Data Driven Decision Making for Online Instructional Design

Tuesday, March 15, 2011

Presented by:
Dr. Phil Ice

Dr. Phil Ice is vice president of Research and Development for Sage Road Analytics. He is responsible for establishing the strategic direction for all company products and services.

Dr. Ice also serves as director of Course Design, Research and Development at American Public University System. His research is focused on the impact of new and emerging technologies on cognition in online learning environments.

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Data Driven Decision Making for Instructional Design

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Our presenter

Phil Ice, Ed.D.
Associate VP, Research and Development
American Public University System

Vice President
Sage Road Analytics
Poll question

What best describes the role of the majority of those viewing the seminar at your location?

- Instructional designer
- Faculty
- Administrator
- Researcher
- Other

The Role of Evaluation in ID

- ADDIE and ASSURE as examples
- Evaluation is the terminal phase of the model
- Carryover to implementation
  - Evaluation viewed as end of course activity
  - Slows the development lifecycle

Problems

- Current students benefit little from end-of-course analysis
- Reliance on end-of-course data is responsible for “mid-stream” introduction of media & strategies
- Allows for institutional “blame game”
  - Instructional designers & faculty shift responsibility to each other
However...

- End-of-course survey data is a very powerful tool for programmatic improvement
- Requires thorough understanding of student demographics

However...

- Demographic mix can alter outcomes
- Multiple iterations of courses are possible if there are large variances in student characteristics
  - Remedial courses
  - Traditional vs. non-traditional learners

Poll question

End-of-course surveys at my institution are based on:

- A face-to-face survey
- A custom construct for online learning at my university
- A national model
Contemporary Problems

- The vast majority of online course surveys are derivative of face-to-face courses
- Online surveys must account for unique pedagogies
- Institutional inertia makes life difficult for instructional designers
  - ID efforts not measured effectively
  - ID / faculty roles are intertwined in most surveys

Measurement Needs

- Effectiveness of media & layout
- Instructor role in discussion & interaction with students
- Student interaction with other students
- Effectiveness of activities
- Cognitive engagement

Exemplar - The CoI Framework

- A process model of learning in online & blended educational environments
- Grounded in a collaborative constructivist view of higher education
- Assumes effective online learning requires development of a community of learners that supports meaningful inquiry & deep learning
The ability of participants in a community of inquiry to project themselves socially & emotionally – as ‘real’ people

The degree to which participants in computer mediated communication feel socially & emotionally connected

Affective expression (expressing emotion, self-projection)
Open communication (learning climate, risk free expression)
Group cohesion (group identity, collaboration)
Cognitive Presence

- The extent to which learners are able to construct & confirm meaning through sustained reflection & discourse in a critical community of inquiry

Cognitive Presence – Elements

- Triggering event (sense of puzzlement)
- Exploration (sharing information & ideas)
- Integration (connecting ideas)
- Resolution (synthesizing & applying new ideas)
**Teaching Presence**

- The design, facilitation & direction of cognitive & social processes for the purpose of realizing personally meaningful & educationally worthwhile learning outcomes

**Teaching Presence – Elements**

- Design & organization (setting curriculum & activities)
- Facilitation (shaping constructive discourse)
- Direct instruction (focusing & resolving issues)

**CSI Survey**

- 9 social presence items
- 12 cognitive presence items
- 13 teaching presence items
### Col Survey – Social Presence
- 9 social presence items
  - 3 affective expression
  - 3 open communication
  - 3 group cohesion

### Col Survey – Cognitive Presence
- 12 cognitive presence items
  - 3 triggering
  - 3 exploration
  - 3 integration
  - 3 resolution

### Col Survey – Teaching Presence
- 13 teaching presence items
  - 4 design & facilitation
  - 6 facilitation of discourse
  - 3 direct instruction
Tested in graduate courses at four institutions in the US & Canada
- Principal component factor analysis
- Three-factor model predicted by CoI framework confirmed

Arbaugh, Cleveland-Innes, Diaz, Garrison, Ice, Richardson, Shea & Swan – 2008
- Subsequent validation & cumulative n over 500,000

Community of Inquiry Survey Instrument (draft v15)
Developed by Ben Arbaugh, Marti Cleveland-Innes, Sebastian Diaz, Randy Garrison, Phil Ice, Jennifer Richardson, Peter Shea & Karen Swan

Teaching Presence
- Design & Organization
  1. The instructor clearly communicated important course topics.
  2. The instructor clearly communicated important course goals.
  3. The instructor provided clear instructions on how to participate in course-learning activities.
  4. The instructor clearly communicated important due dates/time frames for learning activities.

