

# Developmentally appropriate practice buzzwords or best practice?

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Developmentally Appropriate Practice Buzzwords or best practice? By Jocelyn Smrekar and Andrea Hansen Teachers and parents are sometimes fooled into thinking that children must learn to read by age 5, usually in kindergarten. Consider this example: Jamie has trouble reading in kindergarten. Her teacher says it's because she only played in preschool. In first grade, Jamie is called learning disabled because she still doesn't read. By third grade though, Jamie is reading fluidly with her peers. Have teachers cured Jamie of a disability? No!

Jamie's reading development followed its own course and leveled into a lifelong skill and what teachers call "working at grade level." Children develop at different rates in separate areas: physical, emotional, cognitive or intellectual, language, and social. Differences, including abilities and disabilities, affect the way and speed with which children develop skills. Genetic traits, temperaments, learning style, environment, cultural and racial expectations, and experiences influence learning. Some children learn to say words at 8 months, others not until they're almost 2 or older.

Many children learn to walk at 9 months, while others wait until they are 15 to 18 months. Charts of developmental milestones—walking, talking, running, or stacking three blocks, for example—are based on averages. Parents and teachers frequently worry when a child doesn't have a skill at the targeted time. Most often, skills develop according to children's interests and temperaments—that is, a child's basic approach to people and events. Foundation for Further Learning Developmentally appropriate practice (DAP)

is a term coined by the National Association for the Education of Young Children.

It describes teaching techniques that identify and foster the developmental needs of children, both individually and in groups (Bredekamp, 1987). DAP is a set of guidelines suggesting curriculum content and practice serving children birth through age 8. Simply stated, these guidelines encourage early childhood programs to provide an educational environment that responds to the needs and interests of children. In that environment, trained teachers use observation to plan for the class and the individuals in it. In DAP classrooms, children's play is the primary vehicle for learning.

This article will focus on DAP in school settings, prekindergarten through third grade. DAP deals with all the levels and stages children grow through, building a strong foundation for future learning. Children remember, classify, repeat, and modify their experiences as they learn about the world and the people in it. For example, Zach, age 6, is eager to put together a puzzle with 100 pieces. He has experience with puzzles—first with five-piece wooden puzzles in a frame, then with cardboard floor puzzles, and finally with boxed 60-piece puzzles.

He knows that the picture on the outside of the box will be a guide as he separates the straight-edged pieces from the curved ones. He locates the four corners, looks for matching colors, and after 45 minutes of concentrated effort, completes the puzzle. He has used his past experiences to build new ones that include abstract tasks like classifying, matching, counting, sorting, identifying, and experimenting. He has improved his small motor skills,

increased his ability to concentrate on a complex task, and learned the virtue of tenacity, sticking to the task until completion.

Zack's alert teacher notes his success and plans new ways to challenge his skills and foster new interests. A teacher's understanding and use of DAP are keys to educational success. Learning experiences in a DAP classroom Children are active learners—they need opportunities to investigate and explore with objects, materials, and equipment in order to construct a base of information about their world. Through firsthand experiences, children are able to connect what they already know with new, more complex information.

Teachers who use DAP in their classrooms provide opportunities for children to interact with a variety of materials. They offer uninterrupted time to actively explore not only intellectual skills, but also social, emotional, physical, and language skills. Specific teaching techniques include asking open-ended questions, modeling, demonstrating, exploring, coaching, and direct instruction. These techniques extend learning and guide children to skill mastery (Bredekamp and Copple, 1997). Young children learn best and most when they actively and playfully explore materials and activities, using all their senses.

Developmentally appropriate classrooms are set up so individuals or groups of children can become directly involved with materials. Children move between free or spontaneous play and organized play. In free play, for example, a puppet show evolves into a performance by children in dress-up clothes. In organized play, children might chart the favorite fruits of class

members. Role of Play A central issue in DAP is the role of play in the curriculum. Because adults don't depend on play to learn, they tend to dismiss it as a pleasant time spent without profit. In children, however, play is an essential part of a child's education.

Sometimes called children's work, play supports a child's development by providing the tools, equipment, and interpersonal experiences that help children grow. Through play, children acquire information, master activities, use concrete materials as symbols, organize previous learning, learn perseverance and focus, solve problems, and develop creativity. Are Children Really Learning? While many teachers agree that DAP helps children develop cognitive, social, emotional, language, and physical skills, parents often ask, "Is my child really learning? All I see is play."

