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Keynote 2: Student Choice (What Can Student-Directed Learning Look Like?)

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Technology Showcase

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Strategies for Taking Yourself "Off Stage"
(Teaching the Content Without Lecturing)

Joe Ruhl

Teacher Developed Study Guide

1.   Develop a study guide for the lesson.

Write your own study guide for your students to accompany a particular chapter in the textbook (to be filled out by students working in small groups). For example, a portion of the study guide might read as follows:

Read page 245 of the book and carefully study the chart/graph in Figure 18-1 on the page. Then write out your answers to the following questions . . .

After that, your study guide might continue as follows:

Now continue on reading pages 246 and 247 and then write out your answers to the following questions . . .

This interspersing the questions throughout a lesson (rather than waiting until the end of the chapter) can provide a way for you to have your students divide the chapter material into smaller "bite sized pieces." If you ask a question after 10 sentences rather than after 50 sentences, you increase the retention rate by 40% (Harry Wong).

Strive to write some questions that require higher level thinking. Such questions that probe higher into Bloom's Taxonomy are more challenging and require more critical thinking. In my experience, these kinds of questions serve as a sort of "glue" that holds the group together, making the group members more dependent on each other. The more challenging the questions are, the more the group discussions tend to be focused on the lesson at hand, increasing the on-task time of the groups and the quality of the interactions within the groups. On the other hand, if the study guide is simply full of knowledge or comprehension level questions, you will more likely see a group of three students who, even though sitting together at the same table, will quietly work as non-interacting individuals.

2.   Divide your class ahead of time into groups of three students each.

Carefully construct the groups so that each group is composed of an academically strong student, a poor performing student, and a student from the middle of the pack.

There are several reasons why I like to occasionally have students working together in small groups like this:

a. Students learn/retain . . .

10% of what they READ

20% of what they HEAR

30% of what they SEE

50% of what they SEE and HEAR

70% of what they DISCUSS WITH OTHERS

80% of what they EXPERIENCE PERSONALLY

95% of what they TEACH TO OTHERS

(William Glasser)

b. When we allow kids to work in groups we meet an important emotional need that they have. Students are social creatures (Remember – they're wired that way!) The more the students *like* what they're doing, the more they'll learn.

c. When students are acquiring the content in small groups settings with carefully designed, teacher developed study guides, it removes the teacher from "the stage." This frees the teacher up to move around the room, monitoring the groups' progress. As the groups are working, I will typically find the students in one group raising their hands, signaling to me that they are "stuck." As the other groups are humming along, I'm then able to sit down with the group (on *their* level) that has called me over, and respond to questions that *they* initiate. Such *one on three* teaching moments can be wonderful opportunities to tailor instruction to the students' specific needs, to coach, mentor, nurture, and inspire – things that are difficult to do when I'm up front and center.

Teacher Developed Study Guide that Accompanies an Interactive Website Rather than a Textbook Chapter

1. Develop a study guide for the lesson.

There are many on-line interactive websites that can be found for just about any concept or unit that you teach in your course. Write your own study guide for your students to fill out as they work through an interactive website that you have chosen (to be filled out by students working individually, or in pairs). Refer to the instructions in part 1 on page 1 of this document for details on how to write such a study guide. Most of the principles used in writing a study

guide that accompanies a textbook chapter will apply to writing one that accompanies a website. A portion of your study guide might look a little like this:

Go to the url _____.   Click on the tab labeled _____ and:

- Watch the video clip or,
- Study the chart carefully or,
- Read the section entitled _____ or,
- Work through the interactive simulation entitled _____.

And then write out your answers to the following questions . . ..

2.   Should the students work individually or in pairs?

If your school has a one-to-one program where each student is loaned a computer or tablet, you can have the students working individually while you float around the room monitoring the students' progress. Usually, I have preferred to have the students working in pairs because it encourages more interaction between students. Remember! Students learn/retain **70% of what they DISCUSS WITH OTHERS** and **95% of what they TEACH TO OTHERS!**

Teacher Developed Interactive Computer Tutorial

Some of us are more "geeky" than others! Over the years I have developed my own interactive, self-paced computer tutorials designed to take the place of my standard lectures. The motivation for doing this work (which usually happened during the summers) came from the creative pleasure that I derived from the work. It's a little like the joy that a writer might get from writing a book, a composer might get from writing a song, or an artist might get from painting a picture. I used a software program called Adobe Director to create the tutorials. Since I'm not a professional programmer, I used probably 1/10th of the manual that accompanies the software! But still, an amateur like me can create engaging interactive tutorials. Students often tell me that they like the computer tutorials more than my lectures!

When developing a computer tutorial, I take a lecture outline that I have traditionally presented and use it to storyboard the design for the computer program, to ensure that it covers the same content as the standard lecture. Because of the power of Adobe Director, even an amateur can create engaging interactive tutorials that incorporate text, graphics, video clips, sounds, animation, and various levels of interactivity. As the students work through the computer tutorials they are able to work at their own pace. I normally insert checks for understanding throughout the tutorial, to make sure the students are engaged. So as a student works through the lesson, periodically a question will pop up on the screen that requires the student to input an answer. If the student answers correctly, then he/she is allowed to continue on in the tutorial. If an incorrect answer is entered, the program loops the student back to remediation work in the tutorial before the student is allowed to attempt the question again before moving on. For each computer tutorial I have written a study guide that the student fills in while working through the lesson. The study guide then functions as the student's "lecture notes."

