the teacher takes responsibility for structuring the classroom environment in such a way that it helps children to increase their sense of personal ownership of and responsibility to a democratic society, as well as helps them develop an understanding of how they can contribute to that democracy. A classroom that reflects Dewey's principles is one in which children not only interact with the learning activities but also with one another, creating common understandings and shared experiences.

FOUNDATIONS FOR STRUCTURING THE PHYSICAL CLASSROOM ENVIRONMENT TO SUPPORT STUDENT ENGAGEMENT

Classrooms based on the theories of Piaget, Vygotsky, and Dewey operate under the *constructivist* philosophy of teaching and learning—the idea that people build, or construct, meaning from their experiences. One of the fundamental principles of constructivism is that students themselves are responsible for creating their own knowledge (Dewey, 1938/1997; Bruner, 1990; Piaget, 1972). The educator's role is not to directly dispense knowledge but to help students build their own constructs (Fosnot, 2005). This happens in an enriched, emotionally safe classroom environment where teachers support children's development by thoughtfully tailoring the environment and activities to promote engagement in active learning (Copple and Bredekamp, 2009).

Our question now becomes, What specific type of environment promotes student engagement and improves performance? A number of researchers have delved into this question and have provided educators with a research base for shaping practice. Their research, extending that of Piaget, Dewey, and Vygotsky, focuses in new ways on the characteristics of the learner, the presentation of information and materials available in the classroom environment, and the instructional strategies that are used as structures for learning.

IMPLEMENTING DEVELOPMENTALLY APPROPRIATE PRACTICE

School should be meaningful and fun for children of all ages, especially during the early grades, as this time sets the stage for future learning. Developmentally appropriate practices lay a foundation

for a learning culture in which children develop a love of learning and a desire to know, think, and understand. Copple and Bredekamp define *developmentally appropriate practices* (DAPs) as those that result from decisions about the well-being and education of children that are based on at least three important kinds of information or knowledge:

- **Knowledge about child development and learning:** Teachers know the characteristics of the age group they work with and use that knowledge to predict what activities, materials, interaction, or experiences will be safe, healthy, interesting, and achievable—yet challenging—to the children.
- **Knowledge of the strengths, interests, and needs of each child:** Teachers take the time to observe and learn about the individuals in the group and use the information to adapt for and be responsive to each child.
- **Knowledge of the social and cultural contexts in which children live:** Teachers use this knowledge to ensure that learning experiences are meaningful, relevant, and respectful for the participating children and their families.

In 2014, the National Association for the Education of Young Children (NAEYC) published an extension of the original work on developmentally appropriate practice, edited by Carol Copple and colleagues, to address children in first, second, and third grades. It is crucial to keep these points in mind when educating young children in elementary settings.

The teacher has a significant role to play in helping children develop joy in the learning process, and creating a supportive emotional climate is fundamental to this goal. In an environment where respect for all learners is supported, this climate leads children to learn that it is okay and safe to make mistakes. Time and space for reflection support cognitive and emotional development. Children will value their own "think time" and understand the critical role this reflection plays in the classroom culture as they work individually and with others.

Developmentally appropriate practice leads teachers to create learning experiences that are challenging but achievable (Phillips and Scrinzi, 2014) and to adjust those experiences based on individual need. Teachers design their instruction based on the developmental level of the children and structure lessons so that children can more easily grasp concepts being presented (Bruner, 1966). They integrate the children's experiences into instruction and value a sense of community.

In the developmentally appropriate setting, each child's physical, social, emotional, and cognitive development is nurtured. Materials play a key role in the work that children do and are selected based on developmental levels of the children in each of these areas. Tomlinson (2014) indicates that most of these materials are concrete in nature, are readily available, and comfortably challenge the children. For example, math manipulatives and blocks provide children opportunities to link the concrete materials to abstract math concepts. Planting seeds and watching them sprout, develop roots, and grow give children experiences to physically interact with life science concepts. Through interacting with materials and participating in discussion activities, children refine their understandings and demonstrate these understandings.

DAPs provide a framework for structuring the physical, emotional, social, and instructional design of the classroom. Using the work of organizations such as NAEYC and of practitioners such as

Bredekamp and Copple, Bodrova and Leong, and DeVries and colleagues, we can more intentionally generate a classroom design that meets the needs of all our learners.

INCORPORATING BRAIN-BASED RESEARCH INTO PRACTICE

The physical, social, and emotional learning environment must enhance learning, not impede it, and recent brain-based research can inform a redesign of the learning environment.

It begins with rats. Marian Diamond, a neuroscientist and researcher from the University of California at Berkeley, and her colleagues did pioneering work with laboratory rats in the 1950s. They found that positive physiological changes in rat brains occurred when the rats were stimulated with an enriched environment (Diamond, Krech, and Roseweig, 1964).