Standardized tests given after second grade to children in both DAP and traditional classrooms have revealed little difference in general reading skills (Kostelnik, Soderman, and Whiren, 1993). Children in DAP classrooms scored significantly higher in tests of vocabulary, reading comprehension, expressive language, and reading and writing mechanics in context. In standardized tests of math, the two groups showed similar scores in overall math skills, but the DAP children scored significantly higher in conceptual understanding and problem-solving skills than children in traditional classrooms.

Children who had been in DAP classrooms for five years scored significantly higher in reasoning and problem-solving skills. Most importantly, children in DAP classrooms reported great enthusiasm for school and high involvement

in the learning process. What Does a DAP Classroom Look Like? The physical setup of a DAP classroom indicates how learning takes place. The teacher's desk is usually in an inconspicuous place, not in the front of the room. Student desks, if provided at all, are clustered into learning centers. Most often, long tables replace individual desks, encouraging cooperative group work.

Room arrangements and traffic patterns may change throughout the year as children grow and change intellectually, and they meet specific educational goals. Another difference in DAP classrooms is the way textbooks and worksheets are used. Often in traditional classrooms, printed materials are the primary source of instruction; teachers dictate the use of textbooks, worksheets, and other teaching materials. In a developmentally appropriate classroom, children learn through materials that are concrete, real, and relevant to their lives.

In a kindergarten class that is studying insects, for example, the classroom is rich with pictures, colorful field guides, and posters. It may also have an ant farm with magnifying glasses, a box of silk worms spinning cocoons, a tomato plant with resident praying mantis, and a butterfly house. Children are encouraged to collect insects and sort them by size, color, function, or benefits to humanity. They use math skills like counting, estimating, and graphing in the daily routine. They have opportunities to draw and paint their impressions of insects as well as to sing and act out the metamorphosis of caterpillar to butterfly.

In a DAP classroom textbooks are resources, not the primary source of information. All equipment and supplies—including manipulatives, construction materials, artmusic, and role-playing props—are accessible to the children as they explore and discover answers and new questions. Teachers support learning by setting up centers and providing the materials and guidance necessary for the children to learn. DAP as Best Practice Teachers who have adopted developmentally appropriate practices consider each child's uniqueness and skill level when planning activities.

Allowing children to progress through the stages of development at their own rates is the best way to build the foundation for future learning. This philosophy is reflected in the classroom environment and activities planned. Learning takes place naturally, because it is child-centered and relevant. Children are constantly learning, building on what they know to create new ways of thinking and seeing their world. Isenberg, J. and N. Quisenberry. " Play: A necessity for all children," *Childhood Education*, 64 (3), 138-145, 1988. Statements of Developmentally Appropriate Practice Space and Furnishings 1. Indoor space

Children need sufficient space that is well lit and has a comfortable temperature for learning and playing. Indoor space that is well maintained and in good repair sends a message to the young child that is welcoming and inviting. 2. Furniture for routine care, play and learning Children need appropriate furnishings to meet the demands of their daily schedules. Basic furniture such as cots, tables and chairs should be sturdy and appropriate to the size of the children in the group in order for children to be comfortable,

have proper body support, and focus on learning, playing, and routine activities rather than their own discomfort.

Caregivers need easy access to routine care furnishings, such as cots, in order to maintain proper supervision and provide smooth transitions between activities. 3. Furnishings for relaxation and comfort Children need space and opportunity to relax and rest. Soft furnishings and toys allow children opportunities for relaxation and comfort. Cozy areas provide a space for quiet activities to occur and should be protected from active play so children can snuggle, daydream and lounge. 4. Room arrangement Creative room arrangement promotes a child's positive self-image and encourages a wide variety of age appropriate activities.

Well-defined interest centers where materials are accessible help children to understand about organization and returning materials to their proper place. 5. Space for privacy Some children experience unacceptably high levels of stress when exposed to constant activity and interaction. Places where children can escape from the pressures of group care promote positive self-esteem. Providing a child with opportunities, space, and time to be alone can contribute to positive classroom behavior. 6. Child related display Every child needs to know that others value his/her play or work.

Artwork or other individual work that is created by the children should be displayed in the classroom at the child's eye-level. This promotes feelings of positive self-esteem and sends the message to the child that his/her work is valued and appreciated. 7. Gross motor play Children need daily opportunities to exercise large muscles, run in open spaces, and practice



gross motor skills. (Safety is always a number one priority. ) Space to develop children's large muscles through a variety of play experiences should be made safe by providing adequate cushioning for fall zones.

