What Is an Academic Kindergarten?

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This article is the first in a multi-part series on the nature of academics in pre-school and kindergarten programs. Future articles will focus on learning to use symbols and abstract ideas, language development, verbal and written, and on teaching methods that foster the capacity for careful observation, asking in-depth questions, seeking information, and academic achievement.

The Need for Enriched Early Childhood Programs

We all want our children to succeed. We want them to have the best education. We want them to be challenged and motivated. We know they are capable of learning a great deal at an early age. Parents today have high expectations and aspirations for their children. They are willing and eager to provide them with experiences that facilitate their cognitive and psychological growth.

Many young children enter some form of schooling by age three. Young children learn how to play and work in a group, to share, to take turns, and to express their ideas, wishes, and needs to an adult in these early childhood settings. The social and emotional developmental goals of early childhood are addressed before children enter kindergarten.

In addition to these social and emotional goals, parents understand their children are also capable of mastering cognitive and intellectual goals. They see their children interested in a wide array of information, collecting and remembering interesting facts, and asking an endless series of questions. Their language abilities develop at impressive rates. Both the ability to understand increasingly complicated vocabulary and language structures and to express themselves with new words and sentence constructions develop dramatically from three to five years of age.

Parents are aware that expectations for academic learning have increased: it is vitally important that children learn to read, write, and calculate at proficient levels at ages earlier than was acceptable a generation ago. Federal and State standards now clearly communicate the need to measure and document academic achievement as soon as children begin formal schooling.

Framing the Question: What Should an Early Childhood Curriculum Include?

What is an appropriate curriculum for pre-school and kindergarten programs has become an increasingly urgent question. For many parents the old standards and the traditional focus of early childhood education seem to lack academic content and challenge. As parents tour pre-schools and private kindergarten programs, to decide which would be the best for their children, they are asking school directors and educators to explain the academic content of their programs.

As a result of these developments, many pre-school and kindergarten programs teach children reading, writing, math, and science skills that would have been taught in first grade a generation ago. In many of these programs, for example, children use phonics workbooks and learn to identify letter names and sounds. They are taught to circle the right letter in the workbook at the direction of the teacher who stands in front of the class at the chalkboard.

Some early childhood teachers question this introduction of traditionally first grade curriculum into programs for three, four and five year olds. Certainly teachers like parents are aware of the issues and forces outlined above. Certainly teachers are aware, like parents, that young children are capable of learning a great deal. However, early childhood educators, drawing on two decades of research on the development of cognitive abilities as well as their own experiences, have serious reservations about introducing workbook activities

and other "academic" learning activities into programs for three, four and five year olds.

Too often the disagreements about what is appropriate for young children in pre-schools are framed in terms of social / emotional skill development versus academic skill achievement. Parents ask about the academic curriculum and teachers explain how they facilitate the growth of social skills such as getting along in a group and expressing one's ideas and needs. It is like two ships passing in the night. Neither side is really listening to and understanding the other.

Park School's view avoids this needless dichotomy between the academic and the social / emotional. Early childhood programs should support the growth of cognitive, intellectual, academic, physical, social, and emotional skills. However, our definition of academic emphasizes the development of the capacity for thinking and cognitive abilities.

We believe an academic curriculum should be one that develops conceptual thinking in young children. By supporting cognitive growth, kindergarten programs build the intellectual foundation for abstract thinking during later childhood and adolescence.

The early years, ages 3 to 6, are a time for learning to identify information, to represent that information in symbols, both concrete and abstract, and to formulate theories about the workings of the natural and human world. These mental and cognitive processes are as much a natural and biological part of growing as are the physical skills of fine and gross motor development. During these years, the growth of cognitive capacity is intricately connected to verbal language and its two components, receptive and expressive language.

Stories are always more illustrative. What follows is an anecdote of a child internalizing – through spontaneous play – science content and concepts taught by the teacher.

A child is playing with an action figure in the block corner. He is flying the figure back and forth across the room. The teacher observes him out of the corner of her eye from the other side of the classroom while she works with a small group of students. She is getting worried about his activity. This isn't the "time on task" focused behavior indicative of academic learning. The teacher interrupts her work with the small group and walks over to speak with the "boy flying the action figure around the classroom." Before redirecting his behavior, she stops to observe and listen.

The teacher first notices that the boy is flying the action figure back and forth with a fairly tight trajectory, going back and forth repeatedly over the same path. She hears him saying to the figure, "You are getting closer and closer; it is getting hotter and hotter. Watch out, your pants are on fire. Quick! Turn around and fly away." Then as he flies in exactly the opposite direction, he says, again to the action figure, "You are getting farther and farther away. It's getting colder and colder. Watch out, your butt is freezing. You better turn around." And as he says those last words, he flies the figure in exactly the opposite direction. While the teacher is watching, he repeats the actions and words several times.

The class had been taught a lesson about the solar system. The teacher had explained how the planets are in orbits around the sun, and that each planet is farther and farther away from the sun, some very close and some very far away. The teacher had also explained that the distances are very large, and that it is very hot near the sun and very cold in the outer reaches of the solar system.

