

eLearning Sandbox Review Update: Spring 2014

**Student Achievement in Flexible Learning Environments**  
**(as titled in the IRB)**

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## INTRODUCTION

The justification, explanation of the project, and brief literature review were previously discussed in the Fall 2013 report. Therefore, this paper will only discuss the findings of the Spring 2014 data.

## METHOD

In the spring of 2014, four faculty fellows were trained in the use of the technology in the flexible learning environment (FLE) and the ideas of the flipped learning model. Training took place prior to the start of class. Changes in training were minimal. Instructors were encouraged to give all surveys during the face to face class time to improve data collection this semester. Training on the updates to the learning management system was not needed and it was deleted from the agenda.

The students completed a pre-experience and post-experience survey. The pre-experience survey was a pre-assessment in order to determine what experience the students had in similar environments. The post-experience survey, along with class averages, was used to shape this final report. Instructors gave feedback at the midterm and end of course through interviews and surveys. Some of that information is included here as well.

## RESULTS

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### RESULTS BY COURSE

The four courses studied in the FLE were Pre-Calculus Algebra (M 152), Developmental Writing (WRIT 095), Introduction to Organic and Biological Chemistry (CHEM 123), and Becoming a Successful Student (COLS 103). Data was collected from the final grades in all courses except M 152. In M 152 the grade calculations were based on the final exam in each section.

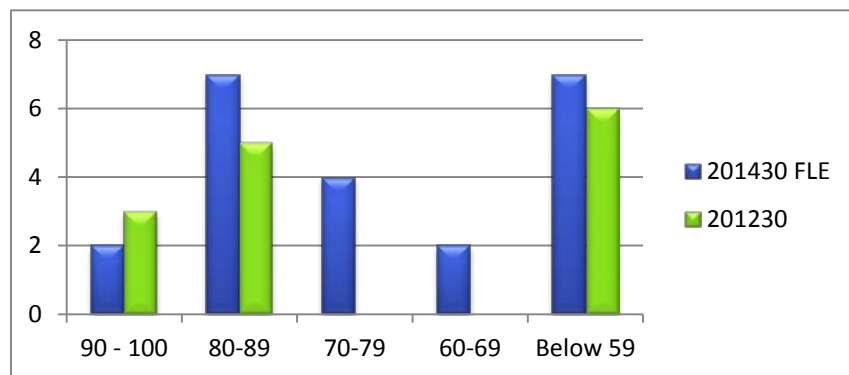
Looking at minimum and maximum scores in Table 1, there is no significant difference in any of the courses. In three of the four courses, improvement can be identified.

Table 1: Comparison of Flexible Learning Environment (FLE) Class to Standard Class

Course Name	Semester and Code	Min %	Max %	Median	Average	Standard Deviation
Developmental Writing (FLE)	WRIT 095 201430	0.23	94.41	77.32	61.95	33.10470742
Developmental Writing	WRIT 095 201230	0.22	97.07	84.625	58	39.24345814
Intro to Organic & Bio Chem (FLE)	CHEM 123 201430	84	97.43	94.5	92.5	4.492752636
Intro to Organic & Bio Chem	CHEM 123 201270	65.3	97.16	90.23	88.5	8.087282424
Intro to Organic & Bio Chem	CHEM 123 201330	63.45	94.93	86.5	84.8	9.103435034
Intro to Organic & Bio Chem	CHEM 123 201370	81.43	98.12	94	92.4	5.177649611
Becoming a Successful Student (FLE)	COLS 103 201430	9.73	100	89.25	71.3	32.37308042
Becoming a Successful Student	COLS 103 201330	10.5	99.62	86.51	73.7	28.72004292
Becoming a Successful Student	COLS 103 201370	11.04	99.5	91.27	79.6	26.74458891
Pre-Calculus Algebra (FLE)	M 152 201430	63	108	86.75	84	13.69827935
Pre-Calculus Algebra	M 152 201330	45.63	100	74.38	73.2	16.39810732

In Chart 1 below, Development Writing shows a broader grade distribution in 2014 than in 2012. According to the instructor, the students scoring below 59 in both sections were reported as also having poor attendance. The increase in the class average for this course from 58 to 61.95 is not a large difference, but can be marked as an improvement.

