Lamination Study: Vocabulary Cards in the Montessori Primary Classroom

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Significant advice and guidance for this study were received from Annette Haines (Montessori Training Center of St. Louis; AMI Pedagogical Committee), Tarin Weiss (Westfield State University), and Pamela Allen (US Department of Education).

Ms. Volkman founded Maitri Learning in 2003, a company which creates color photo cards specifically for use in Montessori classrooms. Her goal in undertaking this study was to inform the manufacturing procedures she follows in creating Maitri Learning's products. Maitri Learning currently uses the Set B lamination and corner rounding model for its language cards. However, the 5 mil laminate itself is much more expensive than a thinner laminate would be. Further, production costs are significantly increased by the rounding of the corners. Thus, if the study had supported Set A cards, Maitri Learning could have significantly lowered its manufacturing costs. Support of Set B, on the other hand, confirms the validity of its current manufacturing procedures. (As such, results in favor of either Set of cards have positive implications for Maitri Learning and thus remove the motive for investigator bias.)

Abstract

This was an observational, international, multi-center, single-blind study of vocabulary card lamination formats in eleven Montessori primary (ages 3 to 6+) classrooms with total enrollment of 284 students. The study ran from December, 2005 through March 15, 2006. The study evaluated identical vocabulary cards laminated in distinct ways: Set A with a flexible, 1.5 mil laminate and square corners; Set B with a rigid, 5 mil laminate with rounded corners. The assumption that vocabulary cards featuring color photographs will call to and interest the child is clearly supported by the findings of this study; the cards were regularly and repeatedly used in all classrooms. The overall frequency with which children chose Set A versus Set B cards was nearly equivalent, although the children were slightly more likely to choose Set B for the initial presentation. Of the children who stated a preference, 83% preferred Set B cards. Ninety percent of responding teachers preferred Set B cards. No teachers preferred Set A cards. Seven of the 11 classrooms (64%) studied reported damage to Set A cards. No classrooms reported damage to Set B cards.

Introduction

This study came about as a result of a question asked by Dr. Annette Haines about the cards Maitri Learning makes, "Why rounded corners?" In my own classroom, I had found that square corners pricked the children's fingers. This would sometimes lead them to avoid certain materials.

Montessori and Choice: The work of Dr. Maria Montessori demonstrated that children learn best when given the opportunity to work with didactic materials that appeal to them. The children must be free to choose their work, to work without interruption, and to repeat their work. Before being able to make a valid choice, the Montessori teacher must demonstrate to the child how the didactic materials are meant to be used. Then, it is through self-directed (not required) repetition that mastery is effortlessly achieved by the young child (under age 6). Thus, mastery is one goal of repetition and we must ensure that the materials we offer the child are of the best possible quality and design so as to encourage repetition.

Sensory Perceptions: Children of this age have an acute sense of touch. They are extraordinarily sensitive to sensations received through the skin, particularly the skin on the fingertips. Since the vocabulary cards are designed for visual work, it is important that the tactile sense not be so strongly roused as to overshadow the visual sense. The materials must teach without presenting even the smallest of obstacles.

Vocabulary Cards. Montessori teachers are expected to equip their classrooms with vocabulary cards that they make themselves and/or purchase. In order to increase their durability, vocabulary cards are usually laminated, often with the most economical roll laminate (1.5 mil) before being used by the child.

Environmental Feedback. If a child seriously misused the cards, would the cards be damaged? This damage would provide direct environmental feedback to the children about their handling (or mishandling) of the materials. This is a highly desirable characteristic in pedagogical materials as the children can see for themselves the results of mishandling and thus temper themselves in handling objects carefully. While the possibility of environmental feedback is desirable in the design of the didactic materials, the design must be sturdy enough that this is indeed a possibility rather than a probability. There is a balance that must be found that makes the pedagogical materials practical for long-term regular use while also allowing for the possibility of environmental feedback if misused.

Economic Considerations. The need to laminate requires a budget to purchase laminate and teacher time to laminate and hand cut each card. Also, if rounded corners are preferred, their will be the additional expense of a corner rounding machine and/or the additional time it takes teachers to manually round the corners (e.g., with scissors). Further, the life of laminated vocabulary cards can vary significantly depending on the type of laminate chosen and the laminating method.

