

The Relationship Between Student Satisfaction with Learning Online and Cognitive Load

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*George R. Bradford, Ph.D.
University of Central Florida*

Agenda

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- Significance to Field
- Instrument Development
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- Data Collection
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“There is no relationship between perceived cognitive load and satisfaction with online learning experience.”

Satisfaction

?

Cognitive Load

Significance to Field of Instructional Design

- Contribute to discussion of theory development
- Establish link between constructs
- Develop research to improve design
- Retain student focus in online learning



Instrument Development

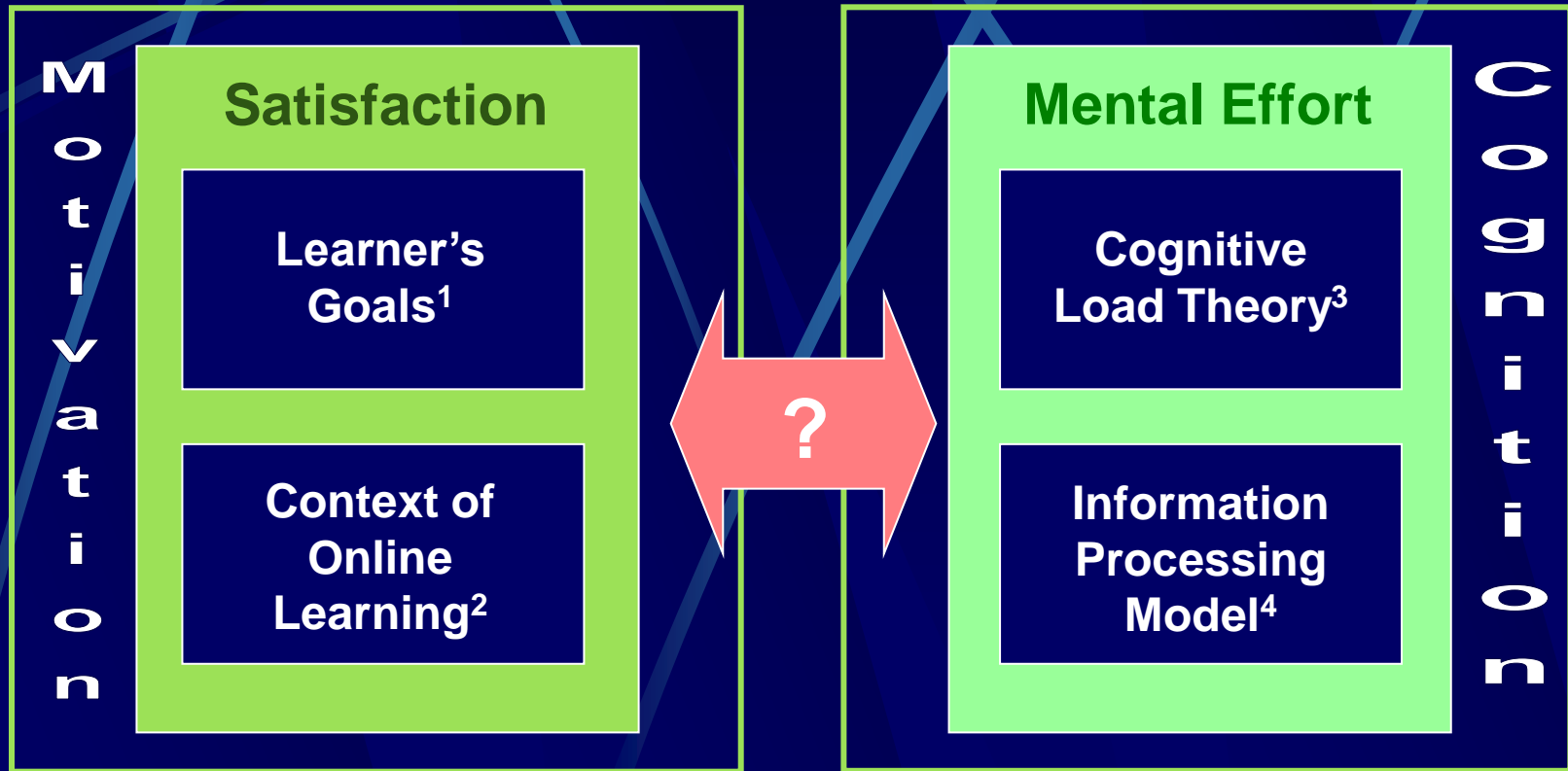
■ Need scales

- Online learning context
- Cognitive load

■ Literature search produced no seminal work

■ Required assembly from multiple sources

Online Learner Experience Model



1, 2, 3, 4 – see References slide at end

Data Collection

- Direct faculty support solicitation
 - Difficult to get responses
- Requested fellow instructional designers
- Went to SGA, received enthusiastic support
- Instrument Delivery: Own instance LimeSurvey
- Response rate: unknown - Completion rate: 94%

