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ABSTRACT

Piggybacking is a new approach to a university-level methods class in math, science, and social studies in early childhood education developed at the McKay Campus School in Fitchburg, Massachusetts. This approach seeks to improve on methods courses that ask college students to pretend they are teaching young children or pretend they are being instructed. The piggybacking approach is a cooperative learning methodology in which first graders are paired with undergraduate early childhood education students. These pairs, or "piggybackers," work together to teach and learn hands-on math, science, and social studies techniques. By working with first graders and approaching education from their perspective, pre-service teachers learn the importance of using real world experience to teach math, social studies, and science. (MM)

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# Piggybacking: First Grade and Pre-service Teacher's Partnership in a Math, Science, and Social Studies Course





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## Abstract

Piggybacking is a new approach to a university-level method class in math, science and social studies in early childhood education developed at the McKay Campus School, Fitchburg, Massachusetts. It seeks to improve on methods courses that ask college students to "pretend" they are teaching young children or "pretend" they are being instructed. The Piggybacking approach is a cooperative learning methodology where first graders teach and learn, together with college students, hands-on math, science, and social studies techniques. This approach allows teacher-child interaction that enhances learning, both by the student, and by the teacher, as well to help the teacher to become the best possible teacher while providing the adult opportunities to listen and value children's abilities and insights into learning.

"The kind of learning environments created in teacher education exert a slow but steady pressure on students' sense of themselves as learners and teachers. What students learn from how they are taught in the college classroom will remain with them long after they have forgotten theories and ideas discussed in those classrooms" (Short ad Burke, 1989, p.203).

## Essential and Philosophical Beliefs

For learning to occur, certain elements are necessary. There must be a child, a teacher, activities or subject matter, an appropriate physical environment, and the proper equipment. Most teachers can become familiar with subject matter and present it to a class of children. Knowledge in the field is essential, but more importantly there is a need to understand a child: the inner feelings of the mind, the heart, and what initiates the desire of discovery in a young learner.

From birth, children are competent, independent human beings who can be given the opportunity for self-reliant learning. The young child is very different from the adult in the way he sees the world. Young children have a strong sense of imagination and make-believe that can be blinded by the pre-service teachers. Pre-service teachers often fall into the "matter-of-fact" category and have no conception of the wonders that a child can see. Failure to understand this may mean that young children can be deprived of an excellent learning opportunity.

Piggybackers believe the best way to understand children and how they think is to study them in the classroom. Studying about children is valuable and college should also provide pre-service teachers the chance to learn with children by hands-on discovery. In Reggio-Emilia, Italy, the municipal pre-school teachers speak of "The Hundred Languages of Children" by which they express their ideas, including drawing, painting, sculpting, acting, facial expressions, shadows, arranging objects, singing, talking, rhyming, etc., long before they can read or write. The Piggybacking philosophy agrees with that assertion. Without children's "languages," there can be no exchange with each other and with adults that is so necessary to learning. (Taming of the Lion Video, 1989).

In Piggybacking, many opportunities are provided for pre-service teachers to observe a child. In order to understand a particular child, one must observe this child mindful of the fact that he or she is unlike any other child. In the piggybacking classroom, a child is given varied learning activities. The observer is sympathetic and openminded. Preconceived ideas about the capacities, interests, or shortcomings of the child are discouraged. The essential concentration on the child as an individual is the philosophy of Piggybackers. Piggybackers believe the child is not a toy, plaything, or an inanimate object whose function is to perform for adults. He/she is a growing person who

is to be respected and who needs the confidence of an older person.

## McKay Campus School Profile

Five hundred and thirty-nine students are enrolled at the McKay Campus School, one of six elementary public schools in the Fitchburg Public School System. Of the school population: 58% come from mid-to upper-income families; 42% participate in the free or reduced lunch/breakfast program; 27% are from backgrounds different from the Anglo-American tradition; 25% are enrolled in Chapter 1 remedial services; 18% have documented special needs, 18% are bilingual; .01% attend a severe behavior development disorder class; and 27% live in extremely stressful family environments. In addition, of 47 staff members 60% or more have 15 or more years of teaching; 90% have Master's Degrees; 53% are classroom teachers; 47% service special needs, Chapter 1, art, music and physical education (Colbert, 1992).

First grade students are grouped heterogeneously with a 20:1 student teacher ratio. The current grade one classrooms are practicing developmentally-appropriate educational strategies and curricula.

The school promotes interaction and collaboration between college faculty and public school teachers. Forty pre-service teachers have participated in the piggybacking grade one curriculum.

