Research Evidence to Support the Consultation Model in Itinerant Early Childhood Special Education Services
DEC Conference
Minneapolis, MN
October 29, 2008
William McInerney, Ph.D.
Lyn Hale, Ph.D.
Laurie Dinnebeil, Ph.D.
University of Toledo
Judith Herb College of Education
Distributed Instruction vs. Massed Instruction: The Spacing Effect

What It Is and Why It Should Matter to Itinerant Early Childhood Special Education Professionals
Research and Development Support

Margie Spino, M.A.
Consultation vs. One-to-One or Small Group Instruction in Itinerant ECSE Services

• This is the primary consideration in current IECSE practice. Which is the more efficient approach to teaching?

• The adoption of a consultation model as the primary mode of intervention in IECSE services must be based on the efficacy of this model vs. traditional patterns of itinerant practice
Rationale for Consultation in IECSE Services

- If episodic intervention (usually 60-90 minutes per week in traditional IECSE service delivery) is as efficient as distributed or spaced instruction (or practice), then there is no need to adopt a consultation model as the primary mode of intervention.

- However, if distributed or spaced instruction is a more efficient model of learning, then adoption of a consultation approach to IECSE intervention is warranted.
Rationale for Consultation in IECSE Services

- If consultation is to be considered as a preferred alternative to 60-90 minute, one-to-one or itinerant teacher-directed small group instruction, then the research base related to efficiency of child learning must be examined.
What is the Spacing Effect?

- The tendency for spaced (distributed) instruction to result in much better learning than massed instruction
Examples

**Spaced practice**

1 Day

10 10 10

Child studies 3 times a day for 10 minutes each time (total of 30 min.)

**Massed practice**

1 Day

30

Child studies 1 time a day for 30 minutes
Examples

**Spaced practice**
Child studies 10 spelling words 1 time a day for 4 days

**Massed practice**
Child studies 10 spelling words 4 times within same day
Distributed Teaching: Two Important Concepts

- Time that elapses between teaching sessions
- Child retention of knowledge or skills between one teaching session and the next teaching session
Interval between Teaching or Practice Sessions - Examples

**Spaced Practice**
- 3 practice sessions per day
- If study at 9 am each day ...
- Time between each practice session is **2 hours**

**Massed Practice**
- 3 practice sessions
- Practice 3 consecutive times with no breaks ...
- Only 1 study session
- No time between sessions
Which method of instruction is more efficient?

Distributed or massed teaching?
Since first study in 1885, there have been 100s of studies, and the evidence is consistent:

*Instruction that is distributed results in better learning than instruction that is massed.*
Research with Adults

- Keppel, 1967
  - College students learned word pairs (*lum* – *happy*)
  - They studied word lists 8 times
    - MP: 8 sessions in one day
    - DP: 2 sessions on each of 4 consecutive days
  - Two ‘tests’
    - 1 day after final study session
    - 1 week after final study session (7 days between study sessions)
Results of Keppel Study (1967)

- College students learned word pairs (*lum – happy*) 2.5 times more efficiently with DISTRIBUTED study sessions.
Research with children

- Are the results the same for children?
- Results from studies with “real” learning tasks
3rd graders (M=8.5 years) taught spelling words and math facts

- Students ranked as Level 1 (top half of class) or Level 2 (bottom half of class)

- Both massed and distributed practice sessions occurred within the same day
Rea and Modigliani (1985)

- **Results:**
  - Better test performance when students had spaced practice rather than massed practice.
  - Distributed practice was better for both Level 1 and Level 2 students (ability level did not matter).

<table>
<thead>
<tr>
<th>Target Skills</th>
<th>Massed Practice</th>
<th>Distributed Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiplication</td>
<td>24%</td>
<td>47%</td>
</tr>
<tr>
<td>Spelling</td>
<td>83%</td>
<td>93%</td>
</tr>
</tbody>
</table>
Seabrook, Brown and Solity (2005)

- 34 children (M= 5.5 years) taught phonics over two (2) weeks

- Schedule for teaching:
  - **Massed** = one 6-minute session per day, within a regular classroom setting.
  - **Distributed** = three, 2-minute sessions per day, within a regular classroom setting
Results:

- Compared improvement scores (score at final test minus score at initial test)