Method

This was an observational, international, multi-center, single-blind study of vocabulary cards in the Montessori primary (ages 3 to 6+) classroom.

The cards were evaluated by regularly enrolled students in Montessori primary classrooms (ages 3 to 6+) led by AMI trained teacher(s) and by the trained teachers. A total of 11 classrooms in seven geographically diverse locations participated in the study. Three classrooms were part of the Chesterfield Montessori School (Chesterfield, MO), three were part of the Casa Montessori Child Development Center (Austin, TX), and one each were part of the Bilingual Montessori School of Paris (Paris, France), the Capitol Hill Cluster School (Washington, DC), the École Montessori Internationale (Montreal, Canada), Mad River Montessori School (Arcata, CA), and the Pioneer Valley Montessori School (Springfield, MA). A total of 284 children were enrolled in these classrooms.

Materials: Each classroom was provided with a Protocol/Teacher Instructions, a Frequency of Use Form, a Children's Comments Form, a Teacher Questionnaire, and two sets of vocabulary cards identical in every way except the type of laminate and corners. (Note: The full study report and all appendices are available at http://www.maitrilearning.com/lamstudy) Set A was laminated with a 1.5 mil laminate and had square corners. Set B was laminated with a rigid, 5 mil laminate and had rounded corners. Each card was 3¾" x 4¼". Cards were printed on heavy weight (80# text) paper and laminated using a pouch laminator and pouch laminating film. Cards were cut at the paper's edge; no extra laminate was left beyond the paper's edge. Study materials were sent to participating classrooms in December of 2005 or January of 2006. Teachers were asked to return completed materials by March 15, 2006.

Each set of cards included isolated photographs (objects only on white backgrounds) of 12 images in individual packets. Packet titles were Around the House (objects from the home environment including couch, desk, phone, etc.), Around Town (objects from the outdoor environment including traffic light, fire hydrant, pay phone, etc.), In the Kitchen (objects from the kitchen including salt and pepper shakers, cabinet, refrigerator, etc.), and Tools (tools commonly found in the home including hammer, goggles, screwdriver, etc.).

Teacher Presentations: Teachers were given specific directions on how to present the cards to the children. Each teacher chose one packet of cards (e.g., Around Town) and placed both Set A and Set B cards in identical baskets next to each other on a shelf in the language area of their classroom. Children were introduced to the cards and given a presentation that offered them the option of choosing either basket to do their work. When the lesson was completed and the child returned the basket to the shelf, the teacher restated that the child was now free to use either basket. The teachers left the Set A and Set B packets on the shelf for two weeks (10 school days). After the two weeks, s/he was instructed to rotate the materials by introducing a separate pair of Set A and Set B packets.

Data Collection: All information was recorded by the teachers on three prepared forms (supplied to participating teachers along with teacher instructions and stamped return envelopes):

- *Frequency of Use:* Teachers noted how often each basket was chosen both for presentations and for independent work thereafter.
- *Children's Comments:* Teachers made a written record of statements the children made about the different card formats.
- *Teacher Questionnaire.* Teachers completed the Teacher Questionnaire to record his/her own impressions on the value of each format including how the children were able to handle each card (e.g., are they easy or difficult to separate, layout, stack, etc.) and how the children treated the cards (e.g., roughly, gently). Also, the teacher noted the state of the cards (their durability) at the end of the study period.

Data was analyzed by the study author.

Results

All packets of cards were frequently used (taken off the shelf and manipulated by children) in all classrooms with a total of 678 recorded work sessions during the 8 weeks of the study. On average, each classroom saw the cards used 1.54 times per day or 7.7 times per week.

Total Number of Times Packets where chosen for Presentation and Independent Work (all classrooms)

Packet	Set A 1.5 mil, square corners	Set B 5 mil, round corners
Around the House	80	95
Around Town	81	70
In the Kitchen	87	86
Tools	83	96
Total	**331**	**347**
Percent	**48.8%**	**51.2%**

Ten of the 11 participating teachers returned the Children's Comments form; two of those returned a blank form with no children's comments listed. Comments were recorded from 21 children. In sum, of the eighteen children who stated a preference, 83% (15 children) preferred Set B cards while 17% (3 children) preferred Set A cards. Eight of the comments specifically state a preference for rounded corners. One comment indicated a preference for the thinner laminate because it is more flexible. Two comments indicated a preference for the thicker laminate because it is not flexible.

