Listening & Note-taking! Helping Students to Become Better Note-takers

By Joseph R. Boyle, Ph.D.
Temple University
Lectures in the Secondary Classroom


7th Gr. Science: 44%  10th Gr Science: 50%
7th Soc. Studies: 53%  10 Gr. Soc. Studies: 47%

(N = 120 teachers from three states – 60 7th Gr. And 60 10th Gr.)
(30 each in science, social studies, math, & English)

Observed 10 HS science teachers (53 lessons) and found 20-22 of 53 lesson were lectures with notes (38-42%)
Lectures in the Secondary Classroom

- Putnam, Deshler, & Schumaker, 1993
- Teacher often use their own lecture notes for tests
- Test scores comprise 50% of student’s grades
Why Take Notes?

- Aids in Our Understanding of Lecture Information
- Serves as Later Record
- *An Extension Of Long-term Memory
- Increases Student Attention to Lecture
- Linked to GPA
**Table 2. Correlation Between Lecture Points, Total Words, and Test Score**

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Test: Pearson’s r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cued lecture points and test score</td>
<td>.53</td>
</tr>
<tr>
<td>Noncued lecture points and test score</td>
<td>.39</td>
</tr>
<tr>
<td>Total lecture points and test score</td>
<td>.48</td>
</tr>
<tr>
<td>Total words and test score</td>
<td>.47</td>
</tr>
</tbody>
</table>
Benefits of Teaching Note-taking Skills

• Active engagement in lectures and passive learners
• Helps them understand confusing information
• Helps students encode information when engaged
• Teaching skills can be used for a lifetime
• Some teachers may not want students to record notes
Types of Lecture Cues

• Organizational Cues
  – There are six parts to the cell
    » The first part is..., the second part is..., ... the sixth part is....

• Emphasis Cues
  » It is important to remember that...
Cognitive Processing:

- Listening
- Processing information in WM
- Writing
Cognitive Effort

Figure 4. Cognitive effort (in milliseconds) in different processing information tasks (1) Olive & Pialat, 2002; (2) Kellogg, 1986; (3) Britton et al., 1982; (4) Britton & Tesser, 1982; (5) Pialat, in press, and (6) Pialat et al., 1996). NB: the values of standard errors are not available.
Cognitive Processing:


Found that students with LD performed worse on a listening to a lecture than students with no LD.

<table>
<thead>
<tr>
<th>Literal Questions</th>
<th></th>
<th>Inferential Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLD = 10</td>
<td></td>
<td>NLD = 9.2</td>
</tr>
<tr>
<td>LD = 6</td>
<td></td>
<td>LD = 4.9</td>
</tr>
</tbody>
</table>
Students with Disabilities
Note-taking Difficulties:
(N = 37 w/ disabilities)

TOP DIFFICULTIES (of 10)(PreTreat)

1. Write fast enough (3.3)
2. Studying notes (3.1)
3. Deciding what is important to record (2.9)
4. Making sense out of notes after lecture (2.6)
5. Understanding what the teacher is talking about during the lecture (2.5)
<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Students With LD (n = 45)</th>
<th>Students With NLD (n = 45)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Cued lecture points</td>
<td>2.33</td>
<td>2.36</td>
</tr>
<tr>
<td>Noncued lecture points</td>
<td>7.27</td>
<td>5.15</td>
</tr>
<tr>
<td>Total words</td>
<td>57.31</td>
<td>39.36</td>
</tr>
<tr>
<td>Test score</td>
<td>47.11</td>
<td>19.84</td>
</tr>
</tbody>
</table>

Note: LD = learning disabilities; NLD = no learning disabilities.
Accommodations for Note-taking

• Scribe or note-taker
• Give students notes or guided notes
• Have students record class lectures
Previous Research

During the Lecture Listen for CUES

C - Cluster - Cluster together 3 to 6 main points of the lecture

U - Use - Use teacher cues to record ideas
   1. Number Cues –
      ex. *There are six parts to the cell*
   2. Importance Cues –
      ex. *This is really important to remember* ...

