Motivating Meaningful Learning

David Fortus
Why are you here?
What are the characteristics of meaningful learning?
Meaningful Learning

Positive Attitudes
Effort
Preference for Challenges
Perseverance
Classroom engagement
Continuing motivation
Self-regulation
Learning strategies
Long-term memory
Self-efficacy
Transfer
Interests
Achievement Goal Theory

Goal Orientation

Mastery Goals

Performance Goals

Not dichotomous
I finally understood the connection between a derivative and an integral... In history there was a real interesting discussion about the influence of technology in WWI... In science I worked on a project with a friend and we had a few good ideas...

I was the first in class to finish the quiz in math... I was the only one to answer a question posed by the history teacher... The science teacher used my portfolio as an example for all to look at...
Performance Goals Orientation

Performance Goals Orientation

- approach
- avoid
Mastery Goals Orientation

- Positive Attitudes
- Effort
- Preference for Challenges
- Interest
- Self-efficacy
- Perseverance
- Classroom engagement
- Continuing motivation
- Self-regulation
- Learning strategies
- Transfer
- Long-term memory
- Continuing motivation
Does enhancing students’ mastery goal orientation lead to more meaningful learning?
Mastery orientation in science declines between grades 4-9
The decline in mastery orientation in science is not an inevitable consequence of adolescence.

"Adolescence - The Inevitable Maze"
Alexandra Nechita
What are the environmental factors that have the strongest relation with students’ mastery orientation in science?
School Characteristics

T’s Perceptions of School’s Emphases

S’s Perceptions of School’s Goals

P’s Goals

T’s Practice & Behavior

S’s Perceptions of T’s Goal Emphases

S’s Mastery Goal Orientation

Peers’ Goals

S’s Perceptions of Peers’ Goals

S’s Perceptions of P’s Goals
Categorization of Schools

Indicators in others subjects

General indicator

School type

- D
- E
- M

Indicators in core subjects

Indicators in science class
Research Question
From the students’ perspective, which instructional practices characterize science teachers who do or do not emphasize mastery goals?
Quantitative Data

- 1181 students in grades 5-8
  - 6 “traditional” elementary schools
  - 6 “traditional middle schools
  - 5 democratic schools

- Mid-High SES

- Measuring students’ perspectives of their science teacher’s mastery emphasis
Extreme Cases
Teachers that were chosen

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Mastery emphasis</th>
<th>Ss’ perspective on T’s mastery emphasis</th>
<th>School</th>
<th># of Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>low</td>
<td>2.06</td>
<td>MS</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>low</td>
<td>2.40</td>
<td>MS</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>high</td>
<td>4.27</td>
<td>MS</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>high</td>
<td>4.40</td>
<td>ES</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>high</td>
<td>4.48</td>
<td>ES</td>
<td>3</td>
</tr>
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</table>
Qualitative Data

- 69 students
- Were interviewed about the teaching and learning in their science classes
TARGETS – Instructional dimensions that can influence students’ goals orientations

**Task** – The structural and psychological characteristics of tasks and activities

**Authority/Autonomy** – S autonomy vs. T authority

**Recognition** – Standards and methods for providing recognition

**Grouping** – Reasons for, ways of, and frequency of grouping

**Evaluation** – Methods and characteristics of evaluations

**Timing** – Rigidity or flexibility in timing events

**Social interaction** – Interactions between the T and Ss and amongst the Ss
Analyses

- Identifying and characterizing utterances using TARGETS
- Searching for commonalities and differences in the various categories between the teachers
- The analyses were done by people who didn’t know if a teacher was rated high or low mastery emphasizing
Findings
Most of the time she talks with us and we ask her questions.

She answers all our questions and she sits and talks with us.

She explains things to us.

Most of the time we sit and listen to what she says.
Task

We don’t have many assignments to do at home that she prepared in advance.

Pages in the book that we have to read and answer.

Book work or she distributes work sheets.

High

low

Once she asked us how to separate salt from sand; work on it for a week and the kids raised some really nice ideas.
Task

high

low
Autonomy

She let a few kids lecture the class

Once a friend and I saw an experiment in a book, and she agreed to let us show it to the class

In class we have assignments to choose from, like experiments, riddles, games…
I almost never saw situations where we had choices. She prepared the tasks in advance and you cannot choose, you simply do what she decides.
You don’t have to copy from the board, only if you want to.