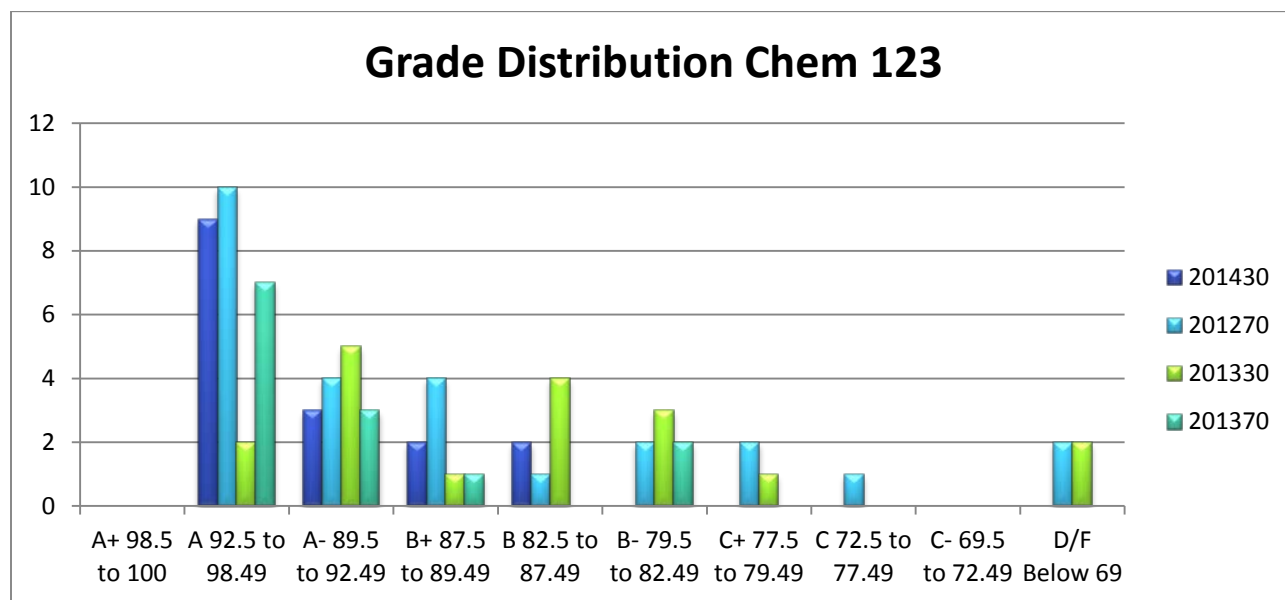
Chart 1: Grade Distribution for Developmental Writing Comparing Spring 2013 and Spring 2014 Final Grades



The instructor in Development Writing commented in her final survey that she started off the semester with “quite a few ideas... but I do believe that I fell into old habits as the semester went on, taking less advantage of the space than I would have liked.” (Ruggiero, 2014) The instructor has been chosen to work in the flexible learning environment again in the fall of 2014.

In Introduction to Organic and Biological Chemistry (CHEM 123), the improvements in student learning were not statistically significant. However, the shift in the grade distribution shows a definite change in student learning as seen in Chart 2 below. The instructor began making changes in his course in the fall of 2013, the semester before he taught in the Flexible Learning Environment. He began using the online tutorials and student centered learning philosophies in the fall and the data above in Table 1 shows that this had a more dramatic impact on student learning than using the flexible learning environment. The addition of the flexible learning environment provided a slight increase but nothing statistically significant. Chart 2 below shows that all students in the spring of 2014 passed with a minimum score of a B.

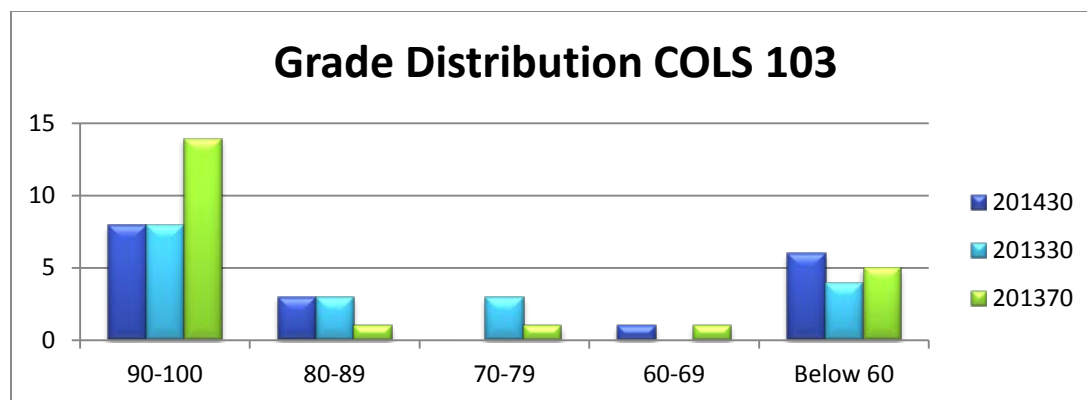
Chart 2: Grade Distribution for Introduction to Organic and Biological Chemistry Comparing Final Grades



During the mid-term interview with the instructor, he mentioned that the, “New design seemed to encourage students to “take charge” of how they were learning the content – i.e. this helped to break down the “invisible” barrier that keeps students from fully engaging with the instructor and other students in the class” (Casmier, 2014). His students also commented that it took some time to adjust to the space and new model, but in the end, they learned more in this class than in previous traditional classes. “It was hard to get used to the sandbox at first, but after a couple of weeks it was nice. I felt that it helped me learn better than the normal type of classroom.”