E - Enter - Enter important vocabulary

S - Summarize - Summarize quickly and whenever possible
Strategic Note-taking

Name______________________  Today's Date________________

Strategic Note-taking Paper
Fill in this portion before the lecture begins.
What is today's topic?
Describe what you know about the topic.
(Complete this part before the lecture begins)

When the lecture begins, use these pages to take notes!
Name 3 to 6 main points with details as they are being discussed

Summary- Quickly describe how the ideas are related
New Vocabulary or Terms?
Name 3 to 6 main points with details as they are being discussed

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Name 3 to 6 main points with details as they are being discussed

Summary- Quickly describe how the ideas are related
New Vocabulary or Terms?
Table 2. Number of Lecture Points (Cued and Total), Vocabulary, and Total Words in Notes

<table>
<thead>
<tr>
<th>Measure</th>
<th>Experimental students (n = 52)</th>
<th>Control students (n = 52)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Cued lecture points</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NLD</td>
<td>6.03*</td>
<td>(2.06)</td>
</tr>
<tr>
<td>LD</td>
<td>4.71*</td>
<td>(1.94)</td>
</tr>
<tr>
<td>Combined groups</td>
<td>5.67</td>
<td>(2.09)</td>
</tr>
<tr>
<td>Total lecture points</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NLD</td>
<td>29.16*</td>
<td>(13.54)</td>
</tr>
<tr>
<td>LD</td>
<td>22.00*</td>
<td>(14.73)</td>
</tr>
<tr>
<td>Combined groups</td>
<td>27.23</td>
<td>(14.09)</td>
</tr>
<tr>
<td>Vocabulary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NLD</td>
<td>7.74*</td>
<td>(2.58)</td>
</tr>
<tr>
<td>LD</td>
<td>7.00</td>
<td>(3.01)</td>
</tr>
<tr>
<td>Combined groups</td>
<td>7.54</td>
<td>(2.69)</td>
</tr>
<tr>
<td>Total words</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NLD</td>
<td>160.69*</td>
<td>(72.39)</td>
</tr>
<tr>
<td>LD</td>
<td>122.43*</td>
<td>(99.17)</td>
</tr>
<tr>
<td>Combined groups</td>
<td>152.00</td>
<td>(77.70)</td>
</tr>
</tbody>
</table>

Note: NLD = students with no learning disabilities; LD = students with learning disabilities.
*Significant at .013 level.
Table 3. Achievement Measures of Experimental Groups and Type of Students.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Experimental students (n = 52)</th>
<th>Control students (n = 52)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Test score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NLD</td>
<td>75.84*</td>
<td>(14.01)</td>
</tr>
<tr>
<td>LD</td>
<td>69.93*</td>
<td>(19.52)</td>
</tr>
<tr>
<td>Combined groups</td>
<td>74.25</td>
<td>(15.70)</td>
</tr>
<tr>
<td>Total lecture points of IFR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NLD</td>
<td>6.68*</td>
<td>(2.83)</td>
</tr>
<tr>
<td>LD</td>
<td>5.36*</td>
<td>(2.06)</td>
</tr>
<tr>
<td>Combined groups</td>
<td>6.33</td>
<td>(2.70)</td>
</tr>
<tr>
<td>Total lecture points of LFR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NLD</td>
<td>5.74</td>
<td>(2.32)</td>
</tr>
<tr>
<td>LD</td>
<td>4.93</td>
<td>(3.05)</td>
</tr>
<tr>
<td>Combined groups</td>
<td>5.52</td>
<td>(2.53)</td>
</tr>
</tbody>
</table>

Note. NLD = students with no learning disabilities; LD = students with learning disabilities; IFR = immediate free recall; LFR = long-term free recall.

*Significant at .017 level.
IES Grant Overview

Goal 2: Development & Innovation

Year 1 – 7th Grade Modules
Year 2 – 8th Grade Modules
Year 3 – 7th & 8th Grade Modules
Experimental Study
Strategic Note-taking Strategy (SN Beta)(Yr1 Grant)

- **During the Lecture Listen for CUES**
- **C** – **Cluster** – Cluster together 3 to 6 main points of the lecture
- **U** – **Use** – Use teacher cues to record ideas
  1. Number Cues – ex. *There are six parts to the cell*
  2. Importance Cues - ex. *This is really important to remember...*
- **E** – **Enter** – Enter important vocabulary
- **S** – **Summarize** – Summarize quickly and whenever possible
- **+ - Plus** – add or use abbreviations, pictures, or symbols to personalize your notes
Pre and Post Intervention Scores

- Cued Lecture Points
- Total Lecture Points
- Vocabulary Instances

# of items recorded

Pre-Intervention Post-Intervention
# Year 1 Scores

Average Pre-test, Post-test, and Gain score on ALL modules for Students with LD in SN treatment, Students with No LD (NLD) Comparison, and Students with NLD in Other 7th Grade Science Classes.