Instrument Reliability & Validity

Reliability

■ Satisfaction:

- Context - .79
- Goals-Rewards - .71

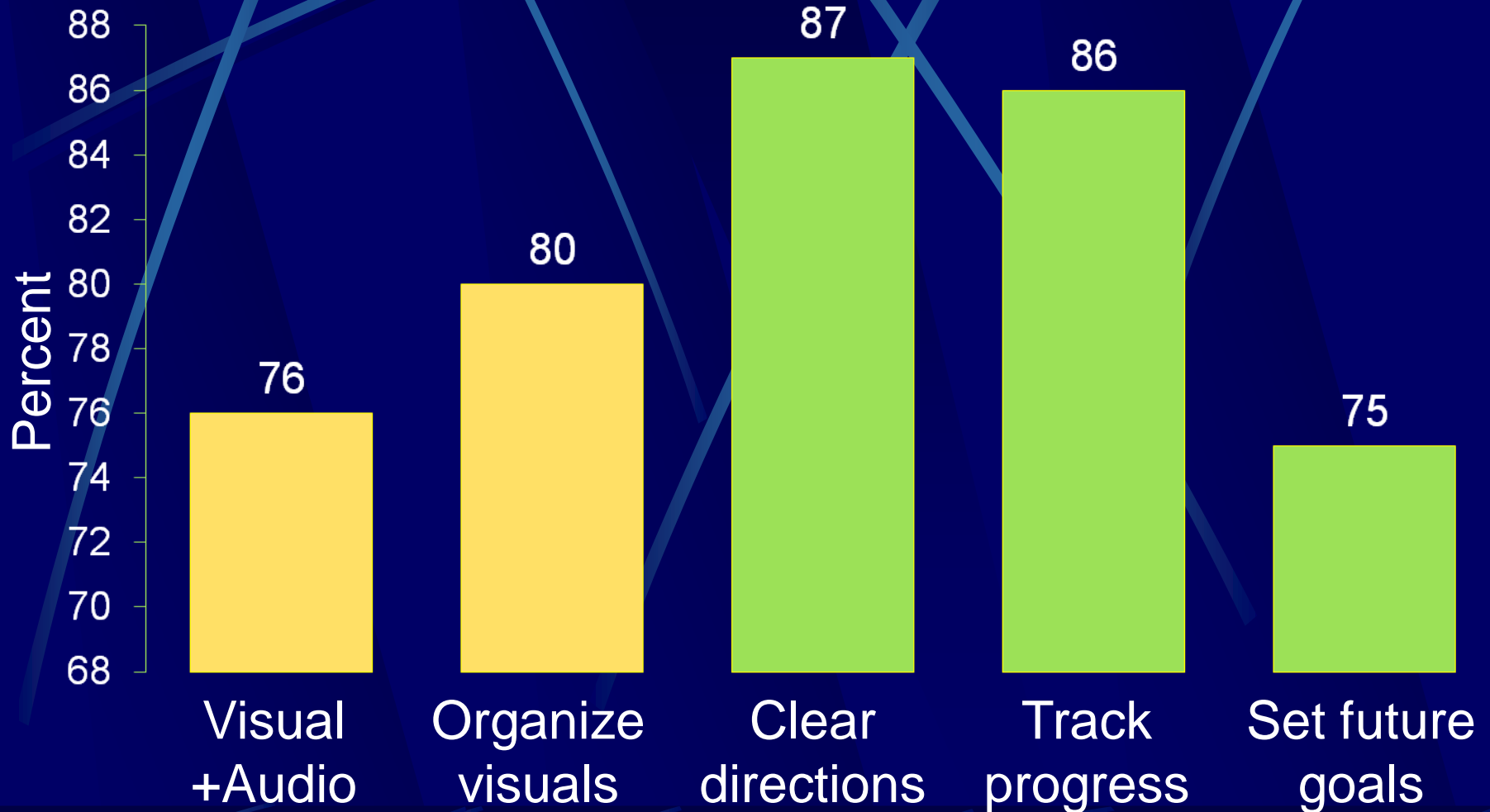
■ Cognitive Load - .49

Validity

■ Each item tied to theoretical foundation

Results

Interesting findings



Cognitive Load

Satisfaction

Correlation of Scales

$$r = .5 \quad r^2 = .25$$

Factor Analysis

- Principal Components Analysis
- 3 Emergent Factors:

Engagement

Challenge

Awareness

Correlations Among Factors: Principal Components Analysis

<u>Factor</u>	<u>Awareness</u>	<u>Challenge</u>	<u>Engagement</u>
Awareness	--		
Challenge	.00	--	
Engagement	.32	.31	--

Significant ANOVAs: Demographics

<u>Item</u>	<u>Significance</u>
Age	--
Marital status	--
Academic Standing	.01 (Satisfaction)
Gender	.02 (Cognitive Load)
Number of children	--
Employment	--
Ethnicity	--

The Narrative:

Some interesting comments

- 📊 4 Survey items, 60 – 95% response rate (n = 1,401)
- 📊 “I feel that the required material for my online course is very much overwhelming. The required reading material is scattered, and confusing having nothing in common with the text book material.”
- 📊 “I have an online class where the Powerpoints are confusing and contain a lot of extra information.”
- 📊 “I need to know how I am doing so all grades need to be available as soon as they are graded.”

Conclusions

- Some sort of relationship exists between cognitive load and satisfaction
- Elevates importance of student satisfaction
- Directs immediate follow-on research

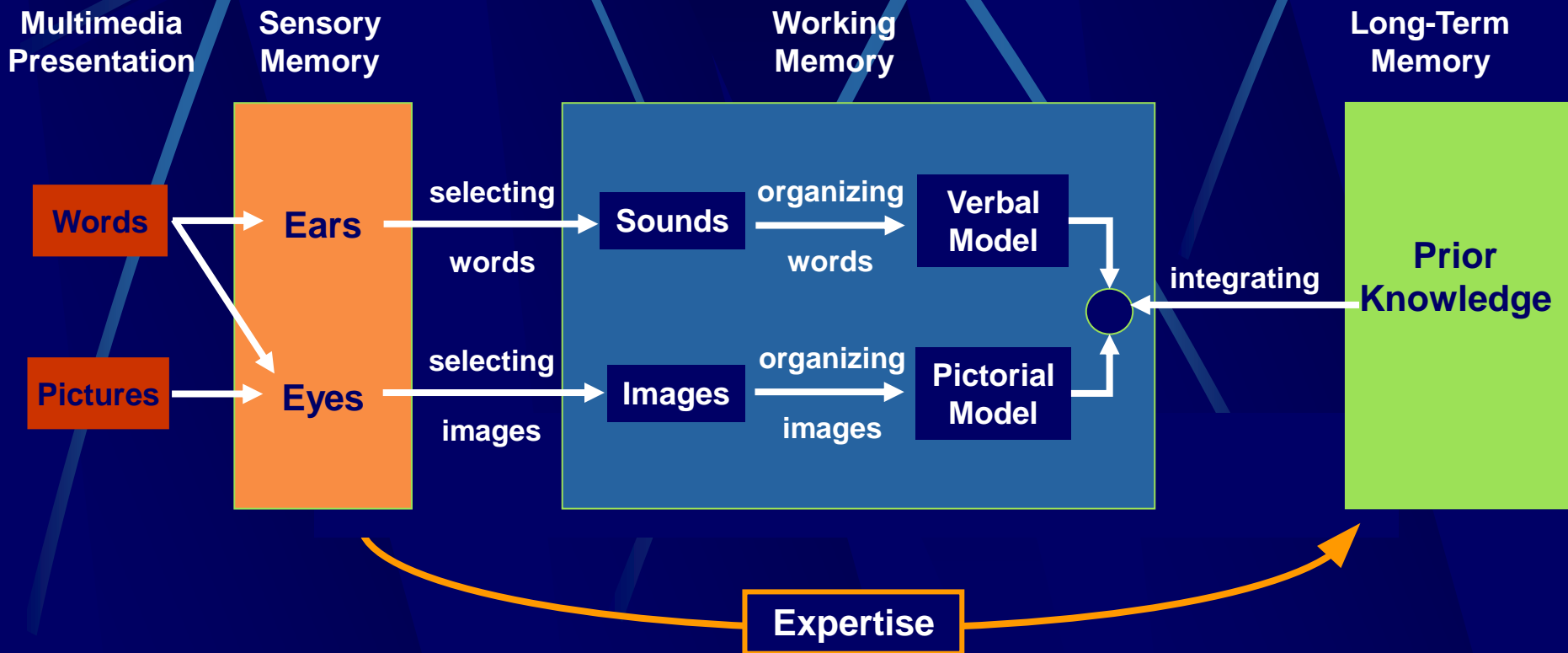
Future Directions

- How does relationship influence performance?
- Can cognitive load scale be improved, explored further?
- Will the findings be same in wider study?
- Do the findings vary in specific disciplines?
- Replicate study in business environments?

Q & A

George Bradford: george@knights.ucf.edu

Information Processing Model



Three Types of Cognitive Load Processing

Processing Type	Refers to cognitive processes that are...
Representational Holding	Aimed at holding a mental representation in working memory over a period of time
Essential	Required for making sense of the presented material <ul style="list-style-type: none">• Selecting• Organizing, and• Integrating words and images
Incidental	Not required for making sense of the presented material <ul style="list-style-type: none">• Primed by the design of the learning task

Mayer's Five Cognitive Overload Scenarios (1 OF 2)

Type 1: Essential processing in visual channel

Visual channel is overloaded by essential processing demands

Type 2: Essential processing in both channels

Both channels are overloaded by essential processing demands

Type 3: Essential processing + incidental processing

One or both channels overloaded by essential and incidental processing

Attributable to *extraneous material*

Mayer's Five Cognitive Overload Scenarios (2 OF 2)

Type 4: Essential processing + incidental processing

One or both channels overloaded by essential and incidental processing