The idea to play this game with the action figure was certainly not planned by the teacher; it came about during some free time in the classroom. Yet, this activity is a genuine intellectual endeavor and is integral to the young child's cognitive development. In what ways is this spontaneous activity genuinely intellectual and part of learning to think conceptually? Does this spontaneous play activity also provide guidance for the teacher designing the academic structure of an early childhood curriculum?

The boy flying the action figure had clearly been fascinated with the great distances in our solar system and the dramatic temperature changes. He was really thinking about the extremes of hot and cold that exist in the solar system. What did he do with the mental buzz that the lesson had created in his brain? He was compelled by his own mental activity to "act it out." He couldn't just sit, ponder and write an equation. That would have been appropriate for an older scientist with a more abstract symbol system at his disposal. Instead the boy explored the implications of distance and temperature with his body and his action figure. He used his imagination and fantasy play to reenact the temperature changes that a space traveler would experience in a trip to the outer reaches of the solar system and back to the center near the sun. Even though he had not directly experienced the vast distances and extreme temperatures, he realized they were significant. The boy included in his reenactment very real and specific examples of the effects of extreme heat and cold, i.e. his pants catching on fire and his butt freezing. His acting out of the physical reality in a game of fantasy play was his way of internalizing and making sense of the scientific concepts. It was his way of creating a symbol system that enabled him to ponder and understand the implications of the information the teacher had given him.

This is, in Park's view, an example of the processes of cognitive development. The boy's physical activity, integrated with his language, enabled him to understand what the teacher had taught him. By talking to himself and creating an imaginary simulation of traveling these distances and experiencing those temperatures, he was "really getting it." Too often information from the teacher is remembered as isolated bits, not part of a meaningful system or a conceptual structure. Again, these are processes fundamental to learning to think.

Conclusion

Children at an early age form ideas and organize information into conceptual frameworks. They do not just learn facts and accumulate isolated pieces of information. They have an innate desire to make the information meaningful, to connect individual facts to other facts, to understand how the information explains other observations.

Young children gain an understanding of the meaning of information in ways that are different from adolescents and adults. They cannot come to understand the implications of facts and ideas just by listening and talking. They need to play with ideas, to re-enact events, and to incorporate facts into their fantasy play. Often fantasy play is the activity that enables children to form cognitive ideas and think through the implications of an idea or fact. Young children think by creating make believe scenarios and incorporating information into the language and narrative of the simulation.

Parents and teachers should create learning activities that give children information and ideas, and then help them come to a deep understanding of them by enabling creative re-enactments and fictional scenarios (fantasy play). Academic instruction should provide information through books and first-hand observation and then support re-enactments so children can internalize the concepts.

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The Rationale for an Academic Kindergarten

Chapter II – The Process of Symbolization from Concrete to Abstract

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This article is the second in a multi-part series on the nature of academics in pre-school and kindergarten programs. Future articles will focus on language development, both verbal and written, and on teaching and instructional methods that foster the capacity for academic achievement.

The Need for Enriched Early Childhood Programs

In our first article, we proposed that the curriculum for early childhood programs should include both academic and psychological goals.

We defined the academic curriculum as an emphasis on the development of conceptual thinking in young children. The early years, ages 3-6, are a time to learn to identify information, to represent that information in symbols, both concrete and abstract, and to formulate theories about the workings of the natural and human world. These mental and cognitive processes are as much a natural and biological part of growing as are the physical skills of fine and gross motor development. During these years, the growth of cognitive capacity is intricately connected to verbal language and its two components, receptive and expressive language.

The Process of Cognitive Development—Expressing Ideas through Symbols

Stories are always illustrative. Here is an anecdote that reveals intellectual work in an early childhood setting.

> It is recess time and several children are building in the sandbox. This sandbox is actually shaped more like a long river than a square. The recess teacher notices that the buildings have an unusual shape and wanders over to observe and talk to the children. He observes three clusters of sand towers connected by curving roads or paths. The whole construction follows a straight line and extends over fifteen feet. He asks the children what they are building. They explain that it is a three-dimensional map of the trip from Baltimore to New York City. The three clusters of towers represent the three cities, New York, Philadelphia, and Baltimore, and the pathways are the inter-state highways. (One of the children had traveled to New York over the recent school vacation.) As the teacher leaves this scene, he sees the children racing their cars along the highways and hears them arguing about which city is the biggest and how long it takes to drive from one city to another.

The idea to construct this map was not stimulated by a teacher; it came about during playtime at recess. Yet, we would claim this activity to be a genuine intellectual endeavor and crucial, if not essential, to the cognitive development of the children. In what ways is this spontaneous play activity genuinely intellectual and part of learning to think conceptually? Does this spontaneous play activity provide guidance for a teacher designing the academic structure of an early childhood curriculum?

