

## **DCCCD Retention Best Practice Submission Form**

Across the district there are many successful practices that contribute to the retention of students. As the district begins to develop a greater emphasis on its retention strategy, all locations are asked to identify and submit information about successful retention programs and activities. Please complete the following information on selected practices.

College/Location: Richland College

The Retention Best Practice is primarily supported by what college/location area:

Instruction  Student Services \_\_\_\_\_ Administrative \_\_\_\_\_

Combination of areas: (Please list) can be used in any classes

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X 6363

Retention Best Practice Title: The Use of a Personal Response System (Clickers) in the Classroom

Retention Best Practice Area of Focus:

Math \_\_\_\_\_ STEM  Honors College \_\_\_\_\_ Other \_\_\_\_\_

Retention Best Practice Executive Summary: approximately 50 words (Please use additional pages for a detailed description)

Questions are embedded within PowerPoint lecture material requiring the students to use personal response systems or clickers to answer questions. Sometimes I will pose questions before going over material to get a sense of what they know. Other times, I cover class material before the questions. The clickers are carried to each of my classes, students pick them up (assigned at beginning of semester), and they are ready to answer the questions as they come up in lecture.

Please describe the evaluation measures utilized to support this initiative as a best practice.  
I compared individual lecture exam scores for 2 sections, as well as a final comparison of grades.  
The students completed an evaluation of the clickers (I have 3 semesters' worth of evaluations).

Provide a summary of the results, including data (such as trend lines over time) to show how it impacted retention and is a best practice. (see detailed writeup below)

Overwhelmingly, the students said that the clicker questions

- helped them understand class material better
- made them go back to look at class notes after getting a question wrong
- made the class more interesting

What would be needed to replicate the practice at other DCCCD colleges?

A set of clickers for classroom use.

Cost to implement this practice (financial and human):

Approximately \$1200 for one set (32) clickers plus a receiver.

**Please submit this form to Dr. Sharon L. Blackman, DCCCD Educational Affairs by October 24, 2008**

I compared 2 sections of microbiology, one section using clickers and one without. Both sections have collaborative learning activities, so I incorporated clickers into the activities, leaving the other section as just pencil/paper activities. In my PowerPoint lectures, I embedded about 12 or so questions for the semester—to be used as in-class points. In the non-clicker class, I used the same questions but without clickers. The advantages of the clickers are 1) immediate feedback to the students about correct answers, 2) a breakdown of how the class participants answered questions, and 3) and further explanation about the class material (if the class was split on answers, indicating confusion). The pencil/paper section turned in their answers on paper for points, but it might take me a few days to get them back to them: therefore, the students don't really get to connect a wrong answer with the explanation very well. Although I would go over each answer for a particular question in the pencil/paper section, I really had no idea how many people were clueless on the material.

I compared exam grades between the 2 sections, as well as final letter grades. I also gave a short evaluation to the class to get some feedback about the clickers.

	Exam 1	Exam 2	Exam 3	Final exam	Grades %
Biol. 2420-8001 CLICKERS	81.6	76.4	80.9	79	A 39.1% B 34.8 C 8.7 D 13 F 4.3
Biol. 2420-8002	82.9	77.4	79.5	78	A 19.2% B 53.8 C 26.9 D 0 F 0

Although I haven't done a statistical analysis of the grades, it looks like little difference in grades on exams. The 8002 section was right after lunchtime, not a great time for getting students' responses. However, I did not want to use the 8am section 8002 as my clicker class because of the tardiness problem for early morning classes. The clicker class had more A grades, but also more D and F grades. I had no previous Biol 2420 class at this afternoon time to compare this clicker section, for grade comparisons.

#### **Evaluation of Clickers – Biol 2420 Microbiology Fall 2007 (18 students)**

Questions were embedded in a few PowerPoint chapters, used in lecture sparingly. The receivers were assigned to each student, and points given for participation.

- The in-class questions helped me understand microbiology better.
  - Yes 16 88.8%
  - No 2 12.2%
- The use of clickers made the class more interesting.
  - Yes 18 100%
  - No 0
- The clickers were difficult to use.
  - Yes 3 17.3%
  - No 15 82.7%
- The clickers were a distraction from the class, making it more difficult to focus.
  - Yes 0
  - No 18 100%

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5. The immediate feedback from the clickers helped me to understand my misconceptions and misunderstandings of class material.
- Yes                               15     82.7%
  - No                                   3     17.3%
6. When I found that I had gotten the question wrong, I made a mental note or a mark in my notes so that I would understand the information when I studied for an exam.
- Yes                               15     88.2%
  - No                                   2     11.8%

Spring 2008 was very busy, and I really did not get to use the clickers very much (although Jo Blackburn was using them in chemistry for the first time). I did use them the last few weeks of class, in my Anatomy/Physiology class. My only evaluation of clicker use was student perception at the end of the course.

**Evaluation of Clickers – Biol 2401 Anatomy/Physiology spring 2008 (31 students)**

Questions were embedded in a few PowerPoint chapters, used in lecture sparingly. The receivers were anonymous, and no points given for participation.

