Critical Thinking in Mathematics

A Real Life Statistics Problem

Applied Critical Thinking Activity Number Two

1. Explain to students that critical thinking is the focus of A&T’s Quality Enhancement Plan (QEP), a SACS requirement designed to improve student achievement in critical thinking and to help them Inquire, Analyze, and Make Decisions. As students develop their critical thinking skills, they will be able to better compete with students from other universities.

2. Emphasize that mathematicians have to help others apply mathematics to real world situations. In real life, statistics are often interpreted wrong and statistical analysis is sometimes flawed.

3. Read the following situation carefully and analyze its elements in order to reach a conclusion.

Situation: A local politician conducted his own study on the state of poverty in his community. Intuitively, he doubted the US Census’s findings about poverty in that region of the country. His findings were featured in the local newspaper. “As I have traveled around our community and seen the rich opportunities here, I began to suspect that we are overcoming poverty. We have a knitting mill, a bus factory, and a furniture factory. The employees at these plants spend their money locally and support the rest of the economy. I now believe that the gap between the rich and the poor is starting to close. Programs that provide assistance to the poor could start to be reduced or eliminated. My assistant went door to door to determine household income. The study found that the mean income is $60,000 per year; way up from the approximately $28,000 figure published by the US Census.”

4. Have student pairs analyze the situation based on the following questions taken from The Miniature Guide to Critical Thinking... (Paul & Elder, 2009) provided by your department chairperson. These questions are used to critique critical thinking. Make students aware that these questions build critical thinking skills, and these same critical thinking skills can be applied in both mathematics and their daily lives.

   All reasoning is an attempt to figure something out.
   - What question are you trying to answer?
   - Are there other ways to think about the question?
   - Can you divide the question into sub-questions?
   - Is this a question that has one right answer or can there be more than one reasonable answer?
   - Does this question require judgment rather than facts? (p. 4)

5. After about 10 minutes, have student pairs write their analysis and conclusions and clearly explain why they reached those conclusions. After the pairs have presented, lead a class discussion on judging the quality of data, analysis, and the critical thought of others (like the politician above) and themselves.

6. It is important to emphasize that students must become self-aware of their own critical thinking.