Ten of the eleven participating teachers completed and returned the Teacher Questionnaire form. Teacher's showed an overwhelming preference for Set B cards. Between 80% and 100% of responding teachers rated Set B cards Excellent in the measured areas. No teachers gave Set B a Poor rating in any category. Set A ratings fell in the Average range with 40% of responding teachers indicating that the durability of Set A cards was Poor. The teacher's were also asked if either Set A or Set B cards was easier for the children to handle. Most teachers (70%) found no difference in the children's ability to separate the cards, lay them out, or stack them.

The issue of environmental feedback was addressed in a question asking the teachers whether the children handled either Set with greater care. Most teachers (60% of respondents) felt there was no difference in how they were handled while 40% felt that Set B was handled with greater care. No teachers felt Set A was handled with greater care. Seven of the ten teachers who completed the Teacher Questionnaire (70% of reporting teachers; 64% of all teachers) noted that at least one Set A card had been damaged by the children during the study. No teachers noted any damage to Set B cards. The damage to Set A cards was in the form of a card's being creased, bent, or folded.

What the Children & Teacher's Said

Child: "I like these [Set A] better because they would be easier if you were cutting them out" [with scissors].

Child: "I like the round corners but I like the bendy cards [Set A] better."

Child: "I like this one better [Set B] because this one can't get bent."

Child: "I don't like pointy corners."

Child: "This set [Set B] is plastic and this set [Set A] is not. I like plastic better."

Child: "[Set B] Doesn't prickle."

Child: "I like the curved corners best…they're not so pokey."

Child: "Do these [Set B] because we like circles on the end."

Child: "We like these ones [Set B] because they are round. The other ones are pricky on the fingers. The round ones are better."

Teacher: "The children did not like it when a card got bent—it was a distraction for them and they felt bad."

Teacher: After damaging a card (it was folded), the child "tried to straighten the fold and did not like to choose that set again."

Teacher: After damaging a card (creased), "The boy was a bit worried and didn't want to take the thin set afterwards."

"Some of the children noticed that the cards were bent and tried to flatten it."

Discussion

The assumption that vocabulary cards featuring color photographs will call to and interest the child is supported by the findings of this study. The cards were regularly and repeatedly used in all classrooms. The regular use of both Set A and Set B cards suggests that these differences in lamination are not perceived as important to the child. However, there were two primary factors which confounded these results. First, the study did not distinguish between the choice of both packets together for matching work from the choice of a single packet for vocabulary work. Second, the study did not measure when a packet was chosen because it was the only packet available on the shelf (i.e., the other packet was already in use). When considering the qualitative data, there was preference for Set B.

As to the question of adequate environmental feedback, the fact that damage occurred during just 8 weeks of use in 70% of responding classrooms is concerning. It may indicate a flaw in the design/manufacture of the Set A cards themselves rather than in a valuable level of environmental feedback. One teacher stated this possible design flaw in her comments: *"I had the impression that with the Set A, children couldn't pick up the cards from the table and that was why they had to crease them to lift them at all, they were too thin."* Based on the results of this study, the thin laminate used in Set A cards created the probability rather than the possibility of environmental feedback. The question as to whether Set B cards provided enough environmental feedback remains unanswered.

Both children and teachers noted that the corners of Set A cards were "pokey," "pricky," or hurt the child's fingers. There were no concerns stated by either children or teachers about the rounded corners. These comments demonstrate that the square corners produced a tactile distraction to the child while the rounded corners did not. Thus, the rounded corners provide greater isolation of the visual stimulus than cards with square corners.

Implications

Teachers may improve student interest in and repeated use of card materials if they use a laminate thicker than 1.5 mil and round the corners. Rounding the corners will not detract from the appeal or usability of the cards, will overcome the resistance some children stated to squared corners, and will remove the tactile distraction of "pokey" corners.