

## **Using “Orbitals” in Constructivist Classrooms**

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### **Abstract**

The author discusses five important tenets gleaned from years of experience teaching using constructivist theory: 1) care and respect for students, 2) formative assessment, 3) student choices, 4) classroom community, and 5) student voices. The use of “Orbitals” – student-chosen oral and written reports – are then discussed as one strategy that embraces all five tenets.

### **Introduction**

When students incorporate new information into the schemata already existing in their minds, they construct their own knowledge (Bruner, 1990.) A process occurs inside an individual’s mind whereby they connect their new knowledge with that which they already understand (Vygotsky, 1978.) Since the education community has known this information for decades why should we ask how teachers should go about teaching their students to use this constructivist theory to help them learn? Perhaps because classroom teaching in many, many schools still do not incorporate these ideas in practice (Kellough & Kellough, 2007; Ravitch, 2000; Sizer, 1984.) Also some teachers may not have the time or inclination to reflect on their actions nor to assist students to reflect on their learning (Osterman & Kottkamp, 1993.)

To demonstrate constructivism in the classroom I suggest that teachers consider five actions: 1) be respectful and caring of students (Noddings, 1984), 2) continually engage in formative assessment (Black & William, 1998), 3) provide

choices to allow for individual abilities and interests (Singer, 2003), 4) create a classroom community where students respect each other (Bigelow, 1994), 5) finally for the teacher to NEVER repeat a student's answer (Heckendorn, 1996.) The student or another student may repeat it, but not the teacher. This action supports each of the other four and has been one of my most successful teaching strategies in public school and college teaching. Let us look at each of these five recommended actions.

**1. Caring and respectful.** Learn the students' names immediately and use them often. Insist that students use each other's names as well. Look at students in the eye and listen carefully to whoever is speaking to the class. Insist that everyone attend to whoever is speaking. Students may repeat a student's answer but never the teacher. When teachers repeat the answers, they unintentionally undermine that student's voice. Without each student's voice, we cannot give them the respect, caring and encouragement to incorporate the new knowledge that is being discussed in class. This support helps to bolster students' self-esteem to take risks and be open to taking in new knowledge, adding it to their schemata to construct their own understanding (Bruner, 1990.).

**2. Formative assessment.** As each lesson progresses teachers should have students indicate what they understand in writing and verbally. This supportive strategy does not call for marking down grades, only trying to ascertain what needs to be better explained or reviewed. This approach requires that teachers talk less and listen more. Questioning techniques can get students involved in

responding to high level and some low level questions. As students talk and write about the content they reveal what they do and do not understand. Through question and answer, discussion, or written responses, students clarify, relearn, and demonstrate their understanding. This is the basic tenant of constructivism.

**3. Student Choices.** Not all students learn the same way nor do they have the same interests (Gardner, 1999.) It is a challenge to connect their concerns with the subject matter, but it is worth effort to help them make connections that make sense to them. Unless there is a pathway leading to each student's mind, that student will not be open to considering new experiences and opportunities to take in new information and content. Thus the person will not be able to attach the new information to the schemata already existing in their minds. As they exercise choices students feel empowered, get involved, and are more willing to take risks to learn something.

**4. Classroom Community.** A warm, successful learning environment is not simply a collection of individuals under the thumb of a teacher. To be a lively place of learning where students are actively involved (Dewey, 1938) teachers should strive to create a classroom community (Bigelow, 1994.) Within this caring community of students and teacher, members listen and learn from each other, fostering constructivism. All contribute. Time is not wasted because what each person says can contribute to the learning of all. The classroom management of a viable classroom community is maintained by each individual because each cares about the group and the individuals therein. Often a student will be able to

explain a difficult concept or problem better in “kid language” than the teacher can. As they take in new content that makes sense, students can construct their understanding as they are supported by others.

