Creative Problem Solving Embedded into Curriculum

By Anna Cassalia, Old Donation Center School, VA

As educators look for strategies and learning mindsets to ensure students are equipped to fully thrive and succeed in society in this rapidly changing century, I can recommend the Creative Problem Solving (CPS) model developed by Trevilinger and colleagues (Trevilinger, Isaksen, & Dorval, 2000), which provides a framework to apply creative-thinking processes to solve problems. Embedded in the model are tools and strategies that, when placed in the hands of students, allow them to be engaged in a process for thinking both creatively and critically. When CPS is tied to curriculum, students are learning to think and thinking to learn, rather than being spoon fed information.

My colleagues and I have found opportunities in our curriculum for students in an academically gifted second-grade classroom to tackle real-world economic problems using the CPS model. Creative Problem Solving (CPS) is a framework for practical application in solving problems. Groups or individuals define the nature of a problem, generate creative and unique ideas to solve the problem, and use specific tools to focus on solutions. The CPS model is a framework that consists of three process components, six stages, and 10 tools. The actual problem will determine which components of the model will be essential to solve the problem. It is not necessary to do all components, stages, or tools all of the tools. The three process components are Understanding the Challenge, Generating Ideas, and Preparing for Action. Within each component are stages for problem solving and an assortment of tools that may be used throughout the model.

- Component One: Understanding the Challenge

I began to organize this unit by focusing on economic and class systems, and rather than present prescribed economic lessons, I chose to have the students deal with a problem in their community. When planning for a CPS unit, you must first consider whether the task is complex, important, open-ended, and in need of novelty. If it meets these criteria, CPS may be the right model.

- Constructing Opportunities. In the Constructing Opportunities stage I posed the headline: Community Needs Are All Around Us. The students then brainstormed various WIBAI (Wouldn’t It Be Awful If…?) statements. Examples of my students’ work include: Wouldn’t it be awful if people were left to fend for themselves? Or Wouldn’t it be awful if no one helped others in need? With guidance, they reformulated these statements into WIBNI (Wouldn’t It Be Nice If…?) statements. Examples from my students include: Wouldn’t it be nice if people helped others in need? And Wouldn’t it be nice if everyone had their needs met?

Next, I had the students use the Hits and Hot Spots strategy to help us determine the problem we wanted to explore. To teach Hits and Hot Spots I gave each student two stickers to place on the statements that jumped out at them. They could put both stickers on one idea or spread them out; the statements with stickers were the “Hits.” After the students voted we clustered the ideas that were similar into “Hot Spots” to determine the actual problem statement we needed to further explore the data.

- Exploring Data.

During the second stage, Exploring Data, the students identified the key data within the problem, looked at the task from many different angles, and began to frame the challenge on which to work. The students explored data using 5W+H (Who, What, Where, When, Why, and How). These questions helped the students to draw out important information and gain clarity on how to proceed. Then, the students considered many sources of data (newspaper clippings, on-line articles, periodicals, and television news clippings) that depicted families/community members in need.

At that point in the economics unit it was apparent that many students were using the language of an economist, but had some difficulty fully understanding the terms. I used the Attribute Listing tool to help redefine the language of economics. The students were provided with a graphic organizer displaying definitions and a list of criteria each student then had to assess while asking the students to provide a brief definition and list some attributes of the term. Then they were to read the story Tight Times by Barbara Shook Hazen and identified items or ideas that fit under each category.

- Framing Problems.

After reviewing the language and identifying the terms in the story, students had a better understanding of economic issues and were ready for the Framing Problems stage. In this stage the students formulated their problem statement. The students were to identify some targeted questions that could be used to stimulate advanced and original ideas to solve the problem. I reminded the students to begin their statements with IWWM… (In What Ways Might…); How Might…, or H2 (How to…). Some examples of the students’ thinking include: How might we as students help those in need? In what ways might the local government improve its methods of helping those in need? It is important to remind the students that they will be focusing on looking for the problem/question that they want to ask. This is not the time to look for answers. After the students generated their problem statements they needed to focus their attention to one state ment. The students were able to decide on a problem statement by using the Head and Shoulders test, which simply asks, “Is one of my options head and shoulders above the rest?” They chose to focus on: In what ways might we help those in need? After the students Framed the Problem they set out to generate ideas for possible solutions.

- Component Two: Generating Ideas

The Generating Ideas component has just one stage in which the students generate multiple and varied ideas then focus their ideas to create a solution. Creative thinking is often referred to as the divergent process in which we begin with a single thought or question and expand our thinking to create new possibilities. CPS idea generating tools include: Brainstorming, SCAMPER, Morphologi cal Matrix, Attribute Listing, and Force-Fitting. It is important to stress that during “generating” those involved are not to pass judgment whether positive or negative. Let the ideas flow and push for novelty.

Brainstorming is a way to generate multiple and varied options for an open-ended problem. I like to give my students Post-it notes to record their ideas first, within a silent work environment, and then the students are encouraged to share their ideas and piggy-back off of others. My students began to brainstorm solutions for the problem statement: In what ways might we help those in need? After the students generated all of their suggestions we put them on a large sheet of chart paper and used the Hits and Hot Spots tool. (See Figure 1) The Hot Spots included: take money donations, sell things and donate the profits, donate gently used items, and have a school fundraiser.