All play equipment should be safe and effective monitoring should be implemented to teach children safe play behavior and to safeguard against accidents. 8. Gross motor equipment Children need age appropriate stationary and portable equipment to promote a wide variety of skills that exercise large muscles while developing confidence and abilities. Equipment should be sound, sturdy, safe and accessible to children daily. Personal Care Routines 9. Greeting/Departing Parents and children need a warm, welcoming, and pleasant atmosphere to make the daily greeting and departing routine a happy one.

Positive greetings help to promote the children's self-esteem and create a welcoming environment for parents. 10. Meals/Snacks Meals and snacks that follow USDA guidelines contribute to the health of children and provide a model for good nutritional habits for life-long practice. Proper hand washing along with careful food preparation teach children proper hygiene and promotes sanitary conditions. 11. Nap/Rest Nap and/or rest time should be appropriately scheduled and supervised for the children in the group. Adequate separation of cots helps to prevent the spread of germs.

Soft music or a soothing story helps to facilitate a peaceful rest time that is important in helping children to balance the day and renew their energy. 12. Toileting/Diapering Young children need appropriate supervision of the toileting process in order to care for basic needs and to teach the importance

of good health habits. The schedule should be individualized. Provisions, such as soap and steps near the sink, should be convenient and accessible so that children can wash hands after toileting; this promotes self-help skills and good personal hygiene.

Diapering should always be managed in a manner that promotes safety and good health practices. 13. Health practices Practicing preventive measures, such as washing hands after handling pets or wiping noses, help to educate children to achieve life-long health practices. Taking appropriate action when children are sick will minimize the spread of germs. 14. Safety practices Protecting children is critical in providing quality care, whether through adequate supervision or minimizing hazards both inside and outside. Caregivers should anticipate potential safety problems and demonstrate, model, and teach children safe practices.

Language-Reasoning 15. Books and pictures The use of books and pictures is an important means of learning for children as they make sense of the world around them. Books, pictures, and language materials should be available in sufficient number both for independent use in a reading center and for use by a teacher with children in formal and informal settings. 16. Encouraging children to communicate Activities and materials that promote language development should be available for use throughout the classroom and the daily schedule. Teachers should establish an environment where language exploration and usage is encouraged.

17. Using language to develop reasoning skills Logical relationships and concepts should be presented in appropriate ways. Children learn through

interaction with materials and people, both peers and adults, in the context of play and daily routines. Language provides the key tool for success and problem solving, as children are encouraged to talk through their thought processes. 18. Informal use of language Language is a way for children to expand understanding. Caregivers should engage children in give and take conversations for enjoyment and learning.

They should support child-to-child conversations as well. Activities 19. Fine motor Children need a variety of age-appropriate and developmentally-appropriate toys and materials that they can manipulate with their hands and play with at will. These activities strengthen fine motor control while encouraging skill development that contributes to academic readiness. 20. Art Children benefit from exposure to child-initiated art activities that are open-ended and process oriented. Children's art should be respected and appreciated as individual, creative expression.

Materials and opportunities to create art projects at a beginning and more advanced level should be available as children are developmentally ready for them. 21. Music/movement Music and movement are valuable means of learning. Children need a supportive environment that includes a teacher and a variety of tools to encourage their self-expression through music and related activities. 22. Blocks Block play, with a variety of blocks and accessories, allows children the opportunity to explore spatial, mathematical, and role-play possibilities.

Powerful block play requires sufficient space in a protected area and time to expand on concepts and ideas. 23. Sand/water Sand and water play gives

children the opportunity to learn concepts through active exploration with their senses. The addition of interesting props extends the learning potential offered through sensory play. 24. Dramatic play Dramatic play gives children the opportunity to discover an array of roles and responsibilities. It provides a vehicle through which they make sense of their world. Dramatic play is enhanced by space, time, props, materials, and supportive teachers.

