Session 3: New paradigms for teaching and learning in academic institutions

Understanding the Potential of Studio-Based Learning as a Teaching and Learning Approach for the Digital Era

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The Digital Era

- New student: Diverse (nationality, socioeconomic status, age), expects flexibility (time, technology, assignments), demands objectives relevant to employability and real world application
- New skills needed (Bates 2015): Communication skills, independent learning, ethics and responsibility, teamwork and flexibility, thinking skills, digital skills embedded within the knowledge domain in which learning takes place

The Digital Era

- New approaches: e-learning, flipped classroom, collaborative and co-creation learning, online coding, hackathons…
- New university (Gallagher & Garrett 2013): increase efficiency in the preparation of the above, invest in technology enabled classes and learning spaces, encourage academic mindset change, integrate leadership training, professional placements and international experience

Studio-Based Learning

- Founded on concepts of reflection and social constructivism and modeled after the architectural design studio, in America dates to late 1800s in John Dewey's Laboratory School, Chicago
- Key elements: focus on real-world problems, for which a student (often a team) will produce a solution, collaborative learning, interactive problem solving both among students and between the student(s) and the instructor, crit session

Studio-Based Learning

- Assignments: must offer different acceptable correct solutions, are product of iterations involving critiques and project updates
- Crit session: public presentation and review by peers (+ instructor) in small groups normally including i) student presenting preliminary ideas/sketches, while explaining how challenge was addressed; ii) the instructor (and students) discuss and provide feedback. Daily, mid-term and final.

Studio-Based Learning

- Rubrics: instructions for the assignments with performance requirements and achievements that serve as a guide for the crit session and include standard performance, required deliverables for different levels of achievements, important aspects to be rated as well as what to consider while rating them.
- …. And now an example of a rubric to support students writing papers and performing peer reviews…

Studio-Based Learning

	Capstone 4	Milestone 3	Milestone 2	Benchmark 1	Not Addressed 0
Context of and purpose for writing	Demonstrates a thorough understanding of context, audience, and purpose that is responsive to the assigned task(s) and focuses all elements of the work.	Demonstrates adequate consideration of context, audience, and purpose and a clear focus on the assigned task(s) (e.g., the task aligns with audience, purpose, and context).	Demonstrates awareness of context, audience, purpose, and to the assigned tasks(s) (e.g., begins to show awareness of audience's perceptions and assumptions).	Demonstrates minimal attention to context, audience, purpose, and to the assigned tasks(s) (e.g., expectation of instructor or self as audience).	Not addressed
Recommendations: (Give specific suggestions to improve this paper to ensure it meets or exceeds the Capstone level)					

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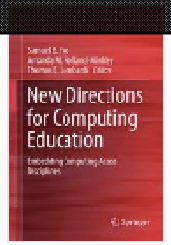

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Adapting the Studio Based Learning Methodology to Computer Science Education

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Chapter

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Study of an online CS1 course at UH

