PRESENTER

- Angela Murray, PhD
- AMS Senior Researcher
- KU Assistant Research Professor
AGENDA

- What does research say about Montessori outcomes?
- What does the mainstream education field say about Montessori practices?
- Where can research be accessed on an ongoing basis?
- How can we leverage research to promote Montessori?
OVERALL MONTESSORI OUTCOMES
Montessori education: a review of the evidence base

Chloë Marshall

The Montessori educational method has existed for over 100 years, but evaluations of its effectiveness are scarce. This review paper has three aims, namely to (1) identify some key elements of the method, (2) review existing evaluations of Montessori education, and (3) review studies that do not explicitly evaluate Montessori education but which evaluate the key elements identified in (1). The goal of the paper is therefore to provide a review of the evidence base for Montessori education, with the dual aspirations of stimulating future research and helping teachers to better understand whether and why Montessori education might be effective. npj Science of Learning (2017)2:11 ; doi:10.1038/s41539-017-0012-7

Studies show children in Montessori environments have as good as if not better outcomes in academic and non-academic domains.
### SUMMARY OF OUTCOMES RESEARCH IN PAST 5 YEARS

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**Source:**
- Lillard 2017
- Culclasure In prep
- Brown 2017
- Ansari 2014
- Besançon 2013
- Lillard 2012

**Legend:**
- **M+**
- **M=**
- **M-**
- **No data**
Figure 5: Academic achievement across four time points by school condition and income group. Although equal to the lower income control children at Time 1, by Time 4 the lower income children in Montessori showed a strong positive trajectory towards closing the achievement gap with the higher income children in control and Montessori schools. Standard error bars are shown.

Montessori education and academic outcomes

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AFRICAN AMERICAN STUDENTS SCORED HIGHER IN READING

- African American 3rd graders
- Public Montessori and other magnet schools
- Montessori students scored higher in reading, but no difference in math on end of year state tests scores

LATINO CHILDREN SAW MOST BENEFIT

- 14,000 Title-1 pre-K Montessori & High/Scope in Miami
- Beginning and end of 4-year-old pre-K year
  - Socio-emotional and behavioral skills
  - Pre-academic skills (cognitive, motor, and language)
- Latino Montessori children
  - began at most risk but had greatest gains
  - ended above national averages
- Black Montessori children had healthy gains but slightly greater in conventional

MORE MONTESSORI STUDENTS “HIGHLY CREATIVE” IN FRENCH STUDY

Identified as highly creative in | Montessori | Traditional
--- | --- | ---
improving a toy task | ![Montessori students](image1) | ![Traditional students](image2) |
parallel lines task | ![Montessori students](image3) | ![Traditional students](image4) |
storytelling task | ![Montessori students](image5) | ![Traditional students](image6) |
drawing task | ![Montessori students](image7) | ![Traditional students](image8) |

“CLASSIC” MONTESSORI YIELDS STRONG ECE RESULTS

- Material use as index of Montessori fidelity
- 172 3-6 year old children participated
- Classic greater gains than Supplemented, Conventional on:
  - executive function
  - reading
  - math
  - vocabulary
  - social problem-solving

REMOVING SUPPLEMENTARY MATERIALS IMPROVED GROWTH

- Experiment: Non-Montessori materials removed from two of three classrooms
- Pretests given as baseline, retest after four months
- Children in “supplementary removed” classrooms
  - Grew significantly more in early reading and EF
  - Grew directionally more in early math
  - No differences in growth in vocabulary, social knowledge, or social problem-solving skills tests

SPECIFIC MONTESSORI PRACTICES
SUPERIOR FINE MOTOR DEVELOPMENT

Five year olds in 4 Montessori schools and one high-performing suburban school

Practical life impact on fine motor development

Montessori moderate to large effects on fine motor development

- accuracy, speed, consistent use of dominant hand

EMBODIED PEDAGOGY (TRACING)

- Finger tracing elements showed benefit
- Experiment with over 100 students
  - Triangle geometry (adolescents)
  - Order of operations (4th graders)
- Tracing students
  - correctly solved more practice problems
  - made fewer errors on follow-up test

Handwriting superior to typing training in word writing, and, directionally, in word reading

Suggests “action-perception coupling” facilitates “sensory-motor representations established during handwriting on reading and writing.”