- Component Three: Preparing for Action

After generating many and varied ideas, the students had to think critically about those ideas to focus them into plausible answers. During this third component the students were encouraged to put those ideas into action.

Developing Solutions. In this stage the students worked on proposing options and refined them to fit our problem statement. At this time, I introduced another focusing tool, ALOI, which stands for: Asks, lofty, options, ideas. How to Overcome the Limitations and Uniqueness. Through this process they determined that making a product and selling it was a good idea and maybe something worth considering.

Based on the students’ suggestions, the students needed to further investigate which idea they wanted to pursue. I introduced Force-Fitting, a focusing tool that requires forcing two seemingly dissimilar objects together to create a new or innovative idea. This is a strategy for students to see common objects or ideas in unusual ways. Through the use of the tool, which asked the students to come up with new ideas, the class decided to make Christmas ornaments and sell them to the entire school community, the proceeds going to charity.

Next, the students had to decide which ornaments they were going to sell. The students decided to use the evaluation matrix to determine their product. An Evaluation Matrix is a focusing tool used to rank the options based on predetermined criteria. For our problem, the students came up with the criteria: (a) most popular, (b) most profitable, (c) least labor intensive, and (d) most novel. There are many ways to use the evaluation matrix; for simplicity, we chose to rank the choices (1=low; 5=high) based on each criterion. Building Acceptance. The students had a plan in mind but were needed to further prepare how to carry out their solution. At this time we focused on anticipating factors that would possibly hinder successful action and identifying ways to overcome these...
hindrances. The students considered possible assisters and resisters using the SWOT + H. For example, who will be willing to hear our suggestions and help us with implementing? Where can we present this information? Where will we meet obstacles?

Component Four: Planning Your Approach

Appraising Tasks. As we thought through the possible obstacles, we decided our next course of action would be to create a plan that included action steps. At this time, I introduced the focusing tool, Short, Medium, and Long term goals (or S-M-L), a tool that helps to organize one’s options in a logical manner. Students were to decide what they would do the same day, what they would do the next week, and what they would do the following month. Medium term was things that would be needed to be done in the next week, and that Long term would be things that needed to be done in the month before our sale. Under short term the students decided they needed to order the ornaments and create a name for the business. In the two weeks that followed they needed to make the ornaments, create advertisements, write a jingle, and divide up into jobs for the actual sale days. Then, in the following month, they would hang posters to advertise, sing jingles on the announcements, set up their store front, and sell the ornaments. S-M-L is a great focusing tool to use when planning a long-term project.

Designing Process. As we proceeded with our solution it became apparent that the students needed a mini-lesson on product development (in order to make unique ornaments) and creative advertising. I chose to use the tool, SCAMPER for this lesson. SCAMPER is an acronym for Substitute, Combine, Adapt, Modify, Minify, Magnify, Put to other uses, Eliminate, Reverse, or Rearrange. SCAMPER is used to generate new ideas by asking questions such as: What could I substitute in this item/problem?, or How could I adapt my idea to make a new idea? We concluded this lesson with the students using the SCAMPER process to determine how to use a $100 donation and to create their advertisements. See Figure 2.

Finally, we had to decide to which charity the students would donate the profits from our sale. The kids had four possibilities in mind. To make this decision, we used a Venn diagram, a paired comparison analysis, a tool for ranking and prioritizing a small number of options. Through this process they decided that they would donate the money to Operation Smile, a charity that raises money for children with facial deformities, namely cleft lips and palates, from all around the globe.

This student-centered unit was based on our city-wide curriculum goals to develop an understanding of systems of knowledge, themes, issues, and problems that frame the external world, to develop metacognitive skills that foster independent and self-directed learning, and to develop creative and critical-thinking skills along with problem-solving skills. Through the CPS model the students gained a deep understanding of basic economic principles while solving a real-world problem. This model allowed the students to grapple with difficult subject matter in a friendly and challenging manner.

The Creative Problem Solving model presents a unique and differentiated framework with which to deliver any curricular materials. If you are an educator searching for the tools to create a classroom full of 21st century learners equipped with tools and strategies to embark upon solving the problems of today’s world, look no further.

References


FIGURE 2

SMART COOKIES

BY BESS WILSON

Program Standards in new areas:

NEW! This Month!

Pancake Flipping

Yo-yo Tricks

Unicycle Riding

Comic Books

iMathination

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deeper context. Students can wrestle with questions like:

• How do the concepts and procedures we’re learning apply in different settings/professions?

• These kinds of problems are really interesting, what kind of career share my interest?

• Why is it important that I know this? How does this idea/concept process apply to the “real” world?

The new NAGC programming standards address the need to focus on students’ conceptual, social, and intellectual growth in addition to the chronological checklists of academic achievement independent of the discipline. If you teach multiple subjects consider how to integrate them across the disciplines. If you’re a single subject expert, look for ways to work across disciplines to increase learning opportunities and develop self-awareness in your students.

Reference