The human brain is highly plastic and constantly changing, especially during the critical years of early childhood development, birth through age eight. Stimulating, enriched environments can grow *dendrites*—the structures in the brain that bring information to the brain cells—while dull or unchallenging environments can inhibit brain development or growth. We learn from Diamond's initial research, and research following hers, that quality environments can promote positive brain development (Diamond and Hopson, 1998; Kempermann, Kuhn, and Gage, 1997). Caine and Caine (1990) connected brain research to education, espousing twelve principles of brain-based learning. Through these principles, we see links between neuroscience and effective classroom practices. (*Twelve* principles? Don't worry—each principle flows naturally and logically into the next.)

1. **The brain is a parallel processor.** This simply means that the brain can perform lots of tasks at the same time. For example, as you read this, you may have music playing in the background as you enjoy a nice cup of tea, and you may be keeping one eye on the time because you have to be somewhere in an hour. Additionally, your body is aware of the chair cushions, the lighting, and the room temperature. All of this information is relayed to your brain, where it is processed.

2. **Learning engages the entire physiology.** Anything that affects our physiological functioning—a stressful morning, a cold or headache, hunger or thirst, an uncomfortable or distracting environment, fear of failure in an upcoming evaluation—affects our ability to learn.

3. **The search for meaning is innate.** Humans are born with a desire to learn, to understand, to make sense of our experiences. Our brains naturally take note of the familiar but pay particular attention to anything new.

4. **The search for meaning occurs through patterning.** The human brain naturally looks for similarities between new experiences and things already experienced and tries to discover how the new fits into what is known and familiar.

5. **Emotions are critical to patterning.** Our feelings, expectations, biases and prejudices, and mind-sets influence what and how we learn. Emotions impact our memory and recall of information.

6. **The brain simultaneously perceives and creates parts and wholes.** Our brains break down information into parts—the letters and the sounds in the word *bicycle*, for example—while at the same time developing an understanding of the whole—what *bicycle* means, what a bicycle looks like, and how it is used.

7. **Learning involves both focused attention and peripheral perception.** The brain responds to the entire sensory context of communication. For example, not only do we hear words spoken, but we also notice and respond to body language, facial expression, and tone and volume of voice.

8. **Learning involves both conscious and unconscious processes.** Our brains perceive signals that we do not consciously recognize, but we react to or use that information nonetheless.

9. **We have two types of memory systems: spatial and rote.** Our spatial memory system automatically registers our experiences in the context of space. For example, you probably remember what you had for dinner last night. On the other hand, remembering facts and skills in isolation—rote memory—requires rehearsal, repetition, and, often, memory techniques.

10. **The brain understands and remembers best when facts and skills are embedded in natural spatial memory.** Thinking about what you had for dinner last night: Perhaps you cooked like you do every night, or perhaps you ordered takeout from your favorite restaurant. You may not "need" to remember that information, but most likely you do because you have a context for it. If, however, someone asks you to remember a complex mathematical equation, that may be harder because that information is without context and is more difficult to fit into what you already know.

11. **Learning is enhanced by challenge and is inhibited by threat.** When we are challenged, our brains respond with enthusiasm as they look for similarities and differences with what is already known and use that knowledge to understand the new experience. When we experience threat, however, our brains revert to a more primitive level of functioning. Thinking becomes less flexible and learning is consequently more difficult.

12. **Each brain is unique.** We all have the same set of systems, but these systems are integrated differently in each of us. Additionally, learning actually changes the structure of the brain, so the more a person learns, the more individualized the person's brain becomes.

In brain-compatible classrooms, each child's individuality is respected, and the value for social learning experiences is acknowledged. These classrooms provide nonthreatening learning opportunities that are challenging but attainable and lead to meaningful learning experiences.

Hart (1998) and Caine and Caine (1990) describe the effect that emotions and the absence of threat can play in the creation of a positive learning climate for children. When children feel emotionally and physically safe and supported, when making mistakes is acceptable, and individuality is respected, children's learning is enhanced. These researchers portray a body-brain partnership, one that engages the learner physically in the learning process, as happening within an emotionally safe and supportive classroom environment. The physical needs associated with general health and nutrition are also elements of this safe environment.

Work by Eric Jensen connects research to teaching strategies that can have a positive effect on teaching and learning in schools. In his book *Brain-Based Learning*, he says, "Learners in positive, joyful environments are likely to experience enhanced learning, memory, and feelings of self-esteem" (Jensen, 2000). Teachers have a responsibility as facilitators of learning to create a positive environment that promotes a sense of community, involves learning content and mastery, and includes real-world application as the goal.