1. Do clicker questions help you verify your understanding of the class material?
- Yes                               31     100%
  - Maybe/sometimes     0
  - No                                   0
2. When you found that you got the question wrong, did you then go back to the material to better understand it?
- Yes                               29     96.6%
  - Maybe/sometimes     1
  - No                                   1
3. Did you enjoy using the clickers?
- Yes                               30     100%
  - Maybe/sometimes     0
  - No                                   0
4. Would you prefer clickers questions be incorporated in class?
- Yes                               30     96.8%
  - Maybe/sometimes     0
  - No                                   1
5. Would you rather have the in-class points tied to the clicker questions instead of the clicker questions being anonymous?
- Yes                               12     44.4%
  - Maybe/sometimes     4     14.8%
  - No                                  11    40.7%
6. How many clicker questions would be helpful per class lecture?
- <3                                2     6.7%
  - 3-5                               23    76.7%
  - >5                                5     16.7%

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7. Would you pay \$15-\$20 for the receiver if the clickers were incorporated into a course you are taking (they can be sold back to the bookstore like a used book)?
- Yes 25 80.1%
  - Maybe/sometimes 1 3.2%
  - No 5 16.1%

For the summer I of 2008, I decided to go all out to examine the use of clickers in my anatomy/physiology class. Our textbook has extensive clicker question collections. Based on feedback from the spring (how many questions per class would you like to have as clicker questions?), I embedded about 4-6 questions per chapters, which would give about 3-4 questions per class period---a total of about 50 questions. In addition, I expanded my student perception/evaluation at the end of the semester.

Another thing added was the use of Bloom's taxonomy levels of questions. I presented a short section on Bloom's taxonomy, giving examples of questions that fit each level. In the PowerPoint lectures, I incorporated different levels of questions.

### **Evaluation of Clickers – Biol 2401 Anatomy/Physiology summer 2008 (20 students)**

Questions were embedded in every chapter PowerPoint lecture, used through the entire semester, almost daily. The receivers were assigned to each student, and points given for participation.

1. The in-class clicker questions helped me better understand the class material on a deeper level.

- True 17 100%
- False

2. When I missed a question, I would go back in my notes or book to go over it---so I did would understand the material when I studied for an exam.

- Most of the time 6 31.6%
- Some of the time 11 57.8%
- Never 2

3. I enjoyed using the clickers in class, and look forward to using them in other classes.

- True SOFTWARE GLITCH---NO ANSWERS REGISTERED
- False

4. Generally, we had about 2-4 clicker questions per class.

- This was just right 10 50%
- It was too many. 2 10%
- Needed more 8 40%

5. If I had to buy a clicker to use in a class (they could be sold back to the bookstore like a used book), the max I would pay would be:

- 10 17 65%
- 20
- 30
- Wouldn't buy at any price. 7 35%

6. The use of clickers made the class more interesting.

- Absolutely 9 50%
- Somewhat 7 39%
- Not really 2 11%

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7. The clickers were difficult to use.

- True 1
- False 18 94.7%

8. Immediate feedback from the clickers helped me to clarify my misconceptions and misunderstandings of class material.

- True 16 88.9%
- False 2 11.1%

9. The clicker questions were used as in-class points (1/2 point for each correct), as part of the overall grade (along with other types of in-class questions).

- The points awarded for clicker questions was about right. 11 55%
- The questions needed to be worth more points of the overall total. 3 15%
- The questions should be anonymous, and not used for points at all. 6 30%

10. Different question types (Bloom's taxonomy categories) challenge my understanding of class material.

- True 17 94.4%
- False 1

### **GENERAL THOUGHTS FOR THE 3 CLICKER SECTIONS**

Overwhelmingly, the students said that the clicker questions

- helped them understand class material better
- made them go back to look at class notes after getting a question wrong
- made the class more interesting

The majority of students (asked of the spring 2008 class who had anonymous receivers, and the summer class who were assigned clickers and points for the grade total) wanted points for their clicker questions. Published studies suggest 8-10% of the class total should be clicker question points (otherwise, the students don't tend to take the questions seriously).

One objection (1/3 of the summer class, 1/5 of the spring class) was the price of the clickers. The textbook publisher gives a discount for the PRS clickers, leaving the student to pay about \$15. This appears to be about the top end of what most students want to pay.

In my spring 2008 class, only 2-3 people had used clickers. In this summer's class, it was around a fourth of the class (most of this class had students home for the summer, off from their own universities).

Didn't see a huge difference in grades (this has been reported in many clicker studies), but the most positive result was the perception of the class (also shown in most clicker studies).

Pros

- Clicker questions are a good way of giving the students some time to think about what has just been covered, and to determine if they understand the material—immediately.
- Great to have immediate feedback to the students, and gives the instructor a much better and quicker picture of what is not understood. If 95% of the class got the correct answer, we moved on quickly. If the answers were spread out over multiple answers, it was obvious that we needed to spend some time on that topic again. The aim is to correct the misunderstanding at that time rather than find that they do not understand the material for a test later on (and probably the misconception would stay in their minds rather than be corrected).

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- One can use the clickers for individual assessment as well as involving groupwork (great for application or analysis questions). I would show the question and have them get an answer individually. Then I would give them the opportunity to get with another person or without a group, discuss the question/answer, and give an individual final answer with the clicker.
- The students like to use them. Immediately upon entering the room, the students would walk over to the clicker holder and get their own clicker.
- The instructor can post the clicker questions (along with the correct answer and class histogram results) in eCampus, or wherever (graphics at end of this report show printouts).

#### Cons

- There is a learning curve for the software. Making the questions (lots of texts have clicker question banks) and embedding them in PowerPoint is easy, but figuring out how to convert the grades into Excel and using that total in the larger class gradesheet is a learning experience.
- Sometimes a clicker would not be ready to send an answer to the computer receiver.