PRIORITIZING DEVELOPMENT OF ATTENTION

- Materials enhance attention in children with ADHD
- 15 non-Montessori preschoolers with ADD and ADHD
- Pre-post test design experiment with a control group

**Used tactile boards, sound boxes, binomial cubes and color tablets**

- Significant improvement on FTFK Attention test

MIXED AGE GROUPS

- School readiness of nationally representative sample of 3’s & 4’s
- 4-year-olds fewer gains in academic skills when more 3-year-olds (4 to 5 months worth of development)
- Age composition unrelated to 3-year-olds’ school readiness
- Author acknowledges not applicable to Montessori

MATH “MANIPULATIVES”

- Principles for effective use of mathematics manipulatives from cognitive science
- Use of manipulative consistently, over a long period of time
- Begin with highly transparent concrete representations and move to more abstract representations over time
- Avoid manipulatives that resemble everyday objects or have distracting, irrelevant features
- Explicitly explain the relation between the manipulatives and the math concept

ACCESSING RESEARCH
The American Montessori Society Research Library provides Montessori educators and researchers with access to a wide range of research documents. In addition to presenting relevant, up-to-date research, we aim to encourage new research that will strengthen the existing body of knowledge on Montessori education. If you are conducting Montessori research and would like to share with AMS, please contact Angela Murray.

Documents included in this online collection have been selected by the Research Committee. Research findings do not necessarily reflect the views of the committee.

http://amshq.org/research

Full Issue

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Table of Contents

Articles

From the editor
Angela K. Murray, PhD

Homework Policy and Student Choice: Findings from a Montessori Charter School
Catherine M Scott, Nelda Glaze

The Effects of Choice on Reading Engagement and Comprehension for Second- and Third-Grade Students: An Action Research Report
Julie Fraumeni-Mcbride

The Montessori Experiment in Rhode Island (1913-1940): Tracing Theory to Implementation over Twenty-Five Years
Susan Zoll

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ISSN: 2378-3923
SOCIAL MEDIA RESOURCE FOR RELEVANT RESEARCH

Facebook Group

https://www.facebook.com/groups/508077912670003/
TAKING ACTION

SMALL GROUP ACTIVITY
STEP 1: IDENTIFY RELEVANT CONSTITUENTS

- Administrators
- Teachers
- Funders
- Legislators
- Regulators
- Adult Learners
- Parents
STEP 2: IDENTIFY RELEVANT TOPICS

Long-Term
- Montessori effectiveness
- Special education
- Need for teachers
- Diversity

Short-Term
- Items in the news
- Local emerging issues
- Scheduled events
- Broadcast news
- New publications
STEP 3: IDENTIFY COMMUNICATION VEHICLES

- Email
- Hard Copy
- Social Media
- Local Press
- In-Person Meetings
- Presentations
- Guest Speakers
STEP 4: ASSEMBLE COMMUNICATION CONTENT STRATEGY

1. Constituent Group
   - Long Term Topics
   - Short Term Topics
   - Communication Vehicles

2. 

3. 
STEP 5: CREATE AN IMPLEMENTATION PLAN

- Roles & Responsibilities
  - Who determines long-term priority topics?
  - Who monitors sources for short-term topics?
  - Who maintains communication vehicles?
  - Who creates content?
  - Who owns the big picture?
STEP 6: BUILD AN IMPLEMENTATION TIMELINE

2-3 Months
Create Content Strategy and Roles & Resp.

3-6 Months
Begin Short-Term Topic Communications

6-9 Months
Roll Out Phase I of Long Term Topic Communications

9-12 Months
Roll Out Phase II of Long Term Topic Communications
SIX STEPS, PLUS ONE

1. Identify Relevant Constituents
2. Identify Relevant Topics
3. Identify Communication Vehicles
4. Assemble Communication Content Strategy
5. Create an Implementation Plan
6. Build an Implementation Timeline
7. Continuously Evaluate Processes for Improvement!