25. Nature/science Science and nature activities and materials foster curiosity and experimentation benefiting the young learner through direct experience and application to other areas of learning. Concept and observation skills are strengthened through science procedures. 26. Math/number Math skills, when introduced through appropriate hands-on methods, form a foundation for school readiness and later academic success. Math skills can be taught effectively through routines, schedule, and play activities. 27. Use of TV, video, and/or computer

TV/video viewing and computer use tend to be passive in comparison to active involvement with materials and people. The use of each should be confined to subject material that is age-appropriate and mentally stimulating. Time limits encourage more active learning. Participation should not be required. 28. Promoting acceptance of diversity Children need to be exposed to the similarities and differences of people in positive ways through books, pictures, toys, materials, and interaction. This exposure encourages respect for others and lessens misunderstandings. Interactions

29. Supervision of gross motor activities Caregivers should use gross motor activities as learning opportunities to promote positive social interactions

and to encourage the development of skills and new experiences Diligent supervision of gross motor activities, whether indoors or outdoors, is critical to preventing accidents and insuring safe, active play. 30. General supervision of children (other than gross motor) During activities, caregivers must balance the level of supervision and control based upon the ages, abilities, and individual needs of the children.

Adequate supervision and awareness of the whole group is required for children's health and safety and in the recognition of accomplishments, which is necessary for children's emotional well-being. 31. Discipline The set-up of the environment, teacher expectations, available materials and opportunities, and daily schedule significantly impacts children's behavior in childcare. A classroom and curriculum geared toward developmentally appropriate practice will lead to generally good behavior that is the product of self-motivation rather than the result of punishment and control. 32. Staff-child interactions

Caregivers, who are nurturing and responsive, promote the development of mutual respect between children and adults. Children, who trust adults to provide for their physical, psychological, and emotional needs, develop their own sense of self-worth and self-esteem. 33. Interactions among children Because self-regulation, proper emotional expression, and positive social relationships are such essential skills for later schooling and life, teachers must encourage children to develop acceptable behaviors by providing a setting that encourages real opportunities for initiative taking and competence building.

Providing opportunities for children to work and play together, to solve conflicts in productive ways, and to participate in group activities are ways teachers promote positive social relationships. Program Structure 34. Schedule Children thrive on having a consistent routine that provides a balance of activities designed to meet individual needs and foster physical, cognitive, social, and emotional growth. Best practice promotes a daily schedule with large amounts of time for play, smooth transitions between activities, and a balance between child-initiated and teacher-directed activities. 35. Free Play

When children are permitted to select materials and companions, and, as far as possible, manage play independently, they practice making decisions and having control of their world. Caregiver intervention should be in response to children's needs, an invitation, or an opportunity to expand play activities.

36. Group Time In group-care situations, the focus needs to be on meeting individual needs and guiding children as they interact in small groups. Whole group activities should be kept to a minimum and limited to gatherings that follow the interests and involvement of the children. 37. Provisions for children with disabilities

Meeting the needs of children with disabilities requires knowledge of routine care needs, developmental levels, individual assessments, and the integration of the children in ongoing classroom activities. It also requires the involvement and establishment of a partnership between the parents and staff in setting attainable goals that will assist the child in reaching his/her full potential. Rutter, M. " Familyand school influences on cognitive

development," *Journal of Child Psychology and Psychiatry*, 26, 683-704, 1985. Maybe little Janie can't read or count because her teacher can't teach.

Or worse still, maybe the teacher doesn't know enough about English or math or history to teach the subject. Mischievous speculation? No. It happens, as a result of a historically flawed system in America of educating mostly average or below-average students to be public-school teachers. As evidence continues to pile up that American children are not learning the basics in school, critics are quick to blame the youngsters, their parents, the schools, television, or the curriculum. But increasingly, the focus has shifted to the teacher, the most vital link in the education process.

Now, a four-month study at teachers colleges by *The Washington Times* indicates that the problem of unsatisfactory classroom learning is rooted in the early selection and education of students who say they want to be teachers. These students then are being taught by professors who differ wildly on what teachers need to know. "Schools of education are cash cows to universities," says Dean Edwin J. Delattre of the Boston University School of Education. "They admit and graduate students who have low levels of intellectual accomplishment, and these people are in turn visited on schoolchildren.

They are well-intentioned, decent, nice people who by and large don't know what they're doing. "Mr. Delattre is one of the harshest critics of schools of education. "It would be possible in terms of the quality of their research, the significance of their research, and the quality of their instruction to give an intellectual justification for perhaps three dozen of them - certainly no more

than 50," he says. There are about 1, 300 schools nationwide teaching students to be teachers. Roughly 2 1/2 million public-school teachers are responsible today for the education of 46 million children in kindergarten through high school.