Attributable to confusing presentation of essential material

Type 5: Essential processing + representational holding

One or both channels overloaded by essential processing and representational holding

Sample Survey Items (1 of 3)

3) The material to learn is difficult, there is a lot of material to learn, and I find that some of the material is extra, or not really necessary.

3.1) I would be satisfied when the material includes extra content.

3.2) I would be satisfied when the extra material is removed

3.3) I would be satisfied when I receive instruction on how to use the extra material.

Type 3: Essential processing + incidental processing

Sample Survey Items (2 of 3)

- 9) The material to learn is difficult, there is a lot of material to learn, and I had to put in a lot of effort to learn it.
- 9.1) To be successful, I need to be motivated to participate in online course activities.
- 9.2) I need activities that follow a routine, such as weekly quizzes, readings, or discussions, to keep me engaged in my online class.
- 9.3) I believe actively communicating, discussing, or debating is necessary for online courses to be effective.

Satisfaction: Context

Sample Survey Items (3 of 3)

12) The material to learn is difficult, there is a lot of material to learn, and I am challenged with the situation.

12.1) I look for the potential of reward when I must learn difficult course material in an online course.

12.2) I set my goals based on future satisfaction.

12.3) I find myself more satisfied when an online course is difficult than when it is not.

Satisfaction: Goal

Pilot Study: Instrument Validation

- Received input from faculty, students
- Revealed faculty issues
- Discovered problem with logic structure
- Forced to reframe instrument

References and Contact Information

Slide	Citation
Online Learner Experience Model	<ol style="list-style-type: none">1. Cognitive Approach of Motivation (Deci, 1975)1. ARCS Model (Keller, 2006)2. Context of Online Learning - Sloan Model (Dziuban et al., 2007)3. Cognitive Load Theory (Mayer & Moreno, 2003; Sweller, van Merriënboer, & Paas, 1998)4. Information Processing Model (Baddeley, 1986, 2001; Cowan, 2001; Miller, 1956, 1994; Salomon, 1984; Sweller, 1988)
Information Processing Model	“Nine ways to reduce cognitive load in multimedia learning,” by R. E. Mayer and R. Moreno, 2003, Educational Psychologist, 38(1), p. 46.
Three Types of Cognitive Load Processing	Mayer & Moreno (2003)
Five Cognitive Overload Scenarios	Table adapted from Mayer & Moreno (2003)

Dr. George Bradford: george@knights.ucf.edu