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Post</th>
<th>%Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LD – SN Treatment</strong></td>
<td>44.07%</td>
<td>60.42%</td>
<td>16.35%</td>
</tr>
<tr>
<td><strong>NLD Comparison</strong></td>
<td>50.86%</td>
<td>71.47%</td>
<td>20.61%</td>
</tr>
</tbody>
</table>
# Year 1 Scores

*Average Percentage of Notes for Students with LD (LD) and Comparison Group No LD (NLD)*

<table>
<thead>
<tr>
<th>Videotaped Lectures</th>
<th>LD</th>
<th>NLD Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. CLP</td>
<td>43.33%</td>
<td>58.44%</td>
</tr>
<tr>
<td>Avg. TLP</td>
<td>19.15%</td>
<td>25.71%</td>
</tr>
<tr>
<td>Avg. Vocabulary</td>
<td>25.07%</td>
<td>32.93%</td>
</tr>
</tbody>
</table>
From a metacognitive perspective, what happens when students use the SN intervention? (retrospective interviews)

- Students directed their attention to teacher cues...
- Pretests directed students’ attention about what to look for...
- Helped them organize information (demystified the note-taking process)
From a metacognitive perspective, what happens when students use the SN intervention?

- For many, SN allowed them to write more notes
- For others, less notes because they used abbreviations, symbols, pictures...
- Allowing students to draw pictures also helped them to better understand certain concepts...
Strategic Note-taking Strategy (SN 2.0)

- **During the Lecture Listen for CUES+**
- **C** – *Cluster* – Cluster together 3 to 6 main points of the lecture
- **U** – *Use* – Use teacher cues to record ideas
  1. Number Cues – *ex. There are six parts to the cell*
  2. Importance Cues – *ex. This is really important to remember...*
- **E** – *Enter* – Enter important vocabulary
- **S** – *Study* – Study your notes by reviewing them three times
  + - **Plus** – add or use abbreviations, pictures, or symbols to personalize your notes
Strategic Note-taking Paper
Fill in this portion before the lecture begins.
What is today’s topic?
Describe what you know about the topic.
(Complete this part before the lecture begins)

When the lecture begins, use these pages to take notes!

Name 3 to 6 main points with details as they are being discussed

Summary- Quickly describe how the ideas are related

New Vocabulary or Terms?

Name 3 to 6 main points with details as they are being discussed

Summary- Quickly describe how the ideas are related

New Vocabulary or Terms?
Year 2 Scores
SN 2.0 S - Study

Average Pretest, Posttest, and Gain Scores for Students with LD in SN treatment, Students with No LD (NLD) Comparison, and Students with NLD in SN Treatment group.

<table>
<thead>
<tr>
<th>Modules Videotaped</th>
<th>Pre</th>
<th>Post</th>
<th>%Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD/IEP SN Treatment</td>
<td>45.8%</td>
<td>71.1%</td>
<td>25.3%</td>
</tr>
<tr>
<td>NLD Comparison</td>
<td>54.3%</td>
<td>79.6%</td>
<td>25.3%</td>
</tr>
<tr>
<td>NLD SN Treatment</td>
<td>59.4%</td>
<td>84.2%</td>
<td>24.8%</td>
</tr>
</tbody>
</table>
# Year 2 Scores

**SN 2.0 S - Study**

*Average Percentage of Notes for Students with LD (LD) and Comparison Group No LD (NLD)*

<table>
<thead>
<tr>
<th>Modules Videotaped</th>
<th>SN Students with LD/IEP</th>
<th>Students with NLD Comparison (No SN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% CLP</td>
<td>66.9%</td>
<td>73.7%</td>
</tr>
<tr>
<td>% TLP</td>
<td>23.9%</td>
<td>25.7%</td>
</tr>
<tr>
<td>% Vocabulary</td>
<td>16.1%</td>
<td>16.1%</td>
</tr>
</tbody>
</table>
Strategic Note-taking Strategy (SN 3.0)

- **During the Lecture Listen for CUES+**
- **C – Cluster** – Cluster together 3 to 6 main points of the lecture
- **U – Use** – Use teacher cues to record ideas
  1. Number Cues – ex. *There are six parts to the cell*
  2. Importance Cues - ex. *This is really important to remember...*
- **E – Enter** – Enter important vocabulary
- **S – Share** – Share your notes with partner
  + **Plus** – add or use abbreviations, pictures, or symbols to personalize your notes
## Year 2 Scores
### SN 3.0 S - Share

*Average Pretest, Posttest, and Gain Scores for Students with LD in SN treatment, Students with No LD (NLD) Comparison, and Students with NLD in SN Treatment group.*

