

Alternate Forms of Course Delivery

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AMS Workshop for
Department Chairs and Leaders

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Important questions for different modes of delivery

- What are the pros and cons?
- Do these methods work at all levels?
- How is technology used and why?
- Do students learn?
- What faculty training is needed?



The discussion is interesting at all levels, but I will emphasize introductory mathematics.



Course Delivery

- Face to Face (Traditional Lecture)



$$\begin{aligned} P &= (7, 12, 10) \\ Q &= (8, 8, 1) \\ R &= (11, 3, 9) \\ \|\vec{QR}\| &= \sqrt{1+16+} \\ &= 7\sqrt{2} \end{aligned}$$



Course Delivery

- Online courses





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Search ID: rma0280

"You don't have to worry about my future any more
— I just downloaded an entire college education."



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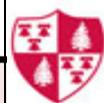
Course Delivery

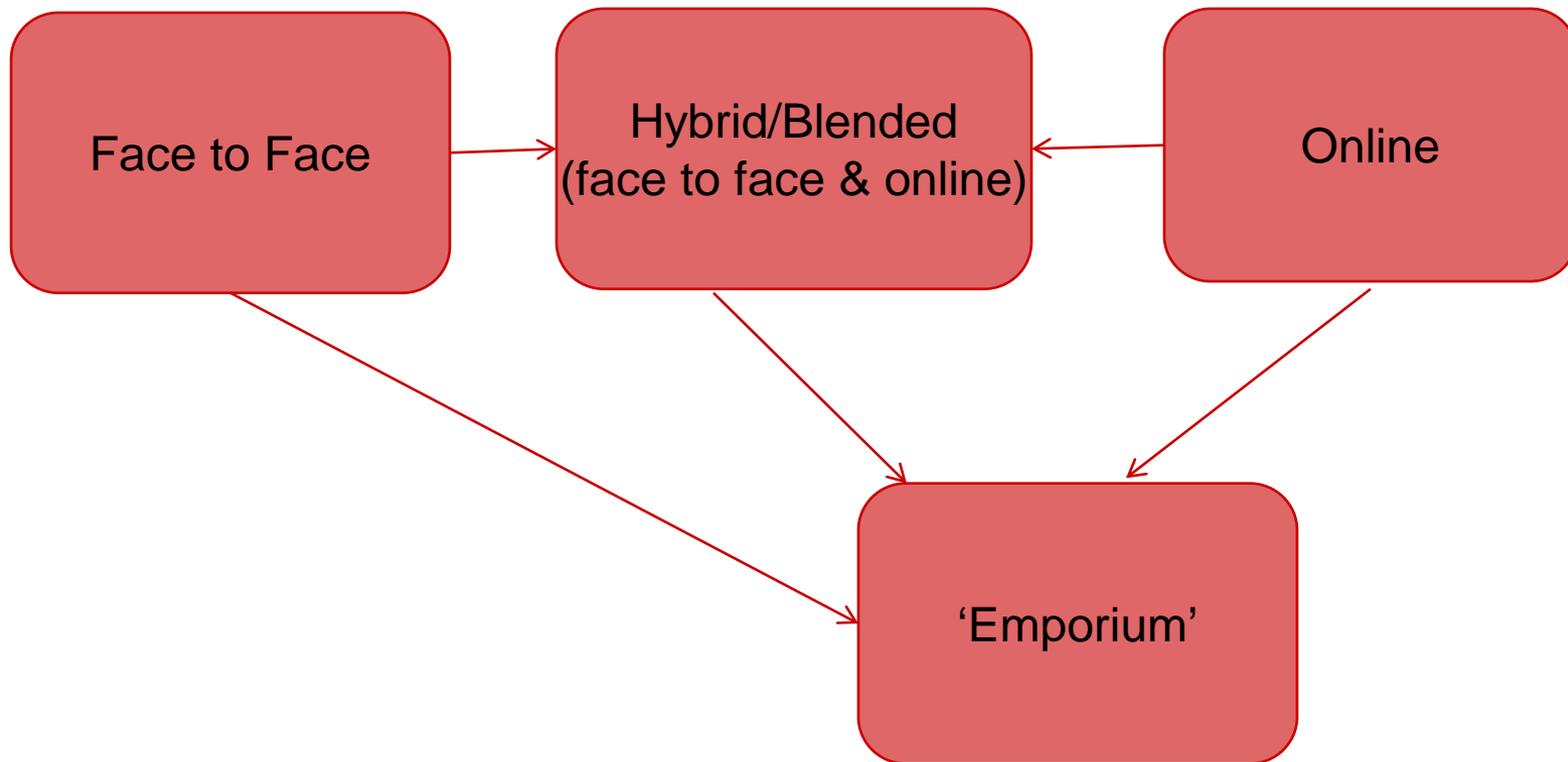
- Hybrid Courses (Blended Learning)