**5. Students’ Voices.** Whether the students volunteer answers to questions, ask question themselves, react to others’ remarks, or simply make statements, this verbal risk taking of revealing their thinking and understanding should be treasured and treated respectfully. Teachers should listen to, question, and perhaps react to (if no student can) what a student has said, but never repeat it. (After teaching for over 30 years in middle school, high school, and college, I have found that by not repeating a student’s answer the students’ participation in the classroom conversation is enlivened, enriched, and increased.) When a teacher repeats a student’s answer there is no need for the rest of the class to listen to that student’s voice. This is undermining and insulting, even though this clearly is not the teacher’s intention. Also, which student’s statement does a teacher repeat and which not? This teacher choice serves to undermine many students’ answers and self esteem. Some will learn not to bother with volunteering their thoughts. Teachers will want to encourage each student to actively participate in each lesson to get all the students to engage in constructing their own understanding of the content (Heckendorn, 1996.).

These five teacher-recommended actions and constructivism itself can all be subsumed under that large umbrella we call active student participation or active learning. Planning lessons that are rich in content and varied in student-centered

strategies allows the teacher to set the stage for a successful lesson that gets students involved. When the teacher cares about the students, is flexible enough to listen to them, and checks to see if they understand the material, the action in class will evolve around the students. Let us look at one teaching strategy that holds the potential of addressing each of the five actions discussed above to increase active learning and constructivism: “Orbitals.”

### **The “Orbitals” Strategy**

I assign Orbitals to all of the teacher candidates in the Fundamentals of Middle School course in hopes that they will try this strategy with their future classes (Stevenson, 2002.) The concept of Orbitals is an assignment whereby students create verbal and written presentations about a topic they choose. They are encouraged to share their enthusiasm for their topics as they speak extemporaneously for five minutes. Students research their topics and demonstrate the interdisciplinary connections with English, social studies, math, and science in their one-page papers that are posted on line for everyone in class to read. Each student will have demonstrated the ability to be an expert in one area that s/he can talk about in an informative manner. This enrichment activity aims to contribute to each student’s self-esteem and to a supportive classroom community where we respect and learn from each another. Each student becomes a source of content as each speaks about a topic of choice for five minutes. Every student in the audience is responsible to write about

something each learned and something positive about the presentation. The focus is on sharing, taking risks, feeling support, and learning from each other.

Having utilized this assignment for the past six years, teacher candidates reacted favorably to it because of what they learned as well as for the good feelings engendered. I ask them to consider incorporating Orbitals as a teaching strategy with their future Middle School students in their classes. Let us look at each of the five recommended actions as they relate to Orbitals as I have used them in my college class.

**Orbitals to Encourage Constructivism.** Since each student revealed a significant personal interest the rest of the class was touched and respected each presenter. Everyone seemed to care about each other more. Students' active participation increased enormously with questions, comments as they related to each other's personal experiences, or with great respect for having learned something important. There was immediate feedback provided from student to student. This superlative example of formative assessment enables the teacher to ascertain who has and who has not understood. The conversation proceeded unabated from student to student. Since each student chose the topic to present, it was based on students' choices. The richness of the variety of topics as well as the powerful motivation for students empowered everyone. The classroom community was enhanced as each person shared personal interests and obtained the respect of others. Some students liked the activity so much that they suggested doing it earlier in the semester. Others demurred because they would not have been comfortable enough before they had felt the beginnings of a

classroom community. I agreed. For some extroverts they could have done this immediately, but for most they require more time. The teacher has to allow the students to speak for themselves and react to the presentations. Orbitals allow each student to stand out and speak one's voice. As a facilitator the teacher's role is to remind everyone to take notes on the content and to be supportive presenter.

### **Summary**

To get students to construct their own knowledge and make connections with the material being taught in your class is an admirable and necessary goal for teachers. Teachers should consider five ways to make it more likely that students will become constructivist thinkers: show respect and caring, utilize formative assessment in every class, give students choices in as many assignments as you can as in Orbitals, create a classroom community where students respect each other, and try to never repeat a student's answer. We teachers can demand more of our students by planning lessons to set them free to interact intellectually within our classroom community. Respect and care for each. Take the extra time to plan for choices to involve all students. Listen carefully but never repeat students' answers. This will encourage greater student participation. The conversation from student to student should flow so that the teachers can listen carefully to engage in formative assessment. As students talk and write more, we get the chance to truly see if they understand. If they construct their own

knowledge they will better retain and utilize it. Creating a classroom nurturing a constructivist philosophy is well worth the effort.

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