Recently, one of our building's computer techs informed me that Adobe is no longer supporting the authoring program Adobe Director (sigh). He said that Adobe has another product though, called Adobe Animate, that can also be used to create professional looking interactive tutorial programs. Guess I'll have to learn how to use Adobe Animate (another sigh!)

Building a Unit that Allows for Student Choice

Joe Ruhl

In 9th grade Biology I have divided the school year up into 2-3 week units (We operate on a block schedule where each class meets every other day for 92 minutes.) A student's grade in a unit is based upon accumulated points rather than percentages. At the beginning of each unit, the students are given a "menu" of all the learning activities on the "smorgasbord" for the unit.

(Refer to the handout entitled <u>Unit "Menu."</u>)

The students have the opportunity to choose which activities they want to do to earn their accumulated points towards a grade of D, C, B, or A for the unit. I have written the activities so that no matter what combination of activities a student chooses to do (or in what order), he/she will be able to master the required objectives for the unit. The students also know that there are more activities available on the "smorgasbord" than an A student would ever have time to do. This student choice takes into consideration differences in learning styles and increases student motivation (The kids love having the choices!)

(Refer to the handout entitled <u>Descriptions of Activities on a Typical Unit "Menu."</u>)

For each unit the students know how many points each activity is worth and how many days in class we will devote to the unit. It's exciting for me to see these freshmen learn to take charge of their own learning, set goals, assign themselves homework, and take an active role in monitoring their own progress. In each unit there are normally a couple of activities that are not optional but required. These are the computer tutorial and the test at the end of the unit. The computer tutorials have been a hit with the students. I have ten Apple computers spaced around the perimeter of the classroom/lab. Each computer has two sets of headphones allowing students to work through the computer tutorials in pairs. I have spent some summers using a powerful authoring program called Adobe Director to develop computer tutorials for each of the units. These self-paced programs contain text, audio, graphics, animations, video clips, interdisciplinary real world relevancy, and humor. I've written the tutorials so that they contain a high level of interactivity as students are frequently required to respond to understanding checks during the lessons. If the student inputs an incorrect response, then he/she is rerouted to a short remedial lesson in the program and must then respond correctly to the question before being allowed to move on. The highest level of interactivity involves virtual labs on the computer where students can click and drag objects around on the screen, performing simulations of labs that are not practical in a high school setting (For example, in the genetics unit the students are able to do an amniocentesis procedure on screen, culture the fetal cells in the medical lab, and perform a karyotype analysis to check the fetal chromosomes for abnormalities.) As the students work through the computer tutorials they fill out a study guide to record their notes. Students take a much more active role in their learning in this way, as opposed to sitting through a traditional whole class lecture. A visitor to my class on a typical

day would likely find some students on the computers working through the tutorial or working on a website activity. Some students might be seen with headphones in a corner of the room, watching a short video related to the unit while writing out answers to questions that accompany the video. Some students would be seen carrying out laboratory investigations. Some might be seen around an educational game board. A few students would likely be seen at the light stand, aquariums, or incubator tending to their ongoing science fair projects (The students are required to design and carry out a science fair experiment throughout the school year, which they then present at the regional science and engineering fair in the spring.) A few students might be seen organizing their course binders or thinking and writing reflection sheets designed for them to reflect on their learning, and self-evaluate their efforts. Many of the activities in each unit can be done in small, self-selected groups of 2 to 5 students. My advocacy of small group work is based in part on the research of William Glasser, which suggests that students learn 10% of what they READ, 20% of what they HEAR, 30% of what they SEE, 50% of what they SEE AND HEAR, 70% of what they DISCUSS WITH OTHERS, 80% of what they EXPERIENCE PERSONALLY, and 95% of what they TEACH TO OTHERS. As I move about the classroom it's exciting for me to hear students in their groups working without direct instruction from me, observing, exploring, testing hypotheses, puzzling through problems, applying or extending concepts and skills in new situations, analyzing data, and teaching one another. In short, these activities provide opportunities for students to probe the upper levels of Bloom's taxonomy as they engage in higher-level thinking. Last spring some teachers who visited and observed were amazed that "100% of the kids were on task 100% of the time in three consecutive 92 minute periods." For me, teaching this way is not only effective but it's fun. It allows me opportunities to informally sit down with a small group of students and respond to questions that *they* initiate. Students hand in the learning activities as they complete them and I grade them all before the next class meeting. Occasionally, on any given day, I find it necessary to pull the whole class together for the first 15 or 20 minutes to explain a concept that a significant number of students appear to be having trouble with (based upon the results of the previous night's grading). To a visitor the classroom may appear difficult to manage and juggle all of the activities, but it's a system that has evolved through years of experience, plus the fact that I have written most of the activities (during those summer months) helps me to keep things straight in my mind! Besides, the students love the approach. It helps them to see that science is relevant, has real world application, allows them opportunities to meet their social needs because of the group work, and is fun because of the hands-on, active nature of the learning experiences. Not long ago I smiled when I overheard a student in the hallway tell another student, "I love biology because we get to do stuff in there!"