Course Delivery

- Math 'Emporium'





Going the Distance:

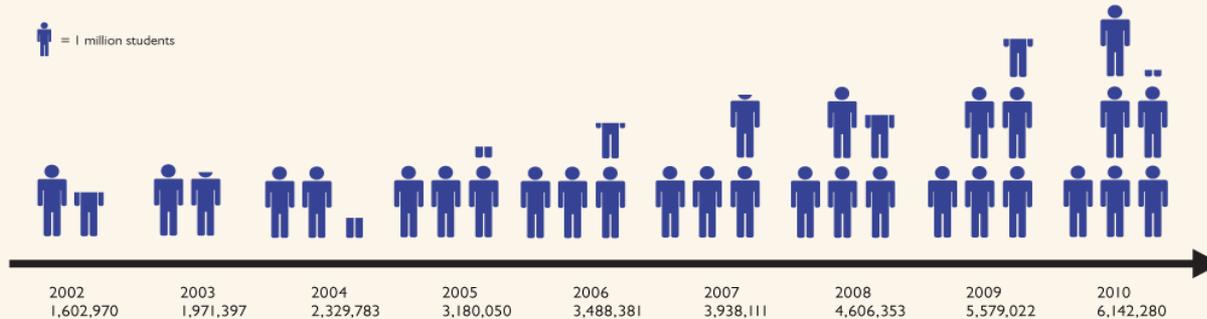
Online Education in the United States, 2011

Survey of Chief Academic Officers by I.E. Allen and J. Seaman, Babson Survey Research Group
 Infographic created by Pearson Learning Solutions



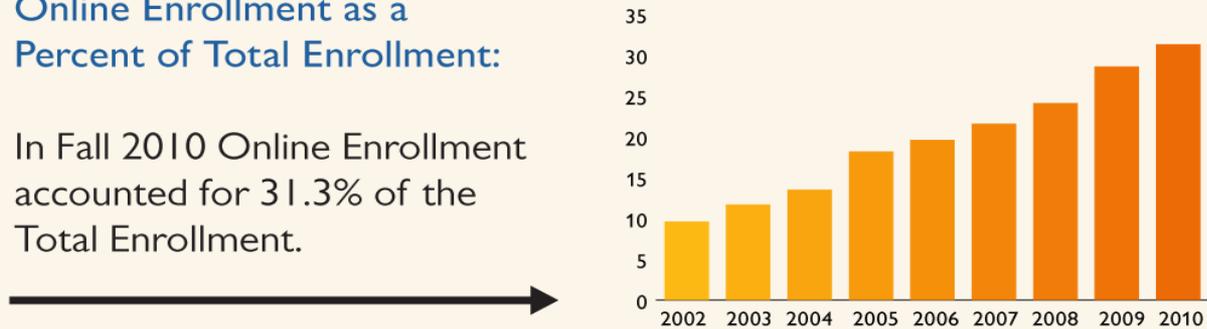
Number of Students Enrolled in At Least One Online Course:

 = 1 million students

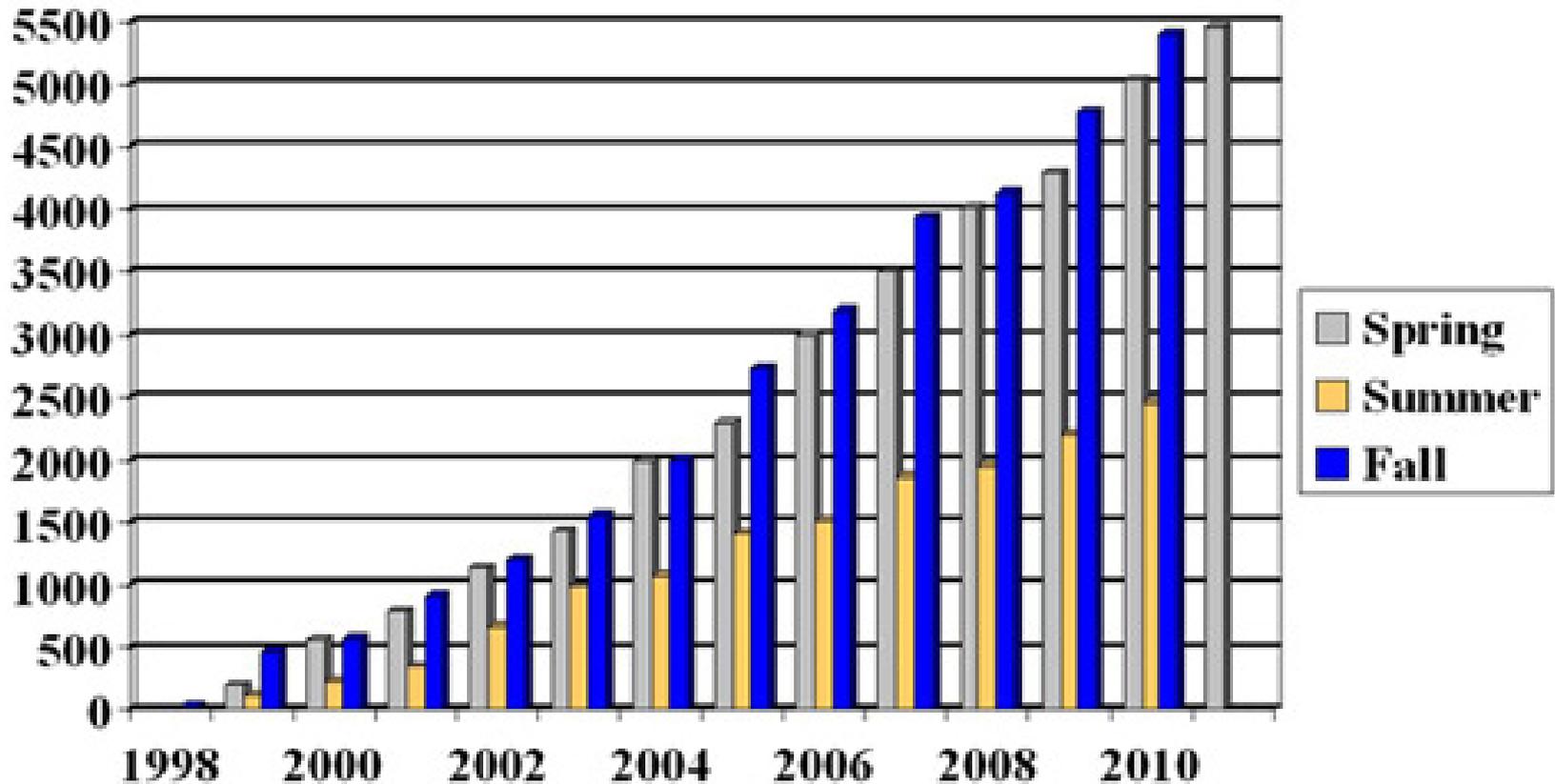


Online Enrollment as a Percent of Total Enrollment:

In Fall 2010 Online Enrollment accounted for 31.3% of the Total Enrollment.



University of Illinois, Springfield Growth of online and blended learning



Online Education Critical to Long-Term Institution Strategy:

Since 2002, the number of CAOs who believe Online Education is critical to the long-term strategy of their institution has shown:



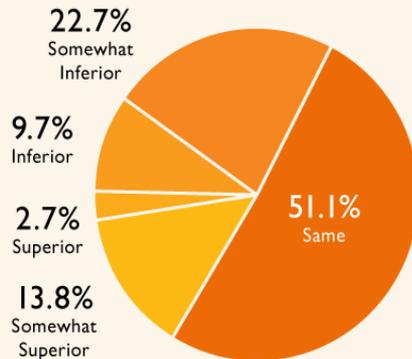
Which types of institutions believe Online Education is critical to the long-term strategy?

Public Institutions...
are largely in agreement of online education's crucial role to their long-term strategy.

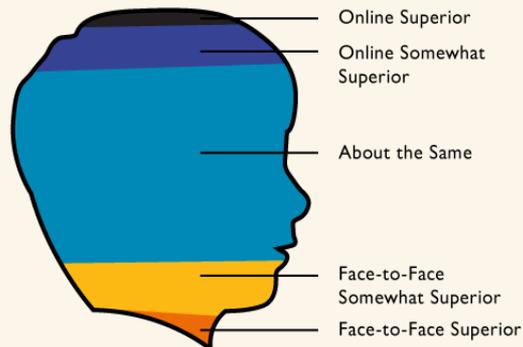


CAO Assessment of Learning Outcomes: Online vs. Face-to-Face

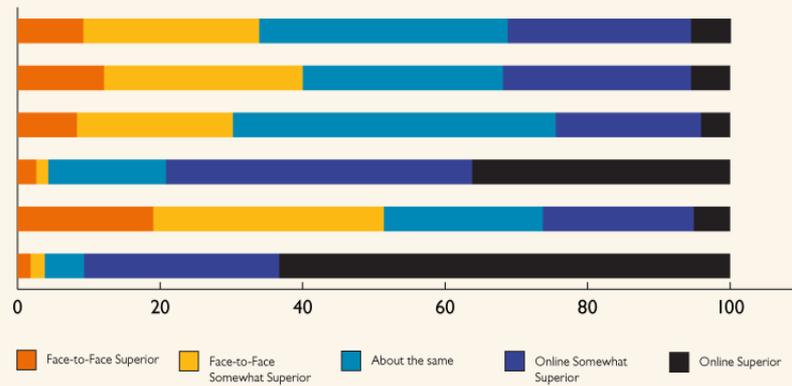
CAO Satisfaction with Online Education:



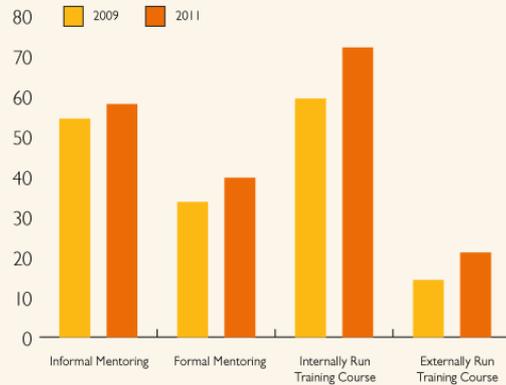
CAO Perceived Student Satisfaction of Online Education:



- Support for students with different learning styles
- Student-to-faculty communications
- Presentation of course material
- Ability of students to work at own pace
- Student-to-student interactions
- Scheduling flexibility for Students



Types of Training Provided for Faculty Teaching Online:



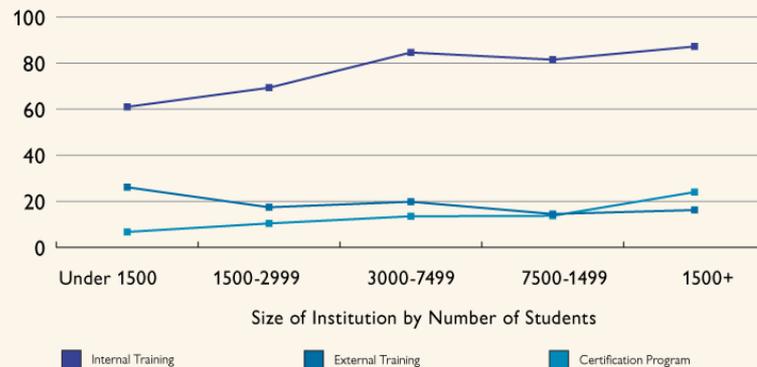
72.0%...

of training for faculty teaching online is through internally run training courses.

87.2%...

of training at institutions of 1500 or more students is through internal training.

Types of Training Provided for Faculty Teaching Online by Size of Institution:



Online Courses

Discuss at your tables and report back

- What are the pros and cons?
- Do these methods work at all levels?
- How is technology used and why?
- Do students learn?
- What faculty training is necessary?
- Other issues you would like to bring up.



Pros - Online Courses

- No commuting: save time, save travel cost, no child care
- Continue working: if asynchronous do the work any time (can work and go to school), flexibility in time to work/access from anywhere
- Easy access to course material/everything is there; instructor more accessible, quick answers to questions/help available 24 hours
- Geographical location not an issue
- Learn at your own pace and study when it is convenient



Pros - Online Courses

- OK to express yourself in writing (shy about speaking up)
- Student involvement can be greater - few lectures
- Instruction can be individualized
- Allows more time to think before answering questions
- More peer/class interaction, more personal or meaningful communication
- Non-threatening atmosphere
- Learn to be more focused, self motivated, independent or disciplined
- Fits learning style of some people



Pros - Online Courses

- Can retain anonymity. Discriminating factors such as age, dress, physical appearance, disabilities, race and gender are largely absent. Focus of attention is on content of the discussion and the responses to the discussion.
- No worry about how to dress



Cons – Online Courses

- Requires too much **self-motivation, self-discipline, time-management and organization** to take the course and keep up
- May have to pay for high-speed communication
- Directions and/or discussions can be unclear and can be more difficult or confusing
- Difficulty keeping up with due dates
- Students can experience isolation/detachment from the school
- Lack of immediate feedback or help
- Too many distractions & interruptions; hard to focus on work



Cons – Online Courses

- Lack of face-to-face, personal or social contact with instructor and classmates
- Lag time for discussion (with peers and instructor) can be an issue
- Computer comfort level/technical problems
- Does not work for auditory learners
- Feelings of being incompetent, inferior, stupid, inadequate, overwhelmed or confused
- Limits certain types of instruction (modeling, demonstrations, spontaneous interactions)
- Group activities online can be awkward



Cons – Online Courses

- Depends on how good the facilitator is
- Too time consuming
- The technology delivery system may not be reliable
- The campus technology may not be able to support the needs for the course
- Standards for course development, design, and delivery may not be in place
- Technical assistance for faculty as they develop the course may not be in place



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Cons – Online Courses

“Baxter, I’m doing an online course in delegating and I want you to sit the exam for me.”