Although many teachers perform well, a significant number are products of an entrenched training system that almost guarantees mediocrity in the classroom. New initiatives are under way in some of the preparatory schools and colleges, but, for the most part, the old ways and faddish new ways are still shaping the teachers of tomorrow. To become a public-school teacher, graduates have to be certified by the state. A college student must take required courses, do a stint at student teaching, and pass a series of general-knowledge examinations.

The passing scores for these tests vary from state to state but tend to be fairly low. Curiously, many aspiring teachers never get in front of a classroom until their final days in college - an experience that sometimes persuades many to seek other careers. A major in education has long been considered an easy route to a college degree. Elementary education majors were especially easy to spot on any campus. They were the ones cutting out letters of the alphabet to make posters while the English majors worried over a paper on Shakespeare's treatment of religious themes. Rigorous academic training was seldom demanded.

" You just had to love kids to become a teacher," says J. Michael Davis, dean of the School of Professional Studies at 105-year-old East Stroudsburg University of Pennsylvania. Thirteen years ago, it was possible to graduate



from East Stroudsburg with a major in elementary education without ever taking a math class, Mr. Davis recalls. Twenty years ago, some University of Maryland campuses gave short shrift to reading instruction. Serious concerns about teacher training surfaced in 1983 with the publication of "A Nation at Risk," a landmark national report on the state of America's educational system.

It found that too many teachers had poor academic records and low scores on tests of cognitive ability. Students who went into teaching programs scored below nearly all other majors on college entrance exams, then graduated not knowing enough about the subjects they were teaching. Not much has changed in 15 years. Anyone who believes that the problem of unqualified teachers is overblown or confined to a couple of subject areas such as math and science has only to look at the experience of a New York state school district last spring when it tried to fill 35 teaching vacancies.

The Connetquot district on Long Island got 758 applications in response to an advertisement. District officials decided to narrow the pool by asking applicants to take a short version of a multiple-choice reading comprehension test taken from the state's old 11th-grade Regents English exams. Just 202 applicants correctly answered at least 40 of the 50 questions. Such incidents keep teacher education in the public consciousness and on the radar screens of elected officials at the state and federal levels. Initially, state legislators turned to higher salaries to try to attract higher-caliber students.

From 1981 to 1997, average salaries for public-school teachers rose from \$17, 209 to \$38, 611. That's for what is essentially a 180-day school year plus in-service days spread over nine months. Then, lawmakers linked salary increases to policies aimed at raising standards such as requiring new teachers to have more education and raising the passing scores prospective teachers must attain on standardized tests such as the National Teacher Examinations and its successor, Praxis. The teachers colleges responded with talk of " restructuring" teacher education, and some institutions actually did move to raise admissions and curriculum standards.

East Stroudsburg has raised entry standards and toughened course requirements. Students still need to take 60 hours in general education, but they no longer have a smorgasbord of courses to choose from. The college recently raised the grade point average needed to get into elementary education from 2. 5 to 2. 75. In 1996, Boston University began to target only teacher applicants with high SAT scores, resulting in a 17 percent drop in the inquiry pool. As a result, prospective teachers in last fall's freshman class had average SAT scores of 1, 276, compared with 964 for all 85, 442 self-declared education majors who took the 1997 SAT.

George Mason University decided in 1989 that teachers should get a bachelor's degree first and then train to teach in a fifth-year graduate-level program. The Fairfax County school says it annually rejects half the applicants for elementary education training because they don't meet admissions standards. It takes a 2. 7 GPA to get into the University of Maryland College of Education at College Park and a 3. 0 to prepare for

special education, a five-year program. " We're not getting the best and the brightest kids," says University of Maryland Dean Willis D. Hawley. " We're getting some of the best and brightest.

Some kids are really smart. What there aren't anymore are kids who are really dumb. " But the perception lingers, even among insiders, that a lack of academic rigor continues to plague the nation's teacher training programs. " The truth is, students get into colleges of education - particularly early-childhood education majors - because it's the easiest thing they can get into," says John E. Stone, professor of education at East Tennessee State University and founder of the Education Consumers Clearinghouse - an Internet source for parents, taxpayers and policy-makers.

" Here at ETSU, the schools of education are kind of at the bottom of the pecking order," he says. " Students flunk out of nursing or business and come to Ed to get some kind of college degree. " Since the concept of a formalized vocational training program for teachers was established nearly 160 years ago, that training has combined lessons in subject matter with courses in methodology, or " how to teach. " The training also has included theories of child development and practical field experience. From the start, teaching preparation emphasized methods of teaching at the expense of the content of courses.