Becoming a Successful Student (COLS 103), did not show a significant change. As seen in Chart 3 below and Table 1 previously, the data is quite similar between all three sections. Table 1 shows a drop in the Mean Score from 79.6 to 71.3 from Fall 2013 to the Spring 2014 semester.

Chart 3: Grade Distribution for Becoming A Successful Student Spring and Fall 2013 and Spring 2014 Final Grades

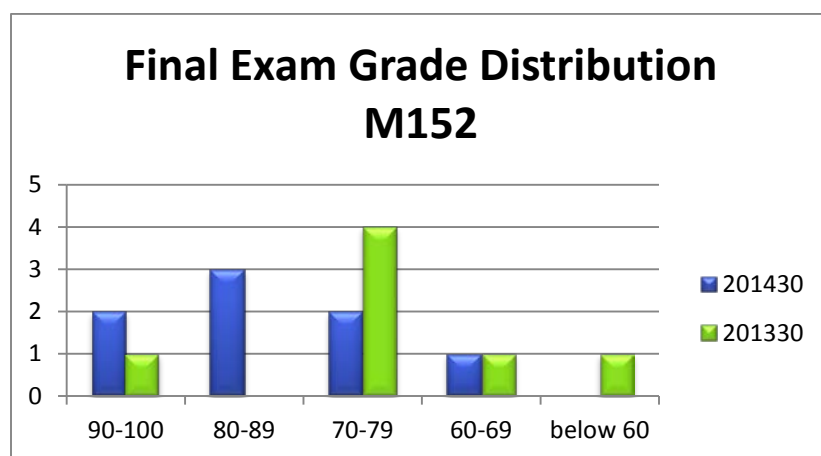


During her midterm interview, the instructor share that she signed up for the Sandbox classroom not only because of the technology available, but also because she had such a negative experience teaching COLS 103 the previous semester. She hoped that a change of scenery might make a difference for her as well as her students. She was happy to report that the room exceeded her expectations. According to her, “it was invigorating after a bad experience”. The technology was a true benefit to the classroom, but the biggest

difference was the size of the room. She loved that the classroom was intimate, and students were forced to talk to each other, due to the close quarters of the room, and many students were able to form relationships that existed outside of the classroom. Students were able to work in groups, have small discussions, and collaborate without any issues.

In M 152, overall grade distribution improved in 2014. The instructor and eLearning chose to compare final exam scores instead of overall class averages due to the manner in which the instructor changed the course. When the instructor adopted the flipped model and implemented the concept workshop style of class, the only assessment that remained the same was the final exam. Therefore, they agreed that it was best to compare this tool instead of the overall grade calculations. The median score on the final increased from 74.38 to 86.75. The class average on the final exam improved from 73.2 to 84.

Chart 4: Grade Distribution for Pre-Calculus Algebra Comparing Spring 2013 and Spring 2014 Final Exam Grades



Instructor and student comments agreed that the change in teaching made a difference: “I think that the Concept Workshops went well. Students had a chance to really work together and make the best use of the classroom time. The flexibility of the Sandbox classroom allowed me to make class time student centered and helped the students gain the most from their classroom time.” (Flood, 2014) Student comments included one that was very insightful; “I thought it was cool how we could all write our work on the wall and everyone could see it and we could see what other people were doing if we were stuck. We were able to learn from each other instead of doing our homework at home. In reality, it

was like we didn't just have one teacher, but many because we all had different ways of doing things that helped each other catch onto the material.”

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#### STUDENT SURVEY RESPONSES

In the exit survey, the team asked students to share the best experiences as well as recommended improvements. When asked about their best learning experience, students responded:

“Working out problems on the "walls" with everyone’s input.”

“I liked that it was interactive and also that it was more casual.”

“I like the hands on part of the class I learn better when it’s right in front of me being explained and drawn out.”

“Getting feedback from people that could show a different perspective on the same thing.”

Students were asked how classes or the space could have been improved. They responded with the following:

“Larger room, more space”

“Longer class period to accommodate for technology lapse and more time for lecture and examples.”

“The "flipped" style was helpful to me when there were videos on D2L that corresponded with the reading done in advance of lecture. I did not find the flipped style as helpful when there were no supplemental materials to review other than the reading before class.”

