

## **PHS 593: Action Research**

*MNS degree candidates are required to complete a minimum of 3 semester hours of Action Research. Action Research (AR) projects are intended to explore practical improvements in teaching practice. Teams of two or more teachers work together to design programs or materials for classroom implementation, which they must field-test and evaluate. This is followed by submission of a final written report and a public presentation to peers.*

The process starts with summer enrollment in PHS 598: Leadership Workshop. By the end of the workshop, *AR proposals are submitted for comment and approval by the instructor of record for the course, and teams obtain university faculty supervision for their project.*

Once ARTs are turned loose to conduct research on their own, they must discipline themselves to meet regularly and make progress. *Team members benefit from keeping a diary of the work they do, both together and separately. This serves as both a chronicle of progress toward their goal, and a record of the hours they invest toward the credit they will earn for the project. They must agree on the general outcomes for which they are hoping, identify specific tasks and who will be responsible for each, and make a timeline for completion.*

Initially they conduct background research on their topic and how it is already incorporated in the typical high school science program. In studying the pros and cons of the current standard, they will inevitably identify areas that can be improved, and then the design process can begin. Each team member commits time to the collectively agreed upon tasks, and shares his or her progress with teammates via e-mail and regular meetings. When necessary the team seeks guidance from their university faculty mentor.

If the product of the AR project is an instructional unit, they must plan for its field-testing. If the team is of sufficient size and diversity, they may choose to do this in their own classrooms. If not, they must solicit the cooperation of their colleagues. This is where the relationships established in their summer Leadership Workshop are invaluable. Teachers with a variety of student populations may volunteer to test the curriculum materials developed, and their pre- and post-test data and personal critiques of the effectiveness of the instructional unit provide valuable insights for the ART in considering modifications to their finished product.

When the team is satisfied with what they have produced, *they submit a narrative report to their university faculty mentor:*

- summarizing their background research,
- outlining the process they followed,
- critiquing their accomplishments and problems,
- presenting their finished product, along with the rationale for the choices they made in developing it, and
- reviewing the feedback information from field-testing and how this feedback was incorporated into the end product.

With the approval of their faculty mentor, *a public presentation of the team's work is arranged.* This presentation normally serves as the required final exam for the MNS degree. Ideally it takes place during the following summer's Leadership Workshop. ARTs may also be examined orally by one or more members of their MNS Program Committee regarding the details of their research.

The reports will be considered for publication on the Modeling Instruction Website. Teachers are also encouraged to present their findings at local, regional or national science teachers' conferences, symposia or colloquia.

The process of planning and executing collaborative research is a stimulating interaction that fosters personal and professional growth and builds lifelong friendships and associations. A successful research experience can serve as a springboard for new collaborations. ASU's MNS program makes a special effort to highlight the integration of physics into other disciplines, and to encourage the incorporation of contemporary physics topics into the traditional physics curriculum. This stimulus, together with the leadership skills that are an outgrowth of the action research process, provide for a vital, self-sustaining, teacher-centered professional development experience that promises solid research-based reform in science education. Leadership Workshop provides an important ongoing opportunity for teachers to mentor each other and profit from one another's efforts and experiences.