## The Program

Piggybacking is a cooperative learning approach offering undergraduate early childhood education students the opportunity to work with a child in a 1st grade setting. At the beginning of each semester a child chooses a pre-service teacher he/she might like to work with for the term. The learning partners are referred to as Piggybackers.

Initially, the primary concern of most pre-service teachers is survival. How can they control all the children in their charge, when they may talk in a language that is meaningless to the children? Pre-service teachers need to learn to appreciate the minds of the children they are teaching. They must learn how accurately the child perceives images or what objects attract the child's attention.

Piggybacking helps pre-service teachers learn the factors influencing the child's attention span. He or she begins to understand how the child thinks, the ideas he grasps, the intensity of his emotions, and the ingenious nature of his imagination. Pre-service teachers learn that discipline/control problems are mitigated when the course of study is individualized.

Piggybacking depends on competent public school teachers to lead the first grade classroom learning experiences for piggybackers. Pre-service teachers then witness creative, veteran

professionals in action.

In math learning, piggybacking utilizes two principles of the most recent research on mathematics education. Carpenter and Moser (1984), DeCorte and Verschaffel (1987), Carraher, Carraher, and Schliemann (1987) demonstrated that children have surprising competence in mathematical situations outside of school and can solve a variety of real world problems using strategies they have not learned directly in school.

Below are three accounts by college students describing a piggybacking experience in which their 1st grade counterparts dealt with a real math "ferry trip" problem.

> "There was the problem about the 12 cars that wanted to cross a river on a barge that could carry 4 cars at a time. The children needed to figure out how many trips the barge needed to make in order to get all 12 cars to the other side. Danny was able to solve this problem by taking twelve unifix cubes and putting them on one side of his desk. He took his empty juice box, placed it on its side, and utilized that as an imaginary barge. He would place four of the unifix cubes at a time on his "barge" and "float" them to the opposite side of his desk, i.e., "across" the river". He continued this process until all twelve unifix cubes were on the other side of his desk. In this manner, he was able to correctly determine the answer on an independent basis, whereas when the question had been initially asked, he really had no idea what the answer was, or how to come to that conclusion using paper and pencil." (LeBlanc, 1992).
>
> "When the guest teacher came to McKay Campus School, Mark demonstrated what a quick learner he really is. When the problem was posed to the class about how many trips were needed for the ferry to make in order to transport 12 cars with only 3 cars per trip, Mark quickly went to work. He used the spinner from another game as the ferry, and the unifix cubes as cars. On a piece of paper, Mark quickly drew and colored a river. Mark then put 3 unifix cubes onto the spinner and pulled the spinner across the 'river'. He repeated this 3 times and found the answer to be 12. He was the first child in the class to raise his hand and answer the question." (Masse, 1992).
>
> "Fernando likes to learn. He learns best by doing. He learns best by using a 'hands on' approach to learning. The best example I can think of to back this statement is when, during the math lesson, there was an activity in which, he used candy representing cars. He had to figure out how many times it would take to get all the "cars" on

the other side of a river. Fernando was very creative. He decided to use an empty juice box container as the ferry boat. He figured out the problem using a "hands on" approach." (Truehart, 1992).

When the guest science teacher shares a lesson on liquids and solids using "ooblah" (cornstarch, food coloring, and water), the pre-service teacher witnesses the importance of manipulation/hands on science in the curriculum. Children like to poke, prod, scratch, tear, twist, and otherwise handle whatever comes into their possession. Pre-service teachers appreciate the wonderful gift for an adult to be able to enter into the world of a little child and guide him into the acquisition of knowledge, attitudes, and habits through participation in his play and problem solving interests.

During the social studies component, visiting professionals share safe touching (through foot massage), and disabilities education. These hands-on experiences are powerful tools in reducing children's fear.

Throughout the semester, the pre-service teacher prepares hands-on discovery lessons for the children. Like Smith (1992), Piggybacking asserts that children's relationships with pre-service teachers, each other, and the learning tasks are supremely important. Observations gauge their progress, not testing.

## Evaluation

Unlike traditional methods class evaluations, piggybacking relies on journal writing and lesson evaluations. The children and pre-service teachers each keep journals. It is not what is written but the writing itself that is crucial. The pre-service teacher and the first grader each write comments and reactions to each other's journal. Both understand that expressing their ideas in written form is important.

Evaluation is generally immediate with young children. In a journal entry dated November 4, 1992, a pre-service teacher writes, "One of the hardest aspects I have found when I am trying to plan a lesson is deciding how long it will take to teach the concept. When I asked my first grade partner how they thought I did, Amanda replied, "You have to be not so shy." She was right. I had presented the lesson but she had picked up on my nature. (Valetta, 1992).