Phase 1

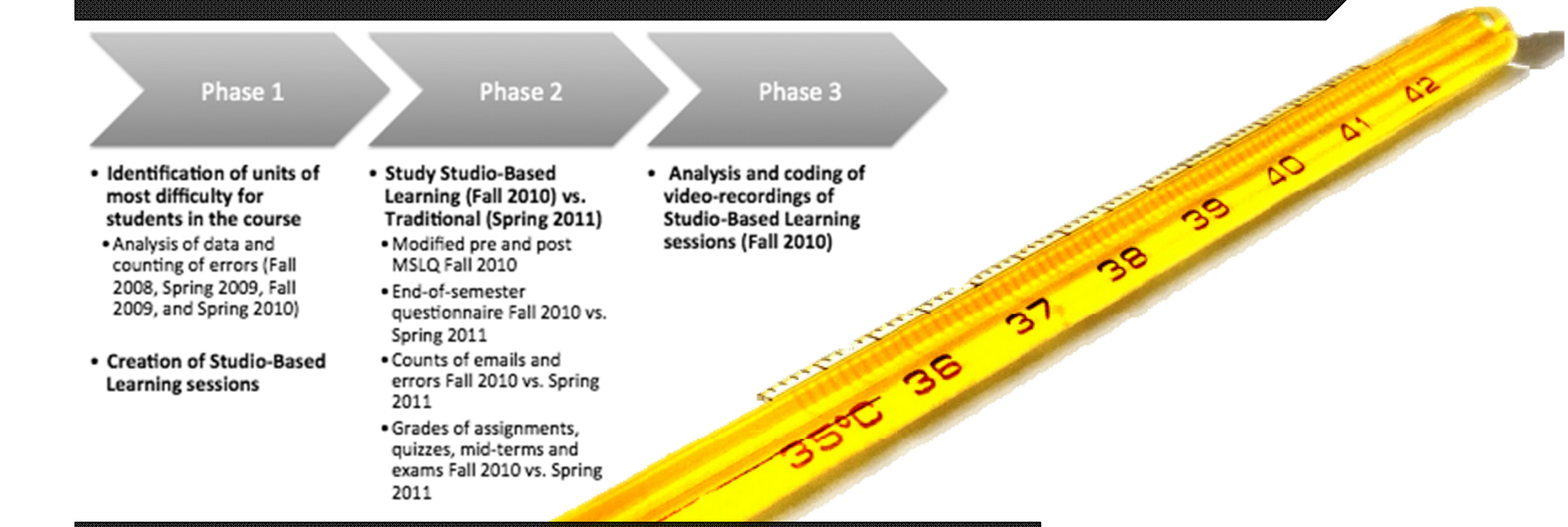
- **Identification of units of most difficulty for students in the course**
  - Analysis of data and counting of errors (Fall 2008, Spring 2009, Fall 2009, and Spring 2010)
- **Creation of Studio-Based Learning sessions**

Phase 2

- **Study Studio-Based Learning (Fall 2010) vs. Traditional (Spring 2011)**
  - Modified pre and post MSLQ Fall 2010
  - End-of-semester questionnaire Fall 2010 vs. Spring 2011
  - Counts of emails and errors Fall 2010 vs. Spring 2011
  - Grades of assignments, quizzes, mid-terms and exams Fall 2010 vs. Spring 2011

Phase 3

- **Analysis and coding of video-recordings of Studio-Based Learning sessions (Fall 2010)**



- Online CS1 lectures were the same for SBL and traditional conditions, 108 students (F10 – 14, S11– 21)
- Two main research questions: 1. Does the use of SBL change students' performance, motivation and perception of learning process? and 2. What can we learn from the artifacts of SBL sessions about students' learning processes?

What we have learned…

Perception of Learning Process: increase in students' perception that they could rely on others and slight increase in their perception of others relying on them; peer learning slightly increased after SBL; ease of learning about how other students solve programming projects/assignments/labs considerably more positive among SBL group students; helpfulness of feedback received perceived similarly, despite feedback given by students in SBL condition and by instructor in traditional

What we have learned…

Changes in Learning in General: asked about the learning in the course, both groups responded favorably, 100% affirmative response rate in groups exposed to the SBL methodology; impact on learning, percentage for the impact of studio/groups activities almost doubled, percentage for the lectures similar; approach for solving computing problems is similar. These results were expected since the structure of the course was similar and the lectures identical for both.

What we have learned…

General Motivation Towards the Course: SBL enjoyed it more, looked forward to taking more computing classes; experienced a change in their confidence on solving computing problems

Confidence and Comfort with Peer Learning: more confidence in giving and receiving quality feedback to and from fellow students; more comfortable in working with classmates and providing them with feedback; little difference in receiving feedback

What we have learned…

Number of Email Messages: Decrease from 337 to 118 emails from students

Quizzes, Exams and Errors: No significant differences in the grades, but differences in the number and kinds of errors, from 28 to 19 errors that is a 32% reduction in the number of errors.

What we have learned…

Learning Processes of the Students: amount of HES (help seeking) is significantly lower than the tallies of HEG (help giving). This suggests that giving help is more common than asking for it. Help giving (HEG) can be prompted directly, indirectly or even by commenting. FBS (feedback seeking) happens only somewhat less than FBG. This shows feedback is often sought and makes sense since the whole idea behind the sessions is to evaluate code and provide feedback.

What we have learned…

SBL has positive impacts on:

- Perception of learning process
- Students' motivation
- Confidence and comfort with peer learning
- Number of emails received by instructor
- Number of errors nade by students

Thank you!
Now let's talk about it…

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