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Online Learning: Does it work?

Do students learn?

- “Many studies have been conducted regarding online learning. Some authors report that online learning can be very effective depending on the subject, *although perhaps, in courses where problem solving is required, such as science or math courses, face-to-face instruction or at least synchronous chat with the instructor may be preferred over asynchronous, online learning.*”*
- Very few studies have been done.
- Results of studies are contradictory.
- Interpretation of studies can be inconsistent.

*Wilson and Allen – Research in Higher Education Journal



Online: Does it Work?

- Deep learning vs. surface learning
- Success rates
 - Does the proportion of D, F, WD decrease? (various studies report that this increases)
 - Does the proportion of A, B, C increase?
 - Retention rate (various studies report that this decreases)
- Motivated vs. Unmotivated Students?
- Do students complete their work on time?
- Students need to be able to work independently without face to face contact



Online: Does it Work?

- Expectation that instructor (tutoring center) is available by e-mail (or Elluminate) to answer questions a lot of the time



Certain Groups do Notably Worse Online. Some Studies Claim:

- Hispanic students online fell nearly a full grade lower than Hispanic students who took the course in a face-to-face class.
 - Might be attributable to missing the body language of the lecturer and other classroom cues, which could be more important to a student whose native language is not English.
 - In online courses students lose the ability to ask an immediate question in class, during breaks or right after the lecture



Certain Groups do Notably Worse Online. Some Studies Claim:

- Male students did about a half-grade worse online, as did low-achievers, who had college grade-point averages below the mean for the university
 - The time-shifting convenience of the online course made it easier for students to put off viewing the lectures and to cram just before the test
 - Female students tend to be better than males at time management, spreading their study time over the semester.



Online: Does it Work?

- Students are more likely to fail or withdraw from online courses than from traditional courses.
- The difference in success rates (online vs. face-to-face) was bigger for remedial English and math classes than other subjects.
- A study by Teachers College, Columbia tracked 51,000 community college students in Washington State for 5 years and
 - found that those with the most online course credits were the least likely to graduate or transfer to a 4 year institution.



Online: Does it Work?

- Between 2004 and 2009, they found an eight percentage-point gap in completion rates between traditional and online courses.
- A comparable study in Virginia yielded similar results
- Students discover that online courses are harder than face-to-face ones, not easier. Online courses require a tremendous amount of self-discipline and no small amount of academic ability and technical competence. Online courses may not be for everyone.



Online: Does it Work?

- Students who were employed for more hours and students who had demographic characteristics associated with stronger academic preparation were more likely to enroll in online courses; however, students who enrolled in hybrid courses were quite similar to those who enrolled in a purely face-to-face curriculum.



University of Central Florida

(from Distributed Learning Impact Evaluation)

Who takes online courses?

- Fall 2011 over 27,000 students enrolled in one online or video course. 6,000 students took only online classes.
- The majority of students (75-80%) who enroll in fully online courses on the campus are also enrolled in face-to-face courses.
- The distribution of students by ethnicity is the same for fully online, hybrid/blended courses, and comparable face-to-face courses
- Fully online courses consistently have more females



UCF- Distributed Learning report

What do students say about online courses?

- The majority of students (79%) take fully online courses because of the convenience of not coming to campus.
- The majority of students in fully online courses report that they are satisfied with their experience (85%) and would be positive about taking another fully online course (89%)



UCF - Distributed Learning report

- On the average, students who enroll in fully online courses are older than those who enroll in hybrid/blended or comparable face-to-face courses
- Roughly half of students who take fully online courses are working full-time,
- Eighty to ninety percent of students who enroll in online or hybrid/blended courses have computers at home.



UCF - Distributed Learning report

Student success and withdrawal from online courses

- On the average, **fully online courses** have slightly **lower success rates** (percentage of students obtaining an A, B, or C) and **higher withdrawal rates** than **either their face-to-face or hybrid/blended counterparts**
- By way of comparison, on the average, **hybrid/blended courses** have **higher success rates** (percentage of students obtaining an A, B, or C) and **lower withdrawal rates than their comparable face-to-face courses**



UCF - Distributed Learning report

- Females typically have higher success rates and lower withdrawal rates in all modalities (fully online, hybrid/blended, and face-to-face sections)
- The best predictor for determining success in online courses, when comparing across departments, modalities, and gender, is department
- Students withdraw from online courses for a variety of reasons, with the most reported reasons including technology issues, an underestimation of the amount of work required for course completion, and personal conflicts.



UCF – Distributed Learning report

Faculty Issues

Who teaches online courses?