<table>
<thead>
<tr>
<th>Type of Teaching</th>
<th>Improvement Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Massed (one 6-min/day)</td>
<td>1.3</td>
</tr>
<tr>
<td>Distributed (three 2-min/day)</td>
<td>8.3</td>
</tr>
</tbody>
</table>
Seabrook, Brown and Solity (2005)

“Over 2 weeks, children whose teaching consisted of three 2-min sessions, per day, showed more than six times the improvement of those who were taught for one 6-min session per day.” (p. 119)
Research with Children - 3

Childers and Tomasello (2002)

- How many times (and on how many days) does a 2-yr old need to hear a word in order to ‘learn it’?
- In two experiments, 2 yr olds were taught novel or nonsense nouns and verbs over the course of one (1) month in ‘teaching’ sessions lasting 5-10 mins.
  - Noun = “This is a wuggy.”
  - Verb = “It’s dacking. See? It dacks.”
Research with Children - 3

Childers and Tomasello (2002)

- **Massed Practice**: 4 or 8 sessions per day

- **Distributed Practice**: various schedules
  - 1x/day for 4 days
  - 1x/day for 4 days, with 3 days between teaching sessions
  - 2x/day for 2 days
  - 2x/day for 2 days with 2, 5, or 10 days between teaching sessions
Research with Children - 3

Childers and Tomasello (2002)

Results:

- Best learning occurred when practice was distributed over 4 days
- Children learned words better if they heard it 1x/day for 4 days rather than 8x in 1 day
- Distribution of teaching sessions was more powerful than the number of exposures of the child to the target words
Rovee-Collier (1995)

- 3 month olds taught to kick at a crib mobile in 2, 15-min sessions

- 4 different intervals between the 2 sessions:
  - 1 day
  - 2 days
  - 3 days
  - 4 days
Results:

- Infant had significant retention of skill if 2\textsuperscript{nd} teaching session was within 1, 2 or 3 days of the 1st session.

- If interval was 4 days between the 1st teaching session and the next session, there was no evidence of retention of skill from the initial teaching sessions.
What did the research say?

Is massed or distributed practice better for children?

Which type of practice or teaching is more efficient?
What did the research say?

- Distributing practices benefited children’s learning. Distributed practice could occur........
  - Within the day (e.g., three (3), 2-min sessions per day)
  - OR........
  - Across days (e.g., 1 session per day for 4 days)
Summary

It is more efficient in promoting learning (and minimizing forgetting) if:

- Instruction and practice are spaced
  - If teaching sessions are too far apart, the child will forget, the skill or knowledge is not integrated, and any benefit of distributed instruction is lost.
What this research indicates…..

**distributed practice IS more efficient**

- Distributed teaching **was more effective** whether tasks were cognitive or physical
- Distributed teaching or practice within the day (e.g., three (3), 2-min sessions per day) or across days (e.g., 1x per day for 4 days) **was beneficial**
What this research indicates.....

Consultation is preferred

- Distributed teaching was more effective whether tasks were cognitive or motor
- Distributed teaching or practice within the day (e.g., three (3), 2-min sessions per day) or across days (e.g., 1x per day for 4 days) was beneficial
Implications of this research....

- Itinerant ECSE teachers should consider adopting a consultation model that focuses on ‘coaching’ of the ECE partner teacher in addressing priority IEP objectives of the child.

- Focusing on consultation activities with the ECE partner teacher should result in the ECE partner teacher providing more opportunities for instruction and learning than could occur in a 60-90 minute weekly visit by the Itinerant ECSE teacher.
What this research does not address.....

Is massed or distributed practice better in any particular phase of learning (e.g. acquisition, fluency, generalization or maintenance)?

Does the fidelity or frequency of distributed teaching affect learning? If so, is massed teaching delivered by a highly competent Itinerant ECSE teacher more effective than distributed instruction delivered inconsistently by ECE partner?
What this research does not address.....

What affect do incidental teaching opportunities have on the benefits of distributed teaching?

What affects might peer engagement have on the benefits of distributed teaching?
References


Contact Information:

Bill McInerney, Ph.D. – william.mcinerney@utoledo.edu
Laurie Dinnebeil, Ph.D. – laurie.dinnebeil@utoledo.edu
Lyn Hale, Ph.D. – lyn.hale@utoledo.edu
Margie Spino, M.A. – margie.spino@utoledo.edu

Judith Herb College of Education - MS 954
The University of Toledo
2801 W. Bancroft St.,
Toledo, OH 43606