Understanding climate change is a challenging task, given the multifaceted interactions across biophysical and social systems that affect climatic variability and its impacts. Recently, scientists have highlighted the importance of analyzing climate change using complex systems perspectives and principles. Accordingly, environment and sustainability programs are increasingly incorporating systems thinking in their curriculum and pedagogy to produce a qualified cadre of systems thinkers capable of addressing the complex social-ecological problems they will encounter in their careers. However, there are still significant gaps on how to promote and assess systems thinking in formal educational settings. In the first study, a novel multidimensional framework was developed and applied to measure systems thinking about climate change among university students. In the second study, I examine how different factors pertaining to a student’s academic training predicts them having more complex systems thinking. The study reveals that engagement in systems thinking falls on a continuum ranging from simple to progressively more complex systems thinking as more dimensions are recognized. Moreover, the results show that there is often a trade-off between the different systems thinking dimensions. Furthermore, the findings reveal that increased knowledge positively predicted a student’s ability to identify the various system components while it negatively predicted their ability to connect them in a logical manner. Surprisingly, as students advance in their studies, they are less capable of identifying system function. Taken together, these findings highlight the value of using the framework as an evaluation tool to identify gaps in students’ systems thinking abilities and inform formal systems thinking teaching in higher education.