- The majority of faculty teaching fully online or hybrid/blended courses at UCF are male (61%), and the majority are tenured (54%) or in non-tenured positions (19%). Twenty-six percent of faculty are tenure-seeking. The average age of online faculty is 50, ranging from 32 to 67 years. Many faculty are veterans to UCF with the average time at the university being 13 years, ranging from 1 to 32 years.



UCF – Distributed Learning report

Faculty Issues

What do faculty say about workload?

- Faculty, including those who are considered “Web veterans,” overwhelmingly indicate that a course with online components requires more time in both development and in weekly administrative duties than a similar course delivered face-to-face.

What do faculty say about class interaction?

- The majority of faculty indicate that more interaction occurs in their online and hybrid/blended courses than in their comparable face-to-face sections. They also indicate that they feel this interaction is of higher quality than what they typically see in face-to-face.



UCF – Distributed Learning report

Faculty Issues

Faculty perceptions of teaching on the Web

- More than 80% of the faculty indicate they are satisfied with their experience teaching online or hybrid/blended courses. They also indicate that they would be likely to teach an online or hybrid/blended course in the future. When examining components that are related to faculty satisfaction, the amount and quality of interaction are the only significant correlates. The additional workload does not appear to affect faculty satisfaction significantly.



UCF – Distributed Learning report

Faculty Issues

- Positive aspects of online teaching cited by faculty include structure and time convenience, increased student outreach and contact, personal satisfaction, availability of expanded research tools, improved course management, and the ability to learn new technologies.
- Challenges of online teaching cited by faculty include dealing with technical problems, having students not attuned to their responsibilities, and lack of student engagement.



UCF – Distributed Learning report

Faculty Issues

Faculty advice for success

- Eighty-seven percent of UCF faculty surveyed indicated they have changed their approach to teaching as a result of their online teaching experience. The changes reported included responding more to student needs, changing their course development and delivery, incorporating technology into teaching, modifying their time management, and utilizing an increased amount of resources in their courses.



UCF – Distributed Learning report

Faculty Issues

- When polled for what advice they would give to faculty considering teaching an online or hybrid/blended course, faculty indicated that preparation was crucial to success, and stressed the importance of faculty attending to their mental health, getting support, and knowing technology. Finally, faculty should be prepared to spend more time on their online course – it is a fact of life!



Online: Some Things to Think About

- We need to think long and hard about which courses should be taught fully online, and which students belong in online courses.
- Which courses should be taught using the hybrid/blended model?
- Which courses should be taught using the face-to-face model?
- How do we create a good online course? Talking head? Hybrid? Use the online component when it makes sense?



Online: Some Things to Think About

- Critics worry that online courses are less rigorous and more vulnerable to cheating, and the emphasis on providing credentials for specific jobs could undermine the traditional mission of encouraging critical thinking. What can we do about this?



Article in The Chronicle of Higher Education (May 22, 2011)

- “...isn't it time that we had an honest national conversation about online learning? With countless studies showing success rates in online courses of only 50 per cent—as opposed to 70-to-75 percent for comparable face-to-face classes— isn't it time we asked ourselves some serious questions? Such as: Should every course be taught online? And should we allow every student—or any student who wishes to—to take online courses?.... What is in the best interests of students academically?”
- What other questions can we add to this?

One Thing to Think About

- Require students to take an assessment of their readiness for online instruction. Software companies now market products designed to determine, up front, whether students can handle the workload, the pedagogical approach (heavy on reading in some disciplines), and the technical demands of the online environment. Some of those products have shown promise.



Another Thing to Think About

- Faculty need training on online pedagogy



Hybrid/Blended Courses

- Students enrolled in hybrid courses at UCF have the highest success rate! These rates are higher than face-to-face courses and higher than online courses.
- Both 100% face-to-face courses and 100% online courses are inferior to hybrid or mixed courses.



Hybrid/Blended Courses

- For some students and subject matters, the most effective mix will be as much as 90% face-to-face and only 10% online.
- For other situations, the most effective mix will be as much as 90% online and 10% face-to-face.
- Per UCF research, usually the optimum mix will be between 90-10 and 10-90.



Learning Mathematics

Discuss at your tables and report back

- How do introductory mathematics students learn mathematics?
 - By listening to instructors?
 - By doing homework problems?
 - By watching someone present solutions to problems?
 - By working in a group?
 - Other?
- Which of the modes of instruction (face-to-face, hybrid/blended, online) best achieves each of the ways of learning mathematics you have identified?



Learning Mathematics

How do students best learn mathematics?

- Face to face lecture – passive learners, watching someone do problems
- Doing homework problems
 - turning in problems - returned by the instructor in a week
 - Meet in a recitation led by a graduate student who grades and reviews problems
 - online grading systems (WebAssign, MyMathLab) provide instant feedback and online tutorials



Learning Mathematics

- Many instructors feel that students learn math best by doing mathematics.
- How do we accomplish this best?
 - Face-to-face?
 - Online?
 - Hybrid/Blended?