From the perspective of cognitive processes, what was happening in the sand river? One of the children had a memorable experience, the trip to New York. She was apparently particularly impressed by what she experienced en route. She remembered the time spent driving in the car; she noticed the difference between being in a city and being on the highway; she knew the car traveled a long

time, which meant a long distance. She probably had asked the driver how many miles there are from Baltimore to Philadelphia and from Philadelphia to New York. She may have asked the driver repeatedly how long it had been and how many miles they had traveled. Her mind was fascinated by the relationship between time and distance and by the contrast between the cityscape and the landscape of the highway. Her mind needed to make sense of these observations and experiences. Her mind needed to organize the disparate and unorganized sensory experiences.

So she did what any good scientist would do: she built a model. An adult might have kept a numerical chart, correlating speed, distance, and time. This chart would have enabled the driver to predict when the car would enter Philadelphia and whether the family would or would not be caught in the rush hour traffic nightmare. However, the early childhood scientist has not yet developed the capacity to manipulate abstract numerical symbols, but she certainly can manipulate concrete symbols. The sand river provided the ideal material for constructing a model that simulated and symbolized (represented) the information she had gathered through observation (paying attention) during the trip. The completed model then enabled her and her friends to organize, understand, and interpret the information and the concepts. The physical model was the symbol that enabled her mind to internalize the conceptual relationship between time and distance and among different geographical features.

The capacity to organize experiences and represent them with symbols is fundamental to the ability to think and to do academic work in school. It all starts in early childhood. The story about the boy flying the action figure back and forth across the classroom highlights another aspect of concept formation and symbolization. It demonstrates dramatically the need for several types of symbols in the learning process.

The Basic Skills of Academic Learning

Let us outline (a) the sequence of learning to express ideas through symbols and (b) a list of quantitative thinking skills.

Young children – and adults learning a new discipline – naturally use a sequence of symbols to express what they know and understand. The symbols appropriately move from concrete to abstract. The types can be described as:

- concrete – three-dimensional
- pictorial – realistic representation
- graphic, logo – symbolic
- abstract – word and number

A **concrete symbol** is an action or an object that recalls and looks like the observed facts or events. The sand model of the trip from Baltimore to New York is a concrete symbol. The architect's miniature model of the building is another example. A re-enactment in children's fantasy play or a NASA simulation is a third example.

This type of symbol is the closest to the actual event and is the easiest to understand. The connection between knowledge and representation is direct. The architect builds the model so the naïve client, who cannot read abstract blueprints, can "see" what is planned.

A **pictorial symbol** is a two-dimensional picture of the idea or facts under review. It can be filled with many details or only a few. Children often benefit from drawing before being asked to write. The process of recalling the event and deciding what to include in the drawing requires the mind to focus and organize thoughts. Simply by making a drawing, the mind recalls to conscious memory what was observed and places it in memory for future reflection.

The picture as a visual image is more symbolic and less real than a concrete representation. It takes more conceptual capacity to understand the information contained in a picture than in a model. The former requires more complex thinking to imagine how it would be to live and move in the space.

A **graphic symbol** is even more abstract. Lines and shapes have no meaning in themselves. They have meaning only to the extent that they remind us of the event or object. Often they are abstract pictures constructed of lines that are reminiscent of the actual object. They can become systems

capable of transmitting a great deal of information when a community of people agrees on the referents of the symbols. Architectural blueprints, for example, contain volumes of information for carpenters, plumbers, etc. But if you don't know how to read the symbols, mistakes can be made.

Finally, **words and numbers** are the most abstract. The information communicated by words and numbers is dependent on knowledge of language and mathematics learned over many years. For children, there is a significant gap between numbers and words, verbal or written.

As young children learn to communicate and think about what they are learning, they use all types of symbols. Deep learning occurs when children move deliberately with the guidance of a teacher from concrete to pictorial to graphic to abstract symbols.

When ideas are presented too soon in an abstract form, children may only learn a shallow isolated set of terms with no real understanding of the ideas. For example, if the "boy with action figure" had not translated the lesson on the solar system into a "concrete action-packed" symbol system at his level, then he would not have understood the implications of the structure of the solar system.

Intelligence is the ability to represent the physical and human world in our minds with symbol sys tems and then imagine what would happen in situations we have not directly observed. Because he had acted out a trip from the Sun to Pluto, the boy was prepared to make recommendations to NASA about the type of clothing needed for space travel. The other students, who had simply listened to the teacher and had not played with the ideas presented to imagine their implications, would be less able to predict what might happen on a trip to Pluto.

Scientific and mathematical thinking requires five basic skills:

- observing
- classifying
- measuring
- predicting
- inferring

All academic learning, including thinking and concept development, involves the thoughtful use of these skills with a variety of natural phenomena and abstract ideas. Children use these skills with the guidance of the teacher as part of the academic curriculum.

Principles of Designing the Academic Kindergarten

Children should be given many opportunities to gather information and to observe, classify, measure, predict, and infer.

Children should be asked to represent their observations and ideas in a varied series of symbolic forms: three-dimensional models, dramatic play, re-enactments, pictures, graphs and logos, and words and numbers.

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