Often the subject matter would be watered down and presented in courses tailored especially for teachers, instead of requiring teachers to take the same math, for example, that liberal arts majors were required to take. " Their focus is process, and that hasn't changed," says C. Emily Feistritzer,

who as president of the private Washington-based National Center for Education Information has conducted a number of studies of teachers and teaching. " Resistance to change is extraordinarily high at the same time there is a high level of conversation about change.

" Many critics of teacher training programs argue that a solid grounding in the liberal arts with a concentration in the subject to be taught is all that is needed to teach math, science, history or English. But Mr. Hawley at Maryland's College of Education disputes that. Chances are, he argues, that a rocket scientist would make a terrible science teacher. " You have to have the ability to transfer knowledge," he says. That ability generally has to be learned, says Dean Gary R. Galluzzo of George Mason's Graduate School of Education.

He believes that only 5 percent of the population might be " born" teachers, while 65 percent have knowledge but need to learn how to impart it. Boston University recently doubled the amount of time its prospective teachers are required to spend in math class. It also requires juniors and seniors in education to take an ethics course that exposes them to the icons of Western civilization. " We try to make the fact that teachers are deeply involved in character and values formation obvious to our students," says professor Kevin Ryan, who teaches an introductory education course.

" `What is the right thing to do? ' is a question teachers need to ask the young. And we want them to see that America has a moral heritage. " Adds Charles L. Glenn, chairman of BU's Department of Administration, Training and Policy Studies, who teaches a course on the social and civic contexts of

education: " Teachers have to be moral exemplars to students. We raise questions that are usually raised in a religious context. On what basis can you say certain behaviors are right or wrong? I don't know how you can send someone who hasn't grappled with those questions out to teach a 7-year-old."

Schools of education, reacting to social and political pressures, are perceived to be more interested in promoting equity, diversity and social justice than in transmitting knowledge. And many of the educational practices they encourage are often criticized as fads. East Stroudsburg's administrators, for example, proudly describe their teacher training program as focused on the learner and on " outcomes," committed to " developmentally appropriate practice," " modeling," inclusion, and " hands-on" and cooperative learning.

These are the buzzwords and the practices that permeate nearly all of the nation's teacher training institutions. " Schools of education are currently the origins of our problems, not their solution," says E. D. Hirsch Jr. , professor of English and university professor of education and humanities at the University of Virginia. Testifying before Congress, Mr. Hirsch sharply criticized what's known as " developmentally appropriate practice" - the philosophy that a child should not be pressured to learn anything until he signals that he is ready and receptive.

" The doctrine," he said, " is drummed into almost all teachers who take early-education courses. The intention is to ensure caring treatment for young children, yet the ultimate effect of the doctrine is to cause social harm. To withhold demanding content from young children between

preschool and third grade has an effect which is quite different from the one intended. It leaves advantaged children [who get knowledge at home] with boring pablum, and it condemns disadvantaged children to a permanent educational handicap that grows worse over time. "

The schools that hire new teachers appreciate the increased attention college and university training programs are giving to practical experience. " Teaching colleges are getting a lot better," says James Dallas, a Fairfax County support coach for new teachers. " They have begun to structure their programs to the needs of the school systems. " Where practical experience used to come in the senior year, it now begins at many places in the freshman year, where it can serve to weed out those who discover that life in an elementary classroom is not what they thought it would be.

While there is general agreement among the deans about the value of practical experience, they part company on the ideal program to train elementary teachers. Mr. Galluzzo of George Mason would opt for a solid general education foundation in an undergraduate or graduate program. " You should be required to take a liberal arts major of about 80 [semester hours] or two-thirds of the college experience for general education plus major combined.

Then you should study the four core disciplines - math, science, history and English - roughly 15 credits each. Spend the other 20 hours getting smart in one of these areas. And in the undergraduate program, the other 40 credits are in learning to teach those things, because now you have something to say. " In many programs, a lot of the basic discipline has to be taught in the

methodology classes because the prospective teachers don't know enough math or science to stand up in front of a class and teach, he says.

One of his concerns is that too many future teachers take a concentration in psychology instead of English, math, science or history, thinking it will help them understand children. In fact, psychology is a subject they will never teach in elementary school. " What does it mean to know your subject? " asks Maryland's Mr. Hawley, whose background is in the liberal arts and political science. " You probably don't need to understand quadratic equations to teach fourth-grade math, but you ought to understand algebra and calculus. "