Learning Mathematics

- Evidence suggests that hybrid/blended courses might be a good alternative – they combine the best aspects of face-to-face and online instruction



Math 'Emporium'



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Math 'Emporium'

- Perhaps for some courses (non-major mathematics – introductory mathematics) a “Math Emporium” with a face-to-face component might be the way to go for many courses.
- This is a hybrid/blended course that incorporates technology to enhance delivery.



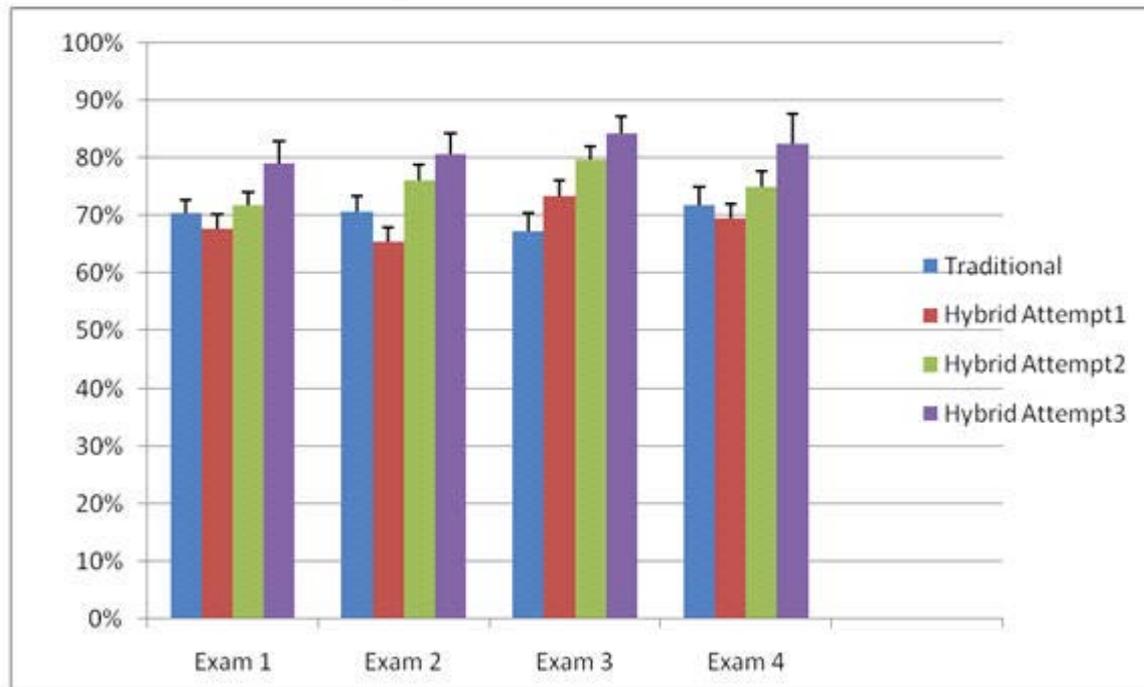
Math 'Emporium'

- Technology can create homework, quizzes, and tests by generating problems algorithmically, thus leaving time for one-on-one interaction with students
- Instructional software packages – which include interactive tutorials, videos, computational exercises, practice problems – can support auditory, visual and discovery-based learning
- Technology exists that can be used to minimize time consuming “busy work” like taking attendance and grading



Math 'Emporium'

- There are variations in how Emporiums are run
- One very interesting approach is Mastery Learning. Students must achieve a certain grade to move on to the next topic or take a quiz three times in order to enhance learning:



Why 'Math Emporium'?

- “Students learn math by doing math, not by listening to someone talk about doing math.” “The primary reason many students do not succeed in traditional math courses is that they do not actually do the problems. They generally do not spend enough time with the material, and this is why they fail at a very high rate.” Carol A. Twigg – President and CEO, National Center for Academic Transformation (NCAT)
- In a 'Math Emporium' students become **Active Learners rather than Passive Learners.**

Why does the Emporium Increase Success? Carol Twigg's answers:

- Students spend the bulk of their course time doing math problems
- Students spend more time on things they do not understand and less time on things they have already mastered. More individualized.
- Students get ***on-demand assistance*** (sometimes referred to as “just in time”) when they encounter problems in doing math



Math 'Emporium'



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Why does the Emporium Increase Success? Carol Twigg's answers:

- In a traditional class students spend most of their in-class time listening to someone talk about doing math. Virginia Tech Emporium students spend most of their in-class time doing math, working with instructional software.
- The 'Emporium' does not reduce the interaction between students and instructors. There is more interaction time between students and instructors and it is more meaningful, more individualized, and more focused.



