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Algebra I Online

A Study of the Effectiveness of the Louisiana Algebra I Online Program

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Louisiana Virtual School & Algebra I Online

- Louisiana Virtual School (LVS), in its 6th year of operation, includes:
  - Satellite learning
  - Advanced Placement (AP) program
  - Web-based courses
    - 24 year long courses, 10 Fall 2005, and 9 Spring 2006 courses
- Received funding from Legislature in July 2002 to produce Algebra I Online
- Algebra I Online course piloted in August 2002

Algebra I Program Goals

- Provide students with a certified and qualified Algebra instructor and with a high quality Algebra I curriculum
- Provide the uncertified classroom teacher with opportunities to extend his understanding and skills to teach Algebra I and with support needed to facilitate the in-class algebra learning experiences of the students
- Provide the uncertified teacher with professional development opportunities that will support their efforts toward math certification

Louisiana Algebra Online Model

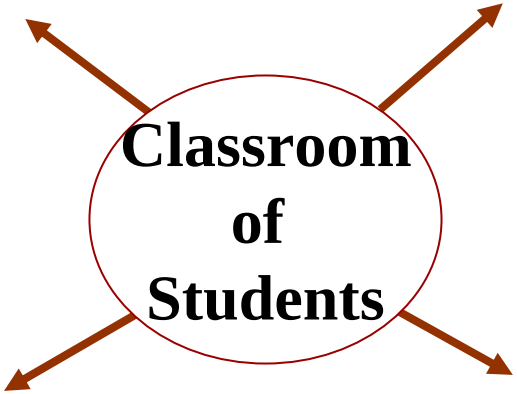
- Students meet as a face-to-face class
- A highly qualified certified algebra teacher online has primary responsibility for student learning
- An uncertified teacher in the classroom supports student learning, facilitates and monitors in-class activities, and collaborates with the online teacher
- A specially designed interactive technology-based curriculum
- *The Louisiana model uses online learning to bring highly qualified mathematics teachers to students in places where they would not be otherwise available, while still providing the structure and the opportunities for hands-on activities, collaborative learning, and in-class mathematics discussions found in good Algebra I classrooms.*

Algebra I Online

Course Structure

LCET: **Coordination, Curriculum, Training, Administration**

Districts/Schools: **Technical Infrastructure and Support, Teacher Release Time**



Online Teachers: **Yearlong Online Instruction, Credit, Grades, Training**

In-class Teachers: **Onsite facilitator, Training, Math Certification Path**

Algebra I Online Program Support

- Multiple **professional development** requirements and opportunities for participating teachers:
  - 4 week summer online course for classroom teachers, 4 week summer online course for online teachers, 2 day face-to-face orientation meeting for all teachers, content based course for graduate credit
- **Curriculum** developed by the Louisiana Center for Educational Technology (LCET) and the Louisiana School for Math, Science, and the Arts (LSMSA) and aligned to NCTM and Louisiana state content standards
- **Course delivery** via BlackBoard and includes use technology based learning activities, Key Curriculum Discovering Algebra Textbook (supplemental text, also available electronically), TI-83 graphing calculator, Calculator-based laboratories using probes and sensors, Graphire 2 digital tablets

LEAP 21 State Results 2004-2005 (Preliminary)

Grade 8 LEAP 21	Algebra I Online Students	Louisiana Statewide Results
Advanced	17.0%	2.0%
Mastery	24.2%	5.0%
Basic	54.0%	44.0%
Approaching Basic	3.6%	22.0%
Unsatisfactory	1.2%	27.0%

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The Research Questions

1. **Student Achievement:** How does the mathematics learning of students in the Algebra I online classes compare with students in traditional algebra classes?
2. **Classroom Implementation:** Is the Algebra I online class implemented differently in different classrooms? Are there relationships between the way in which the course is implemented and the effectiveness of student learning?