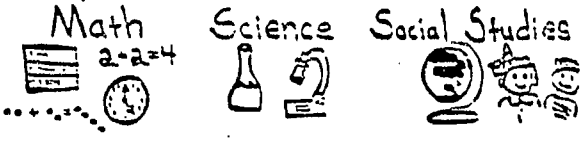
While reading the pre-service teachers journals, the instructor writes comments and reactions in the journal. When individual pre-service teachers present lessons to the class in math, science, or social studies; both the first graders evaluate the lessons with forms that are developmentally appropriate.

**Samples of both evalution instruments are included;**

FICHTHACKER'S COLLEGE STUDENT EVALUATION FORM

First Grader _____

College Student _____




Color One . .

This made me feel... ☹ 😐 ☺

I understood what to do. ☺ 😐 ☹

I liked it. ☺ ☹ 😐

I learned a lot. ☹ 😐 ☺

I think it was ...

_____

_____

_____

_____

_____

_____

FITCHBURG STATE COLLEGE
STUDENT DEMONSTRATION EVALUATION

Score granted: _____
(1-20 points.

Name: _____ Date: _____
Evaluator's Name: _____
Title of Demonstration: _____
Type of Demonstration: (ex. game, educational curriculum. materials) _____

Target Population: (Circle One) Pre-kind Kind Primary

Project's area: (Circle One) Science Math Social Studies

Score Criteria

(3)H Highly Satisfactory (2)S Satisfactory (1) Needs Improvement

| | H | S | N |
|---|---|---|---|
| Mastery of subject matter | | | |
| Planning and preparation of materials | | | |
| Provision for individual differences | | | |
| Rapport with students | | | |
| Student interest | | | |
| Classroom organization | | | |
| Appearance | | | |

*The maximum number of points per each category equal to 3 points.

What I enjoyed the most was

Recommended Suggestions - How would I do it differently

In reference to this project, something to think about when doing it with children:

## The Consequences of Feed Forward Principle

In her "Confession of a Teacher/Educator" (NAECTE, Spring 1992), Lilian Katz writes about the frustrations she experienced while teaching undergraduates in a parent involvement course. She points to the student's inability to adequately identify with either the parents' perspectives or the teacher's predicaments during a role playing activity. Most pre-service teachers described role playing as a "waste of time."

Katz implies that we have to allocate enough time to get to know the students (vs. know about them), and to find out in what pertinent ways they vary. In this way, we can offer appropriate individual treatments by which to insure such homogeneous outcomes as the acquisition of knowledge, appropriate skills, and desirable

as the acquisition of knowledge, appropriate skills, and desirable dispositions. In Piggybacking, this is encouraged by allocating enough time for pre-service teachers to get to know the first graders. The first grader knows someone truly cares about him/her as a thinking human being.

One pre-service teacher wrote, "The first graders have really put a lot of trust in us, and have come to depend on us a great deal. I have shared the excitement when these first graders discovered something new... (Doucette, 1992)."

The children and pre-service teachers are very caring and concerned for each other's well being. Initially pre-service teachers are almost too helpful and don't allow the children enough time to work things out for themselves. In fact a majority of children seem to feel safe about taking chances and trying new types and ideas.

In Katz (1990), students asked, "Which pages should we read?", and later, "which pages will be covered on the exam?" When Katz said that she didn't know, the students asked, "How will you know if we've read the pages?" Katz replied, "Do you mean you wouldn't read the chapter or book if it is not covered on the exam?" "Yes" answered the college student.

It is painful to acknowledge that the college student behavior described above is in a sense intelligent and adaptive. In piggybacking the professor faces the same dilemma as did Katz. Should one respond to students' demands for exact grades? Or should one let them struggle with global grading criteria, ambiguous goals, and open ended assignments? Piggybacking disrupts the usual expectations of teaching students when a course is identified and announced as a methods course, students expect clear procedures and specific prescriptions for action, tips for teaching, and perhaps a minimum of the background reasoning and conceptual material.

Piggybacking however endorses the "feed forward" principle. Pre-service teachers find the ambiguity in the course painful at the time, but in retrospect, they evaluate it as having caused them to take some responsibility for their own education. Ultimately, they appreciate its impact.

## Summary

Piggybacking can be a component of many pre-service methods courses. Our goal as methods instructors is to have pre-service teachers become successful educators. These future teachers need to understand the math, science and social studies concepts and how to use them from the perspective of the child. Piggybacking demonstrates that this can be accomplished by the coordinated efforts of the instructor, the teacher and the children learning together.

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