Maximizing Learning in Online Training Courses: Meta-Analytic Evidence

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Purpose of Current Study

- Compare Web-based instruction and blended learning to classroom instruction in terms of:
  - Their effectiveness for teaching declarative and procedural knowledge
  - Student reactions to training
- Examine training design characteristics which influence the effectiveness of Web-based instruction

What is meta-analysis?

Statistical technique for summarizing quantitative results from research in a literature domain

What is an effect size?

Hedges and Olkin's (1985) procedure

→ mean corrected *d* effect

- *d* > 0 indicates Web-based training is more effective
- *d* = 0 indicates Web and classroom training are equally effective
- *d* < 0 indicates classroom training is more effective

Meta-Analytic Notional Example

Research report	Sample size	*d*	Total
Arbaugh	150	.05	*d* = .22
Jackson	288	.26	
Manning	35	-.02	
Smith	71	.18	

Participant Demographics

- 19,331 trainees
- 96 research reports
- Types of courses
  - 113 undergraduate courses
  - 29 graduate courses
  - 26 corporate training courses
- Average age = 24 years

Do trainees learn more from Web-based than classroom instruction?

For declarative knowledge → Yes

- *d* = .15
- Web-based training is 6% more effective than classroom training

For procedural knowledge → No

- *d* = **-** .07
- Web-based and classroom training are equally effective for teaching procedural knowledge

Do trainees learn more from blended courses than classroom instruction?

For declarative knowledge → Yes

- *d* = .34
- Blended learning is 13% more effective than classroom training

For procedural knowledge → Yes

- *d* = .52
- Blended learning is 20% more effective than classroom training

What about training reactions?

Trainees are equally satisfied with Web and classroom instruction

- *d* = .00

Trainees react 6% more favorably towards classroom instruction than blended learning

- *d* = **-** .15

How can I ensure employees will learn in Web-based training courses?

6 moderator variables:

- Learner control
- Human interaction
- Length of the training course
- Instructional methods
- Experimental design
- Year

Meta-Analytic Notional Example

Research report	Sample size	*d*	Learner control
Arbaugh	150	.05	Low
Manning	35	-.02	Low
Jackson	288	.26	High
Smith	71	.18	High

Learner Control

Learner control refers to the extent to which trainees have control over the content, sequence, and pace of instruction

Low learner control *d* = .07

High learner control *d* = .30

- Trainees learn more when they have control in Web-based courses

Human Interaction

Human interaction indicates the extent to which trainees interact with the instructor and other trainees throughout the course

Low human interaction *d* = .19

High human interaction *d* = .18

Length of Training

Number of days spent in training correlates .38 with the declarative knowledge effect size

Short courses *d* = **-** **.**18

Long courses *d* = .17

- Trainees learn from long than short Web-based training courses

Instructional Methods

If the same instructional methods (e.g., lecture, assignments) are used, Web and classroom instruction are equally effective

- *d* = .04

To optimize learning:

- Incorporate a variety of instructional methods
- Require active involvement of trainees

Will all trainees be successful in Web-based courses?

When trainees were randomly assigned to course, classroom instruction was 10% more effective than Web-based instruction

