Chapter 20

Teacher Perspectives on Science and Literacy Integration

Laura Robertson
East Tennessee State University, USA

Renee M. R. Moran
East Tennessee State University, USA

ABSTRACT

In this chapter, the authors discuss teachers’ perspectives on science and literacy integration in secondary classrooms. Beginning with teacher belief, the authors posit that teachers must first believe in the value of science and literacy integration to themselves, their students, or to district, curriculum, or assessment goals in order to implement integration. After belief in the value of integration is established, teachers vary in their approaches to implementation. Analysis of focus group data from middle and high school English language arts (ELA) and science teachers reveals patterns in frequency, strategies, and barriers to integration by subject area. In conclusion, the authors offer a framework for integration that explains teachers’ approaches to integration at the classroom and team levels and suggests methods for advancing science and literacy integration.

INTRODUCTION

The Common Core Standards and the Next Generation Science Standards address the importance of integrating literacy skills across the content areas (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010; NGSS Lead States, 2013). In the Science classroom, students “cannot do science without using scientific tools for sense-making and thinking that are mediated through language” (Tolbert, Stoddart, Lyon, & Solas, 2014, p. 68). However, students may struggle with vocabulary and comprehension of scientific texts (Zmach, et al, 2007; Ortmann, 2015). Likewise, scientific cross cutting concepts can be an important support for the English Language Arts (ELA) classroom, as the amount of nonfiction text required has been greatly increased as a result of Common Core State Standards. Pappas (2006) connects students’ success with nonfiction text with their ability to apply “the language that scientists use as they read, write, and talk” (p. 26). Yet, ELA
teachers lack confidence in tackling scientific concepts that arise in nonfiction text pieces (Plummer & Kuhlman, 2008). Professional development that helps science teachers integrate literacy strategies into their classroom practices can improve students’ science content knowledge and reading comprehension (Greenleaf, et al., 2011).

Plummer and Kuhlman (2008) recommend a similar professional development experience for ELA teachers that shows them how to weave scientific experiences into the ELA classroom to increase student comprehension of nonfiction texts. During our work with teachers over a three-year period, we observed two distinct approaches to integration, which we termed Classroom Level and Team Level. We have numerous teachers that fit into one of these two categories, and their frequent occurrence has influenced the organization of this book. In the following sections, we will share our methodology and findings from a focus group study, as well as a framework for understanding and advancing science and literacy integration.

METHODOLOGY

This chapter is based on focus group data collected over the course of two summers through professional developments held for two-week sessions. Participants in the workshop included ELA and science middle school and high school teachers from public and private schools in the southeastern United States. There were 72 teachers in year one and 87 teachers in year two. During the workshop, teachers participated in a variety of sessions focused on methods and materials for teaching ELA and science and integration. Teachers worked in teams (one ELA and one science teacher) to plan an integrated lesson which they presented to their peers in the final days of the workshop. All workshop materials, including integrated lessons created by the teachers, were uploaded to a shared Dropbox folder available to participants. Two follow-up sessions to the summer workshop were held on Saturdays during the academic year. While a variety of data sources were collected, including pre-and post-tests, student achievement data, and teacher value added scores; in this chapter, focus group interview data is the primary data source. Anderson (1990) notes that a focus group is a group of people with particular attributes that focus their discussions on a certain topic. Therefore, we divided participants into groups based on grade level and subject area. Casey and Krueger (2000) note that a focus group allows for “a more natural environment than that of individual interview because participants are influencing and influenced by others—just as they are in real life” (p. 11).

The workshop participants were organized by grade band and subject area resulting in five groups, middle school ELA, middle school science, high school ELA, high school biology, and high school chemistry. These same groups were used for the focus groups. The focus groups met to discuss integration once during the fall of year 1 and once during spring of year 2. All workshop participants were invited to participate in the focus groups, but due to schedule conflicts, the total number of participants was 52 in year 1 and 47 in year 2. The participants varied slightly between years 1 and 2 with some teachers remaining the same and some teachers changing due to schedules and participation in the workshop. During the focus groups, teachers responded to a list of questions such as:

1. Have you collaborated with your ELA/science partner this year? If so, how? If no, why?
2. What further support would you need to improve collaboration with your ELA/science partners?