You can submit the homework if you want to and then she’ll check it.
The teacher asks us what we would like to learn… for example, I said I was interested in solar energy so we learned about solar energy.
Autonomy

case

She tells him that she’ll answer him later or that it’s not related to the lesson or she gets angry because he’s not focused on the lesson
Autonomy

Rules
1. Behave
2. See 1.
Recognition

- **High**
  - She tries to give attention to everybody
  - I feel like she doesn’t prefer some kids more than others, everybody’s equal. There are no good or bad students

- **Low**
  - She pays attention only to the kids that she knows are really good… Let’s say that somebody suddenly raises their hand, she won’t call on him unless he’s somebody that always raises their hand
Recognition

- Low
  - She shouts when she’s not pleased
  - She started to shout at us that we weren’t thinking

- High
  - She hasn’t shouted at us even once
No differences were found in the criteria used for grouping
She emails us the summaries of stuff we need to know for the test.

Two hours prep for a test in which she answers our questions.

Special pages… sort of a workout before the test.

She gave us an assignment to do at home to prepare for the test.
There’s not enough time to learn everything for the test so she teaches real fast without us understanding.

We didn’t do any experiments because she said there wasn’t enough time.

She doesn’t give time to copy… she wants to cover a lot.
Sometimes we can discuss a single topic for a whole lesson and she’ll give a million examples until she sees that everybody really gets it.

I don’t think it’s so important to her that we cover everything.

We continue because the topic still interested us.

We continue until we finish the topic and understand it.

She never rushes.
Social

- **Low**
  - She not really personal with us
  - She gives us the feeling that she doesn’t really care
  - She makes everybody be afraid of her
  - If she would be nicer we might want to participate more in her lessons

- **High**
  - She’s considerate
  - You can tell that she listens to us, that she sees us
  - It’s important to her that we feel like we understand
<table>
<thead>
<tr>
<th>Task</th>
<th>Lack of Mastery Emphasis</th>
<th>High Mastery Emphasis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• <strong>Lots</strong> of worksheets</td>
<td>• <strong>Sometimes</strong> worksheets</td>
</tr>
<tr>
<td></td>
<td>• The T asks the questions</td>
<td>• The Ss ask questions</td>
</tr>
<tr>
<td></td>
<td>• The T talks <strong>to</strong> the Ss</td>
<td>• The T speaks <strong>with</strong> the Ss</td>
</tr>
<tr>
<td></td>
<td>• Lots of homework, especially bookwork</td>
<td>• Little and varied homework</td>
</tr>
<tr>
<td></td>
<td>• The textbook is at the center</td>
<td>• The book is of secondary importance</td>
</tr>
<tr>
<td></td>
<td>• Sitting in rows</td>
<td>• Sitting in groups or semi-circles</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Autonomy</th>
<th>Lack of Mastery Emphasis</th>
<th>High Mastery Emphasis</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>• Little choice</td>
<td>• Much choice</td>
</tr>
<tr>
<td></td>
<td>• Little influence on instruction</td>
<td>• Much influence on instruction</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Recognition</th>
<th>Lack of Mastery Emphasis</th>
<th>High Mastery Emphasis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Non-equitable</td>
<td>• Equitable</td>
</tr>
<tr>
<td></td>
<td>• Anger and shouting</td>
<td>• Without anger and shouting</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Grouping</th>
<th>Lack of Mastery Emphasis</th>
<th>High Mastery Emphasis</th>
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<tbody>
<tr>
<td></td>
<td>No differences were found</td>
<td></td>
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</table>

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<thead>
<tr>
<th>Evaluation</th>
<th>Lack of Mastery Emphasis</th>
<th>High Mastery Emphasis</th>
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<tbody>
<tr>
<td></td>
<td>Lots of preparation for tests</td>
<td>Little preparation for tests</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Lack of Mastery Emphasis</th>
<th>High Mastery Emphasis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Rushing to cover all the material</td>
<td>• No pressure of time</td>
</tr>
<tr>
<td></td>
<td>• Limited time for questions</td>
<td>• Plenty time for questions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social</th>
<th>Lack of Mastery Emphasis</th>
<th>High Mastery Emphasis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cold and distant relations</td>
<td>Concerned, warm relations</td>
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Conclusions

- A SEM analysis on the quantitative data indicated that

<table>
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<th>Task</th>
<th>Autonomy</th>
<th>Time</th>
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are the main dimensions that are perceived by students as emphasizing mastery.
Conclusions

- Pre- and in-service training should focus on helping teachers develop mastery-promoting practices related to Task, Autonomy, and Time.
- Presumably emphasizing these mastery-promoting sides of these dimensions won’t change Ss’ mastery orientation unless the emphasis is accompanied by a genuine change in the T’s attitudes and beliefs about the purposes of schooling.
IQWST and NGSS

- Does IQWST promote mastery and thereby meaningful learning?

- Does the NGSS promote mastery and thereby meaningful learning?
  - I think not. It creates lots of time pressure, no place for student interest or autonomy, and for that matter, no place for teacher interest and autonomy.
Thank you for your attention!

“What do you think ... should we get started on that motivation research or not?”