- *d* = -.26

Trainees may lack Internet skills required to be successful in online training

Some trainees may require an instructors presence to maintain motivation

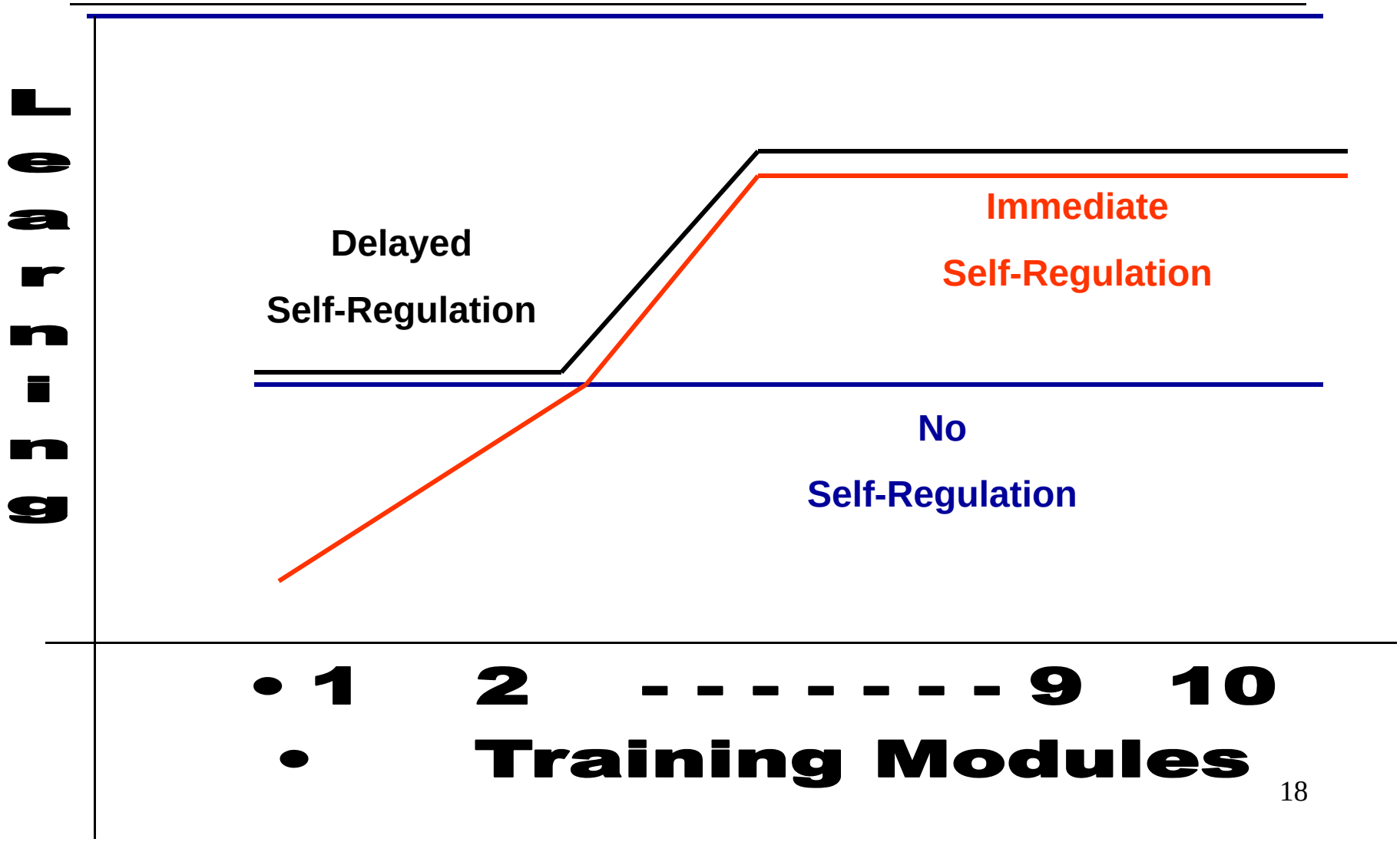
Self-regulation

Self-regulation is a set of meta-cognitive, motivational, and behavioral techniques learners use to increase their understanding of the training material