Facilitation of Discourse
- 5. The instructor was helpful in identifying areas of agreement and disagreement on course topics that helped me to think.
- 6. The instructor was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking.
- 7. The instructor helped keep course participants engaged and participating in productive dialogue.
- 8. The instructor helped keep the course participants on task in a way that helped me to learn.
- 9. The instructor encouraged course participants to explore new concepts in this course.
- 10. Instructor actions reinforced the development of a sense of community among course participants.

Direct Instruction
- 11. The instructor helped focus discussion on relevant issues in a way that helped me to learn.
- 12. The instructor provided feedback that helped me understand my strengths and weaknesses.
- 13. The instructor provided feedback in a timely fashion.
Social Presence

**Affective Expression**
14. Getting to know other course participants gave me a sense of belonging to the course.
15. I was able to form distinct impressions of other course participants.
16. Online or web-based communication is an excellent medium for social interaction.

**Open communication**
17. I felt comfortable conversing through the online medium.
18. I felt comfortable participating in the course discussions.
19. I felt comfortable interacting with other course participants.

**Group cohesion**
20. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.
21. I felt that my point of view was acknowledged by other course participants.
22. Online discussions helped me to develop a sense of collaboration.

Cognitive Presence

**Triggering Event**
23. Problems posed increased my interest in course issues.
24. Course activities piqued my curiosity.
25. I felt motivated to explore content-related questions.

**Exploration**
26. I utilized a variety of information sources to explore problems posed in this course.
27. Brainstorming and finding relevant information helped me resolve content-related questions.
28. Discussing course content with my classmates was valuable in helping me appreciate different perspectives.

**Integration**
29. Combining new information helped me answer questions raised in course activities.
30. Learning activities helped me construct explanations/solutions.
31. Reflection on course content and discussions helped me understand fundamental concepts in this class.

Resolution
32. I can describe ways to test and apply the knowledge created in this course.
33. I have developed solutions to course problems that can be applied in practice.
34. I can apply the knowledge created in this course to my work or other non-class related activities.

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**Instructional Design**

- Col analysis informs optimal design strategy
- Bifurcation of Teaching Presence is an indicator of need for review of “instructor voice”
- Social Presence bifurcation is an indicator of the need for more collaboration
- Strength of factor loadings can indicate areas where content review is needed
Socio-epistemological orientation – objectivist vs. constructivist
- Two-factor loading pattern indicative of an objectivist orientation
- Constructivist paradigm important for those most impacted – 38-47 years of age

Even basic data can be informative
- Most LMSs allow for viewing of fundamental statistics (e.g. time on task, course components accessed, last entry date, etc.)

Informs what resources & activities are & are not being utilized
- Basic ratios can inform the relationship between activity & grades
- Identification of problem areas
Extended Analysis

- Regression, factor analysis & qualitative data mining can be powerful tools
- Institutional researchers are always looking for new topics
- Partner with faculty to analyze your data

Qualitative Data

- Student focus groups
- What works for them and what doesn't
- Especially helpful in determining how effective activities and material are

- Let students navigate you through the process of knowledge acquisition
- Combine with quantitative data for an explanatory mixed methods approach
Faculty as Data Points

- Faculty are closest to the students
- Regular feedback forms, suggestion box, & ID / faculty interaction
- Make a part of the faculty research agenda

Faculty as Data Points (cont’d)

- ID as partners
- Differences in the same or similar courses between individual faculty can inform design
- Identification of isolated vs. systemic problems

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As part of a process of Continuous Quality Improvement (CQI), work to strengthen data to improve decision-making.

When expanding existing systems for assessment and evaluation of student achievement, identify new measures that may be collected to more fully explain student retention. For example, the Community of Inquiry Framework survey has been used by other online institutions to help inform student retention, and items from this survey have been found to be significant predictors (both statistically and pragmatically) of student retention.
**Long-term Trends**

- Aggregation of data can identify trends over time versus semester effects
- Can highlight institutional culture issues (positive & negative)
- Informs integration of new technologies through beta testing against norms

**Institutional Issues**

- Large-scale data collection requires IT cooperation to facilitate infrastructure requirements
- The case for improved ROI needs to be made with administrators
- Faculty relationships are key – ID & analytics as partnership

**Thank You!**

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