CHAPTER 10

CREATING A STORY

In previous chapters we introduced or recaptured several stories. We also considered components that make stories engaging for learners, such as conflict, imagery, wonder, and humour. However, where do stories come from? If a teacher believes that a story is a creative and appropriate way to engage students with mathematics, how is a good story found? ... chosen? ... created? In this chapter we demonstrate how instruction of specific mathematical topics or concepts can be planned and implemented, that is, we provide what we refer to as a ‘planning framework’. In what follows we first present the framework, explain its various components and then exemplify the planning of instructional and learning activities according to this framework. We purposefully avoid the terms ‘lesson planning’ or ‘unit planning’. For our purposes, an instructional and learning activity can be a part of a lesson, an entire lesson, or can even be extended over a series of lessons.

PLANNING FRAMEWORK

Our framework includes the following components, on which we elaborate below.
– Identifying the target.
– Identifying the problem (mathematical problem or problematic issue).
– Identifying the story. Exploring what tools are appropriate to support the plot and present the problem in a way that engages students.
– Organizing the presentation of the problem using story telling. Considering students’ possible engagement.
– Extending or varying the initial problem situation (optional).
– Conclusion, closure.

Identifying the target

Identification of a target is essential before the actual planning can begin. A target may take many different forms. It can be a fragment of curriculum content, such as a specific concept or topic. It can be related to a specific formula, method or strategy. It can also be a meta-content, such as applicability or beauty of some mathematical idea or method. Furthermore, our target can be what is identified in different curriculum documents as a ‘standard’ or ‘intended learning outcome’. And of course it can be any combination of these.

For example, in the story of The King’s Will (see Chapter 7) the specific concept targeted is division by zero. In the story of The Pirates and the Buried Treasure (see Chapter 6) the targeted concept is that of a standard unit of measurement and
the meta-content relates to its usefulness and applicability. In the story of *Gauss and His Teacher* (see Chapter 2) the curriculum content we are targeting is related to the topic of patterns in elementary school, or the sum of the elements of an arithmetic sequence in secondary school; the specific strategy is the pairing summation method and the meta-content is the internal simplicity and power of this method. In the story of *Grains on a Chessboard* (see Chapter 6) the target is the appreciation of exponential growth.

**Identifying the problem**

Once the curriculum content is identified, the questions to be addressed are: What is the mathematical problem or activity that can engage the learner with the given content? Is there anything problematic about the specific target? How can the problem or the problematic be presented in the form of a story? It is through the examination of these questions that we can begin to explore resources and examine possibilities.

The most easily accessible, and at times the only, resource is personal knowledge. Experienced teachers know where learners have difficulties and know how to get past these difficulties. Where immediate personal knowledge does not serve the needs, we turn to books, children’s stories, colleagues, or the internet in order to find mathematical problems or snapshots of existing mathematical folklore and historical anecdotes.

**Identifying the story and supporting tools**

The story itself can be dry and uninviting when presented without an emotional context. However, these ‘barebones; versions can eventually become an engaging story or activity. Consider for example the following plot – “Cinderella lost her shoe and the prince found her based on this shoe”. The details are correct, but the emotions are lost.

Similarly, in relation to our mathematical theme, consider the task – “find the sum of the numbers from 1 to 100”. For the majority of students this would not capture their interest. In teaching we are not interested in these ‘barebones’ versions. Our task is to present a problem in a way that is engaging, memorable and which captures a student’s imagination. This is where we turn to stories and the repertoire of cognitive tools that were introduced, discussed and exemplified in previous chapters and take advantage of their ability to engage the imagination.

Of course there is no expectation that all these tools will appear in every problem or every lesson. We consider them as a menu to choose from, acknowledging that we will always attempt to chose several menu items and that some items will appear more frequently than others in our choices.

Almost every mathematical problem can be presented using some story plot. At times our exploration will not be extremely fruitful and we will feel blessed if able to find or create one scenario for a story. At other times we will be faced with a variety of possible plots and be forced to make a choice. The needs of our students...