<table>
<thead>
<tr>
<th>Modules Scripted</th>
<th>Pre</th>
<th>Post</th>
<th>%Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD/IEP SN Treatment</td>
<td>52.4%</td>
<td>72.8%</td>
<td>20.4%</td>
</tr>
<tr>
<td>NLD Comparison</td>
<td>52.7%</td>
<td>72.9%</td>
<td>20.2%</td>
</tr>
<tr>
<td>NLD SN Treatment</td>
<td>53.8%</td>
<td>74.8%</td>
<td>21.0%</td>
</tr>
</tbody>
</table>
Year 2 Scores
SN 3.0 S - Share

*Average Percentage of Notes for Students with LD (LD) and Comparison Group No LD (NLD)*

<table>
<thead>
<tr>
<th>Modules Scripted</th>
<th>SN Students with LD/IEP</th>
<th>Students with NLD Comparison (No SN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% CLP</td>
<td>60.0%</td>
<td>68.5%</td>
</tr>
<tr>
<td>% TLP</td>
<td>21.6%</td>
<td>25.2%</td>
</tr>
<tr>
<td>% Vocabulary</td>
<td>18.1%</td>
<td>20.6%</td>
</tr>
</tbody>
</table>
Students with Disabilities

Note-taking Difficulties:
(N = 37 w/ disabilities)

Three Most Improved Areas (Less Difficult) As Reported By Students

1. Deciding what is important to record
2. Write fast enough
3. Understanding what the teacher is talking about during the lecture
Other Note-taking Techniques

• Guided Notes

• AWARE Strategy

• Smartpens –
  – TARGET strategy

• Pause Procedure

• Strategic Note-taking app iPad
Guided Notes

- Student copy
- Teacher Copy
- Tally
Guided Notes
(Boyle & Rivera, 2012)

• RESULTS:

• Baseline vs Guided Notes (GN) (Lazarus, 1993)
  • On average 30% to 60%
  • And 96% when 10 min. review session added to GN
AWARE Strategy
(Suritsky 1992)

• A - Arrange To Take Notes
• W- Write Quickly Using Shorthand
• A - Attend to Cues
• R - Review Notes
• E - Edit Notes
AWARE Strategy

- RESULTS:
- 9 College Students with LD
- Baseline vs. Intervention
- Avg. 34% to avg. 60% of lecture points (compared to instructors’ lecture notes)
Smartpen Technology
How Smartpens Might Help Students...

- Students are actively engaged in the lecture
- Students are recording notes in their own words/thoughts
- Allow them to take periodic breaks/respites
- Helps them to account for slow writing/processing
- Provides a review of notes...
Smartpens Study

TARGET Strategy

TARGET key information when you record notes

- T¹ - TAP on the record button
- A - ACTIVATE your notes.
- R - RECORD cued lecture points
- G - GRAB vocabulary
- E - END your notes
- T² - TOUCH up notes
Preliminary RESULTS:

Total Lecture Points
Exp = 19
Con = 16

Word Recorded
Exp = 168
Con = 142

Test Scores
Exp = 82%
Con = 78%
Pause Procedure

• Pauses are placed in a lecture
  – 3 two-minute pauses in a typical 60/70 min. lecture
• Students are placed in pairs
• Students discuss only prev. covered mat.
• Instructor NOT involved
• Pauses placed at random (natural breaks)
• RESULTS
Pause Procedure

- RESULTS (Ruhl & Suritsky, 1995)
- Pause vs Outline vs Outline+Pause
- 17LPs vs. 13 vs. 12 IFR (Recall)
- 33 LPs vs. 32 vs. 22 Lecture Points
Strategic Note-taking App for the iPad

- **During the Lecture Listen for CUES+**
  - **C** – *Cluster* – Cluster together 3 to 6 main points of the lecture
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    1. Number Cues – ex. *There are six parts to the cell*
    2. Importance Cues - ex. *This is really important to remember...*
  - **E** – *Enter* – Enter important vocabulary
  - **S** – *Share* – Share your notes with partner
  - **+** – *Plus* – add or use abbreviations, pictures, or symbols to personalize your notes
Five things teachers could do to help you take better notes:
(N = 141 8th Grade Science Students - 39 w/ disabilities)

1. Give hints on what’s important to note
2. Explain things better (explain slower)
3. Talk slower
4. Offer additional help for students
5. Provide study tips
TIPS

- Train for Generalization
- Practice Fast Pacing
- Teach Abbreviations
- Teach to Review Notes
SN Note-taking Website
http://sites.temple.edu/snotetaking/
http://iris.peabody.vanderbilt.edu

IES Grant Project Coordinator
candy.crawford@temple.edu

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