INCORPORATING RESEARCH INTO BEST PRACTICES IN THE PHYSICAL ENVIRONMENT

The classroom environment can be used as a tool to support learning by both the teacher and the child. Developmentally appropriate practice works in concert with the findings of research about the brain and leads us to design physical environments that are more engaging for young children. Caine and Caine (1990) recognized that brain research has implications for the physical environment. Their principle that learning involves both focused attention and peripheral perception brings to light the importance of designing a classroom environment that intentionally addresses elements such as temperature, light, noise, and displays in the room. Hart (1998) corroborated this principle, stating that the physical environment of our schools should be:

- healthful, clean, and well lighted;
- uncluttered;
- well laid out for multiple uses;
- pleasant smelling; and
- aesthetically pleasing with calm colors, plants, and music.

The physical environment must be clean and contain materials safe for children to use. Additionally, well-maintained, stable classroom furnishings should accommodate the needs of individual children as well as those of the learning community as a whole. Flexible use of space is critical. Jensen (2000) identifies the importance of environmental influences and recommends using a variety of seating options within a room arrangement that provides for individualization. He also notes the value of including manipulatives, music, and concrete objects for study and exploration.

The use of peripherals is also important. They are evidence of learning and are connected to current topics of study. Peripherals are often child generated and support understanding. *Peripherals* are artifacts created during the learning process that are then placed around the classroom to capture, celebrate, and extend the learning. Mrs. Roller demonstrates these three benefits of peripherals during a study of insects.

> She displays a variety of resources about insects in the classroom, including a large 3-D model of an insect. Her students make scientific drawings of an insect using these resources, and these drawings capture their learning. Mrs. Roller displays the drawings prominently in the room to celebrate her students' learning. She uses them as a point of reference during discussions about insects and as a basis for comparing insects to spiders, thereby using them as a way of extending the learning.

Peripherals can be tools for continuous learning, especially when they are created by the students (Tarr, 2004).

Teachers who integrate principles of DAP into the physical design of their classroom are mindful that too many colors and products that are not representative of learning, such as posters and cartoon-based items with no connection to the explorations, can be distracting. Classrooms that have displays that do not connect in a meaningful way to the topics of study waste valuable space. It is important to remove banners, artifacts, posters, cut-outs, outdated displays, and decorations that do not lead students to focus on the current concepts. The learning taking place in the classroom community should be apparent for all to see. This environmental evidence of learning shows students that you value their thinking and work. Creating and using the environment as a teaching tool is the instructional foundation for engaging children in learning.

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Did you know CLASSROOM DESIGN affects learning?

Environments are a complex interaction of physical elements, including sensory components, design and organization, aesthetics, nurturing attributes, and pedagogical resources. Research shows these elements can work together to improve early learning, self-efficacy, and higher-order thinking skills.

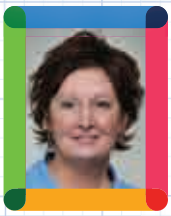
Pamela Evanshen, EdD, and Janet Faulk, EdD, have developed an environmental rating scale—Assessing the Pillars of the Physical Environment for Academic Learning (APPEAL)—to help educational professionals evaluate and improve the design and use of elementary learning environments.

Transform learning spaces from teacher-centered classrooms where creativity and collaboration are stifled to student-centered, developmentally appropriate learning communities where children thrive.

The APPEAL rating scale is a valid and reliable assessment that quantifies six environmental domains:

- **Meaningful Learning:** occurs in a healthy, welcoming, and inviting classroom
- **Social Learning:** encourages positive learning interactions through room arrangement and seating choices
- **Purposeful Learning:** facilitates discovery and active engagement through learning centers and stations, personal spaces for children, and teacher space
- **Responsible Learning:** encourages children to take ownership of their learning, be accountable for their effort, and work together to accomplish learning goals
- **Continuous Learning:** showcases children's understandings of core content knowledge
- **Inquiry-Based Learning:** project-based learning and collaborative problem solving supported by rich resources

Room to Learn: Elementary Classrooms Designed for Interactive Explorations will help elementary educators completely reinvent their spaces to achieve the best child outcomes.



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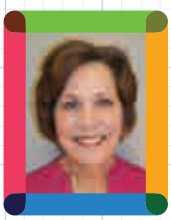

Janet Faulk, EdD, has taught at the preschool, elementary, and middle-school levels. She is an experienced administrator, serving as a supervisor of special education and an elementary-school principal. She retired as an associate professor from Milligan College in Elizabethton, TN, where she taught courses in literacy and special education. An author of many books and articles, Dr. Faulk continues to consult with educators about designing classroom environments to support student engagement.

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