Video #2 Chartres Cathedral Tone Poem and Animation

What Does Architecture Sound Like?
A musical exploration of Architecture

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This Arts Integration project engaged 12-13 year old students in a small, rural school in upstate New York in a multi-disciplinary exploration of a medieval cathedral. Instead of studying History, Math, Art History, and Music in separate classes, these students studied key curriculum concepts by analyzing the components of Chartres Cathedral and then expressing their knowledge through an original musical composition.

The School: The Mt. Morris Central School District has approximately 50 students per grade level and all grades, kindergarten through 12th grade, are located in a single school complex. The school population includes a large percentage of Spanish speaking immigrants, mostly from Puerto Rican heritage. The remaining students come largely from Italian and Irish backgrounds, going back several generations. This rural district strives to provide multiple opportunities to motivate students of many diverse learning styles. There is also a need to expose students to a wide variety of career opportunities that are not found in the immediate area.

The Project Design: Arts Integration is based on the interplay between two complementary strategies. Receptive Arts Activities invite students to learn lessons in Math, Science, History, and Language through existing works of art. All art making involves skills and knowledge in these areas, therefore, the artwork provides a springboard for the study of a wide variety of lessons. Expressive Arts Activities allow a student to synthesize their accumulated knowledge in a new work of art. Just as we ask students to display their knowledge in essays for standardized tests, we can also guide students through expressing their knowledge in scripts, musical compositions, paintings, dances, computer animations and more. In this project, students researched the history, math, science, iconography, and culture background to this medieval cathedral. They came together to share their research (therefore teaching each other new information), and then, with the guidance of teaching artist, they collaborated on the conceptual framework of a new musical composition that illustrated key points of their research. The composer assembled the student ideas into a rough draft and then it was edited by the students in several group sessions. The completed musical composition was then given to a computer animation artist. This animation allows the viewer to see the correlation between the chosen sounds and the corresponding components of the cathedral.

Animation Outline

1. **Pythagorus**- The piece opens with 2 A's, 2 B's and 2 C's played on bells with a triangle sound between each note. This represents the Pythagorean Theorem by transferring the letter names of the variables to the letter names of musical notes. The

triangle sounds between each note represent the operations symbols in the equation. This musical line continues for the entire piece and all the other musical lines are based on it. ***Students chose to build the entire piece around the Pythagorean Theorem, because medieval engineers built Chartres Cathedral around the theories and philosophies of Pythagorus. Since there was no standard system of measurement or a theory of physics in the Middle Ages, these engineers used mathematical ratios from Pythagorus to construct large buildings. Pythagorus derived these ratios from musical notes. The ratios that produced pleasing harmonies (1:2, 3:4, etc.) were the same ratios that created strong structures, by creating building materials of the corresponding dimensions. The decision to build the musical piece around the mathematics of Pythagorus, not only recognizes the presence of his philosophy in the design of Chartres Cathedral, but it also honors the fact that his mathematical theories were born of music.***

2. **The Four Biographers of Christ**- We see stained glass representations of Matthew, John, Mark, and Luke appear. A new musical line enters with each biographer that corresponds to the iconography in the artwork. Matthew is represented by a small boy in the artwork, so the students chose a gentle flute line to represent him. John is represented by an eagle, so the students chose a high, soaring piccolo part to represent him. Mark (lion) and Luke (bull) enter with powerful low notes representing their symbols. We see the four artworks travel to the four corners of the cathedral which reveals the cross-shape floor plan. ***Students chose this idea to show how a symbol of the religion is transferred into the architecture of its place of worship.***
3. **Columns/Flying Buttresses-** Descending and ascending musical lines meet in the middle to form the columns and flying buttresses. The music mimics the physics of these structures. The weight of the cathedral roof creates a downward force (descending line) that is opposed by the upward force (ascending line) of the column or buttress. The two musical lines meet and meet and play in harmony just as the actual forces meet with equal and opposite force. This is illustrated by the animation.
4. **Arches-** Trumpets enter, playing a melody that ascends and descends in the shape of an arch.
5. **Ceiling Spaces-** An organ enters in the background of the sound to fill in the sound, just as the animation fills in the spaces between the arches.
6. **Walls and Spires-** A swirling pattern of strings and percussion enter to represent the walls and spires of the cathedral. This sweeping musical line allowed the animator to give us a panoramic view of the cathedral that points toward the heavens. Notice that the string parts start low and swirl up to a high point to mimic the conical structure of the spires.
7. **The Heavens-** The piece transitions to the heavens by removing the large structural gestures of the percussion and low instruments. The piece gradually focuses more on high frequencies and diminishes into simpler musical lines. We hear three entrances by the harp, connecting to the many ways that the number 3 is used in the history of the church. The piece concludes with the original bell sound to ties the beginning of the piece to end. ***In addition to being an effective musical gesture, students wanted to show how the ideas of the ancient Greek philosopher were adopted and transformed into the medieval philosophy. The Pythogorean view that music, mathematics, poetics, visual art, and religion are all different expressions of the same truth and could be***

transferred from discipline to discipline, is expressed in this return to the opening musical motif.

Partnerships and Assessments
How can Assessments help to build a Partnership?

"Not everything that counts can be counted. Not everything that can be counted, counts." Albert Einstein

The dynamic environment of arts-based learning affects the instructional, social, behavioral, and institutional components of a classroom and a school community. As Einstein points out, measurement cannot be effectively applied to every affect and we shouldn't assume that just because something can be measured, that it should. Assessments are useful for improving the learning environments teachers create. Some assessments are also useful for reporting the progress of students, for the purpose of growing programs that are effective.

Assessment as a Development Tool- Good Assessment tools are vital because they…

1. Tell us if our work is effective.
2. Indicate the strengths and weaknesses of our team.
3. Give us leverage for future support by clearing displaying how our work meets state learning standards and other educational/social challenges.
4. If arts integration is framed well, it can provide test preparation.

We must be interested in both raising the level of inquiry in our work and, measuring the results. Here is a brief overview of a variety of assessment tools. Each assessment is capable of measuring some part of the project's impact on student achievement and teacher/artist skills.

Formative Assessments
attendence records, class participation, performance based assessments, etc.

Summative Assessment
school-based tests, state academic tests,etc.

Site-based Assessments
Action Research-Not pure research. This is internal study allows educators to answer their own questions about their work. Collaborative nature raises level of discourse that generates practical results.

Site-based management- Internal assessments and shared decision making have elevated the profession by including teachers and artists in key decisions. This process continues to help "professionalize" the field through self-evaluations.

1. Focus question- An informal conversation generates the initial question.
2. State your theory in the form of a specific research question.

3. Collect data focused on the research question-For example…pre/post survey, formal observations (frequency chart of student participation-verbal/cognitive, case study of several students- various achievement levels across several classes, quality of verbal responses-PNI-"Positive, Negative, Interesting" grid – double entry observation includes observation/comment. Triangulate the data by verifying data with several people or ask the same question in several different ways. This will increase the validity of your claim.
4. Analyze the data- show how multiple assessment tools-energize the joy of learning-reduce the data.
5. Report the results with maximum impact to the best audience (internally and externally).
6. Allow the results to affect your work-change for the better.

Now that we have explored these key concepts, let's move on to the mechanism of creating effective partnerships.