“The laptops were really slow connecting to the internet.”

Many of the COLS 103 responses included that the course should be changed to an entire semester instead of just eight weeks. This is one comment that a student in this course made; “The ON COURSE class should be a full semester, instead of half a semester. I personally believe that the ON COURSE class is a needed course for many of the students to become more aware of who they are and what they can do to better themselves.”

All responses from students agreed (36:0) that the flexible learning environment met or exceeded their expectations.

When asked if the FLE along with the mixed mode teaching model improved their learning, 25 students responded that they agreed or strongly agreed that it had improved their learning of the material. Six students were neutral on this topic and only five students felt that the FLE and mixed mode teaching did not improve their learning.

The survey also asked students whether the FLE increased their desire to attend class. In response to this question, three students responded that it did not increase their desire to come to class, 15 were neutral about it, and 20 responded that it increased their desire to attend.

They were asked a similar question about if the mixed mode teaching model increased their attendance. Four students reported that the model did not improve their attendance. Fourteen were neutral and 20 students reported that the mixed mode of teaching improved their class attendance.

When asked if the students felt the instructor was prepared for class, two students were neutral on the topic and the rest of the responses were positive. Students felt their instructors were well prepared and ready to teach in the flexible learning environment.

The students were asked if the technology in the class was easy to learn and use. In response to this question, only one student felt the technology was not easy to use. Seven students were neutral. 27 students agreed or strongly agreed that the technology was easy to learn and use.

Finally, students were given an opportunity to add their own comments. The input from students ranged from students that really enjoyed the experience to those that did not like it. Of those that did not like the experience, most said that they prefer a more traditional teaching model, and that this mode of teaching and learning was more difficult. The following are a sample of some of those comments.

“It was harder for a non-traditional student like me to learn in this environment.”

“I didn't like the mixed mode model... it is helpful to have the instructor lecture on the subject. Self-study before class is not enough.”

“It is a good concept and could help a lot in some instances.”



“The walls should have been entirely white board paint so that there is more room to work.”

“I am agreeable with how everything had function and feel no need for change, or improvement is not necessary.”

## SUMMARY

The eLearning team began a project in the summer of 2012 researching flexible learning environments, and the use of a flipped teaching and learning model. This research led to a proposal and the creation of a flexible learning environment. The space is lovingly called the Sandbox at Great Falls College Montana State University. This Sandbox classroom was developed with two desired outcomes. The first outcome was to improve student learning and comprehension through the integration of technology and student interaction. The second outcome was to improve student learning and retention through the use of a mixed mode of teaching to include the use of a flipped learning model and online support. This report highlighted ways in which the team’s outcomes were met.

Classes taught in the flexible learning environment (FLE) in the spring of 2014 demonstrated an improvement either numerically or affectively. The data collected showed that the combination of the space and the teaching model work well together to increase student’s ability to retain information. The key to success in this space was definitely the instructors’ acceptance of changing the way the course was taught. The two courses in which instructors embraced the model showed a greater improvement in student learning than the two courses that where the instructors fell back into their previous habits. Teaching with technology or changing an environment is not going to truly improve student learning unless the teaching changes to better use the tools. The combination of these two elements combined was successful in the Sandbox.

**REFERENCES:**

Casmier, D. (2014). Survey: Post Sandbox Experience Survey for Instructors.

Dirksen, J. (2012). Design for how people learn. California. New Riders.

Flood, C. (2014). Survey: Post Sandbox Experience Survey for Instructors.

Ortega, E. (2014). Survey: Post Sandbox Experience Survey for Instructors.

Ruggiero, L. (2014). Survey: Post Sandbox Experience Survey for Instructors.

## DATA FROM STUDENT SURVEY

**Describe how much you agree with the following statement:**

**The flexible learning space (sandbox classroom) combined with the mixed mode model improved my learning.**

	Total
Strongly Disagree	1
Disagree	4
Neutral	6
Agree	11
Strongly Agree	14

**The flexible learning space (sandbox classroom) increased my desire to attend class.**

	Total
Strongly Disagree	1
Disagree	2
Neutral	15
Agree	12
Strongly Agree	8

**The mixed mode teaching model improved my class attendance.**

	Total
Strongly Disagree	0
Disagree	4
Neutral	14
Agree	12
Strongly Agree	8

**The instructor was well prepared for class.**

	Total
Strongly Disagree	0
Disagree	0
Neutral	2
Agree	12
Strongly Agree	30

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**The technology in the classroom was easy to learn and use.**

	Total
Strongly Disagree	0
Disagree	1
Neutral	7
Agree	11
Strongly Agree	16