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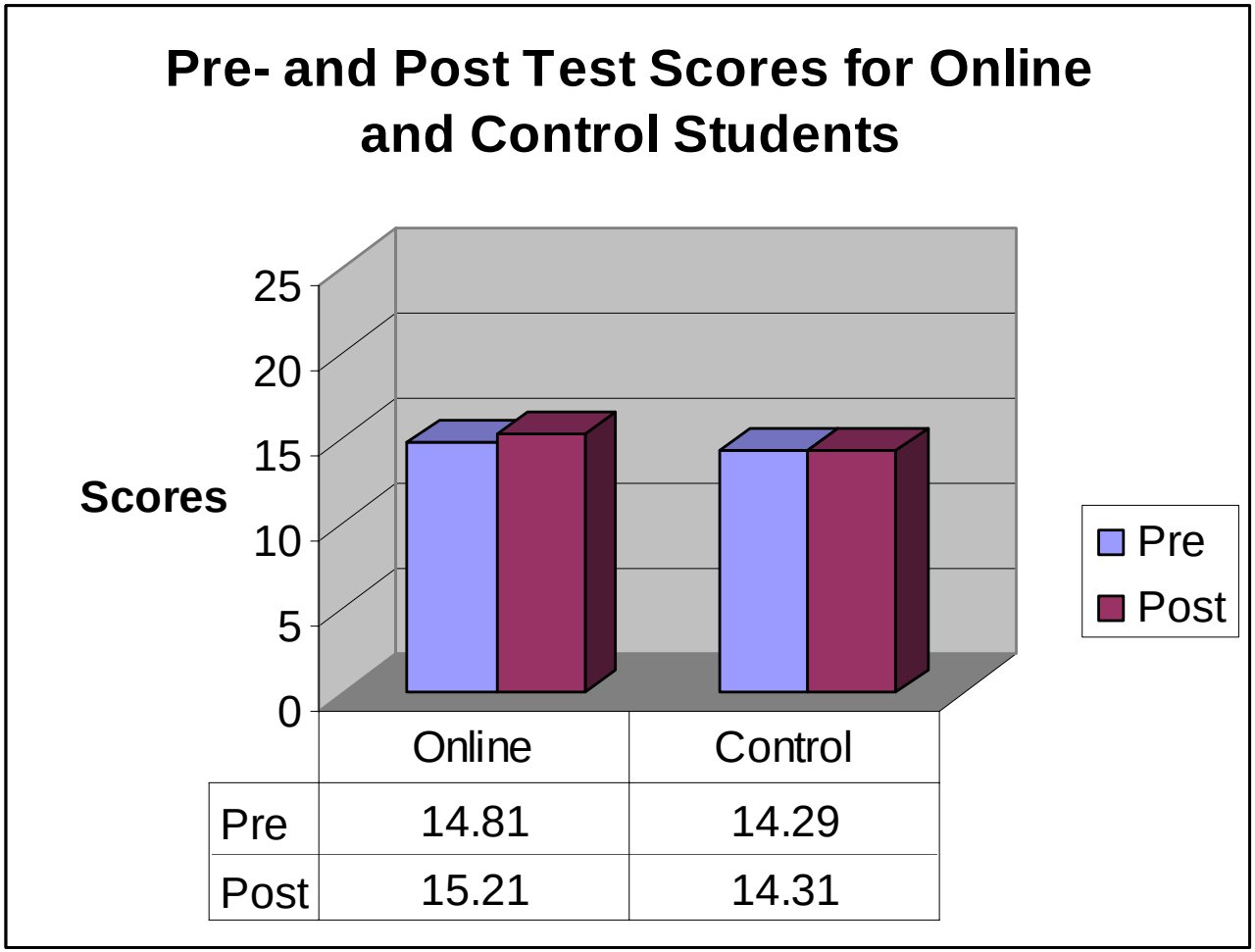
Research Design

- Quasi-experimental design created by the LCET team in the beginning of 2004/2005 school year for internal evaluation purposes
- Districts directed to identify matching control group classes on student demographics and pre-course mathematics performance
- Control groups received “business as usual” Algebra I course
- Selection of control classes may not have been entirely adequate for research purposes (individual districts made the determination about the control classes)

Extensive Data Collection

- Students
  - Pretest
  - Post-test
  - End-of-year online survey
  - Louisiana standardized test
  - Demographic data
  - Course grades and course attrition rates (online only)
  - Classroom observations (online only)
- Online and In Class Teachers
  - Teacher characteristics survey (also included control teachers)
  - Teacher Survey
  - Classroom observations
  - Telephone focus groups

Student Achievement: Pre-test and Post-test Scores Treatment group showed larger gain than the control group, p< 0.05



	Online	Control
Pre	14.81	14.29
Post	15.21	14.31

Linking student learning to classroom practice

- Positive correlations between student post-test scores and:
  - online teacher's belief that their school and district provided adequate support (r=0.61)
  - Both online and in-class teacher's perception of student level of interest (online r=0.60, in-class r=0.53)
  - frequency of online teachers' level of communication with in-class teachers for planning assignments (r = 0.58).
  - The frequency with which online teachers reported spending time grading students' assignments and homework and reviewing course material (0.55 and 0.49, respectively).
  - Time in-class teachers spent working with small groups of students and observing students as they work (0.33 and 0.24, respectively).

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What did students like most about Algebra I Online?