Unit "Menu"

Unit **Cell Biology**   Name _____

Activity	Points Possible	Points Earned
1. *Cell Structure & Function* Study Guide (C)	10	_____
2. *Cell Membrane* Study Guide (C)	10	_____
3. *Cell Chemistry* Study Guide (C)	10	_____
4. How are Plant and Animal Cells Alike? (L)	10	_____
5. Amazing Cells (I)	5	_____
6. Cells Alive (I)	5	_____
7. Create a Cell (WB)	5	_____
8. The Cell Game (L)	5	_____
9. Immortal Life of Henrietta Lacks (WS)	5	_____
10. Cell Membrane and Osmosis (L)	5	_____
11. Building Models of Molecules (L)	10	_____
12. Yikes! Yeast!! (L)	10	_____
13. Some Cells of the Immune System (C)	3	_____
14. How the Cell Works (WS)	5	_____
15. Cells (V)	5	_____
16. Germs (V)	5	_____
17. Respiration (V)	5	_____
18. Understanding Viruses (V)	5	_____
19. The Cell – How it Works (V)	5	_____

Pgs. 190-194; q. 1-5
(iPad pgs. 338-346; q. 6-10)   3   _____

Pgs. 196-205; q. 1-5
(iPad pgs. 350-364; q. 6-10)   3   _____

Pgs. 208-213; q. 1-4
(iPad pgs. 366-374; q. 6-9)   3   _____

Pgs. 214-217; q. 1-3
(iPad pgs. 375-380; q. 6-8)   3   _____

20. 7.2 (WS)   3   _____

21. Reflection Sheet   2   _____

22. Arts & Entertainment   10   _____

    Binder   5   _____

    TEST   25   _____

Descriptions of Activities on a Typical Unit "Menu"

Joe Ruhl

The initials in the parentheses after many of the menu activities refer to the type of activity:

(C) = a study guide that the student fills out as he/she works through the interactive computer tutorial

(L) = lab involving hands-on materials and equipment

(I) = internet activity

(WB) = white (dry erase) board. In this particular unit the student is given a box of pictures of cell parts, labels, and descriptions of functions with a magnet glued to the back of each one. Working in groups of two or three they are required to construct a cell on the white board. When finished, I give them a short oral quiz about their cell.

(WS) = traditional worksheet

(V) = video with a sheet of questions they must answer while watching the video

Pgs. 190 - 194; q. 1-5 = Items like this on the menu are the traditional "read the pages indicated in the textbook and answer the questions on page _____ of the textbook"

Reflection Sheet = Students may fill out **ONE** of these per unit to reflect on **ONE** of the activities that they have done in the unit. **(Refer to the handout entitled Learning Activity Reflection Sheet.)**

Arts & Entertainment = **(Refer to the handout entitled Arts and Entertainment Suggestion List.)**

LEARNING ACTIVITY REFLECTION SHEET

Name _____

Title of Activity:

Summary **Paragraph** of the Activity (must be at least 5 sentences):

New Question that *YOU* Have as a Result of Doing the Activity:

Connection (Explain how one concept that you learned about in this activity is **LIKE** something else that you already knew about.):

SELF EVALUATION SHEET

Name _____ Unit _____ Date _____

Think about your work during the last and current unit. Read the statements below and check the category that best describes your performance.

	Always	Most of the Time	Some of the Time	Never
1. I contribute in group work.				
2. I put forth the effort to reach my goal.				
3. I am on task the entire period.				
4. I ask questions when I need help.				
5. I give up easily.				
6. I come to class prepared daily.				
7. I work carefully and thoughtfully.				
8. I study for unit tests.				
9. I keep track of my progress.				

ARTS and ENTERTAINMENT
Suggestion List

    Arts and Entertainment is a 10-point opportunity during each unit that allows students to use their talents in a nontraditional way that demonstrates understanding of a concept in the unit. Students are not limited to this suggestion list and any idea may be considered for points. If an idea is not listed below, please discuss it with the teacher before beginning the activity. Points are awarded based on quality of work and the amount of time invested in the activity. **Arts and Entertainment projects are to be worked on outside of class time and they will be presented near the end of the unit, the day before the test day. <u>A student's Arts and Entertainment presentation will be limited to 5 minutes or less.</u>**

    Students may demonstrate their understanding of a concept in the unit by:

        producing a video

        writing and reading a poem (original- authored by the student)

        writing and reading a short story (original- authored by the student)

        performing a dance

        writing and performing a skit

        making a model

        preparing a poster

        reading and preparing a summary of a current science event related to the unit

        designing a lab activity

        designing a game

        producing a comic strip

        playing a musical instrument