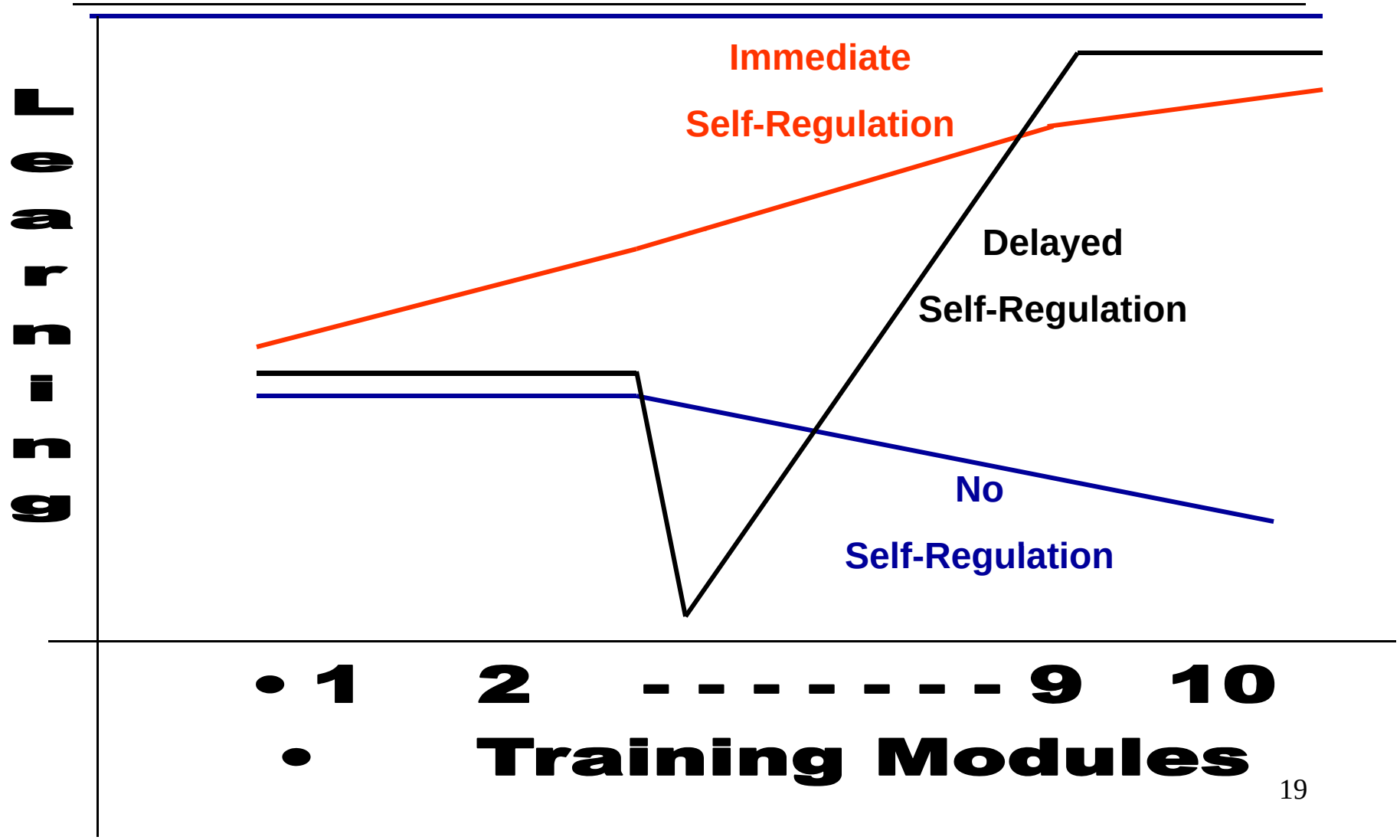
Prompting self-regulation

- Do I understand all of the key points of the training material?
- Are the study strategies I'm using helping me learn the training material?

Hypothesis


Learning
Delayed
Self-Regulation
Immediate
Self-Regulation
No
Self-Regulation
1
2
9
10
Training Modules

Results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Training Modules

Are recent online courses more effective than older courses?

The year a paper was written is correlated .21 with the effectiveness of Web-based training relative to classroom training

- The effectiveness of Web-based training relative to classroom training is increasing over time

Limitations

- Few studies assessed differences between Web and classroom training in procedural knowledge and reactions to training
- Many source studies failed to provide descriptive statistics for study variables and did not provide enough details about the training program to code for some of the desired moderators

Conclusions

- Overall Web-based instruction is 6% more effective than classroom instruction for teaching declarative knowledge
- Overall Web and classroom training are equally effective for teaching procedural knowledge and trainees are equally satisfied with the two forms of instruction
- Course design and training environment characteristics can result in learning from the Web being inferior or superior to classroom instruction

Designing More Effective Online Training

- Provide trainees with control during training
- Online communication should be synchronous rather than asynchronous
- Online training is more appropriate for long than short training courses
- Incorporate a variety of instructional methods
- Require active involvement of trainees
- Provide an Internet skills course for trainees lacking technical skills
- Provide incentives to trainees to maintain motivation