- 72%: using technology to learn math
- 69%: working with other students
- 59%: the new experience
- 45%: the activity days
- 33%: challenging material
- 31%: having two teachers
- 24%: pace of the course

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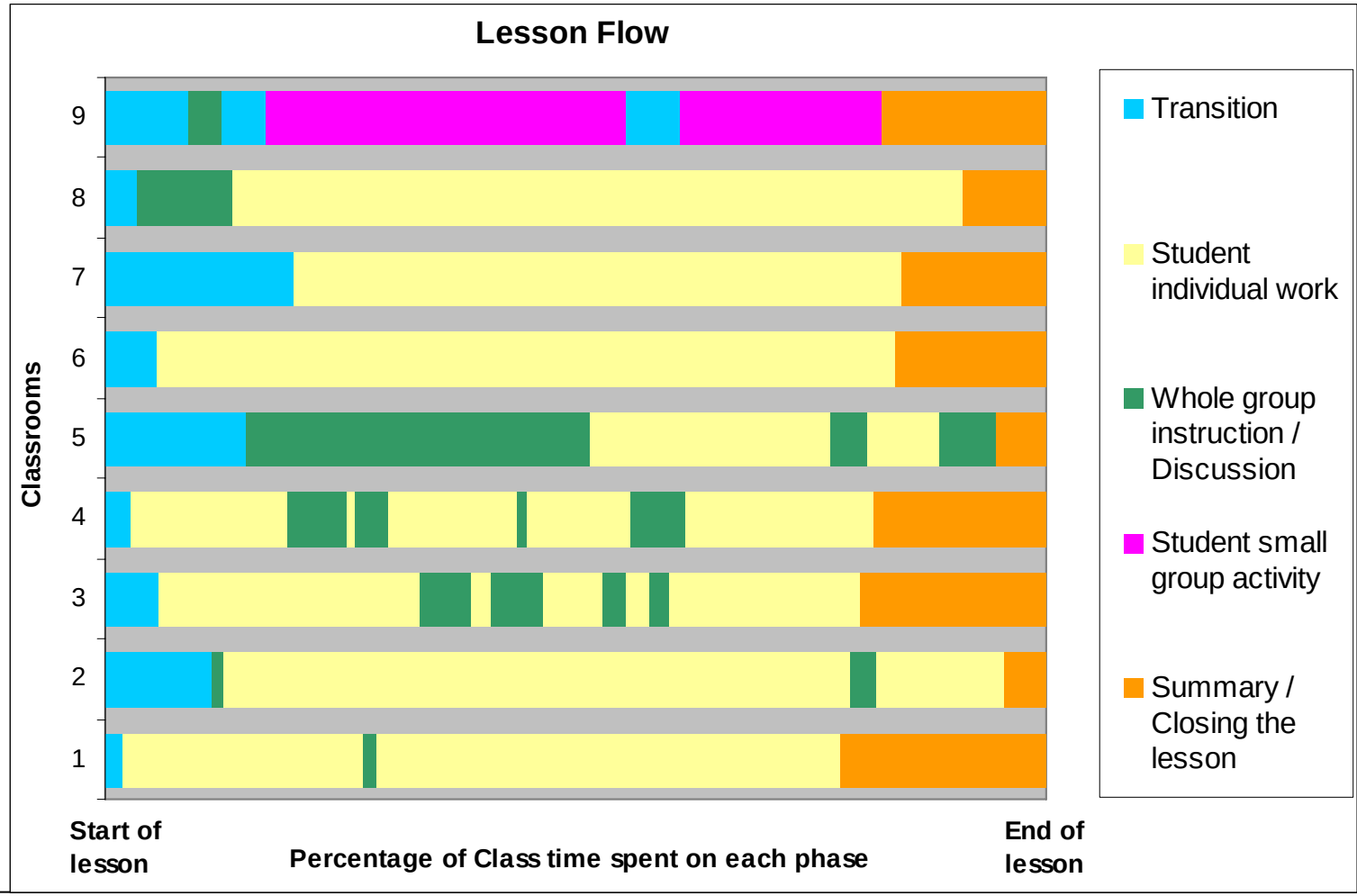
Student to student interactions

Under what circumstances did you interact with other students?	Online	Control
To talk about the math in the course	**84.0%**	**68.0%**
To talk about technology	55.9%	Not asked
To socialize	62.4%	64.1%
To understand assignment directions	71.4%	67.7%
To work together on in-class assignments	70.9%	70.1%
To work together on homework	55.9%	51.5%
To work together on activities	**86.9%**	**60.9%**

Almost all classes had students working individually for a majority of time with some additional instructional strategies incorporated



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Conclusions

- Algebra I online is a viable approach when a certified mathematics teacher is not available locally
- The course is implemented very differently in different classrooms
- Student satisfaction is not as high as desired
  - Lack of in-class teaching
  - Inadequate interactions with online teacher
- Course design can be improved
  - Better defined, more active role, for in-class teacher
  - More interaction of online teacher with students
  - Clearer expectations for roles of both teachers and how they collaborate
  - Improved use of interactive technology tools
- Impact on professional development of in-class teachers was not examined in detail.