Why does the Emporium Increase Success? Carol Twigg's answers:

- There are proven methods of integrating technology and learner-centered pedagogy
- Personal on-demand help is always available and is given more than in a face-to-face setting.
- Attendance is often required. Get points (course points) for attending. A study at the University of Alabama based on 3,439 students showed:

86.6 % no effect	4.5% increased + (B to B+)	0.5% allowed them to pass
1 % did not pass	7.3% decreased - (C to C-)	



NCAT's Recommendation for Success of 'Emporiums'

- NCAT suggests course redesign for large enrollment introductory courses – result is improved learning
 - Redesign the whole course (all sections)
 - Use instructional technology (where it is helpful)
 - Reduce cost (use course coordinator, graduate students and peer tutors)
 - Modularize the curriculum



Success in 'Emporiums'

- **Virginia Tech** – started with a linear algebra course: All online, no face-to-face. In the first iteration of the course, overall performance on a common final was similar to that of the face-to-face format
 - The percent completing the course (D or better) went from 80.5% to an average of 87.25% (in the 1st four Fall semesters it was offered).
 - There was a 37% cost reduction on average
- Other 'Emporiums' have made modification to require attendance (fixed time, flexible time or fixed/flexible time) and some face-to-face time (focus group)



Success in 'Emporiums'

- **University of Alabama** – 1500 students take Intermediate Algebra – nearly 60% of the students earned D, F and W grades (often took the course 2 or 3 times).
 - In the redesigned course the total # of A and B grades was significantly higher than in the face-to-face sections.
 - In Fall 1999 (face-to-face) 40.6% of students earned C or better
 - in 2003 (Emporium) 78.8% received C or better.



Success in 'Emporiums'

- **University of Alabama**

- In the follow up course the students who took the 'Emporium' version out-performed the face-to-face group.
- Cost went down 30%.
- African American students were more successful in the 'Emporium'.



Success in 'Emporiums'

- **University of Idaho** – structured learning activity in the Polya Learning Center (PLC) – just-in-time assistance and once-a-week focus group.
 - Intermediate Algebra % grades of C or better increased from 50% to 75% in the PLC.
 - Precalculus C or better increased from 68% to 75% in the PLC.
 - Faculty preparation time went down while the interaction time went up.
 - Hispanic success rate increased in PLC.
 - Cost reduction about 31%



Success in 'Emporiums'

- **University of Missouri-St. Louis** – algebra redesign
 - success rate (grade C or better) went from 50% to 80%
 - reduced cost by 30%.
- **Louisiana State University (LSU)** 4,900 students take College Algebra – Emporium with a once-a-week focus group (face-to-face).
 - Success rate (grade C or better) went from 64% (5 prior years) to 75%.
 - Drop rate went down 6%.
 - Cost savings was 36%.

Success in 'Emporiums'

- **Alcorn State University** ~ 600 students college algebra
 - the average score on the mid-term and in all face-to-face class was 55.89 after the emporium it was 66.16.
 - Cost savings 34%
- **Mississippi Valley State University** ~ 500 students in Intermediate Algebra
 - Percent earning C or better went from 36% to 49%.
 - Cost savings 24%

Success in 'Emporiums'

- **University of Central Florida** more than 4,100 students in College Algebra.
 - Rate of C or better went from 65% to 74% (mean exam grade went from 63% to 80%).
 - Cost savings was 30%
- **Santa Fe College** 2,760 students in Intermediate Algebra
 - Grade of C or better on a common final exam went from 59% to 78%.
 - Cost savings was 26%



Why the Emporium?

- Whole course redesign – **everyone** learns the same material. Consistency in content, coverage, assessment, grading and pedagogy for all sections.
- Students do math
- Technology is utilized to help in the delivery and the management of the course (attendance, grading etc) [ALEKS, Hawkes Learning Systems, or MyMathLab]. Attendance software AccuTrack.
- Success rates (A, B, C) increase while F, D, WD grades decrease.



Comparisons

Face-to-Face

Lecture format – treat students as “one size fits all”

Some students are bored while others are overwhelmed

Emporium

Diagnostic assessment – individualized study plans possible

When students understand, they can move through quickly and demonstrate mastery

When students get stuck, they can take more time to practice



Comparisons

Face – to – Face	Emporium
Must admit in front of others they do not understand	Individualized help
No assistance available when doing homework	Instant feedback from software
Hand-graded homework often returned days later when no longer motivated	On-demand help from Emporium instructors/helpers
	“Mastery learning”: achieve a certain grade before moving on.



Comparisons

Face – to - Face	Emporium
May or may not go to class	Required to go to Emporium
May or may not do homework	Required to do homework
May or may not ask questions	Given course points for completing all required activities
May or may no go to office hours	Help whenever the Emporium is open



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