Noyce Program Evaluation Project

By the Noyce program evaluation group.

Our evaluation project has four major components:(1) preparation of an extensive literature review pertaining to effects of incentive programs in recruiting and retaining STEM K-12 teachers, (2) thematic synthesis of the existing Noyce project evaluation information through content analysis of project information, (3) statistical querying of the existing monitoring data to produce quantitative models of the program development and (4) execution of an overall program evaluation plan through collaboration with existing projects. In terms of our philosophy of evaluation as articulated in *Our Beliefs about Evaluation*, our evaluation is knowledge and judgment oriented. We hope to add to the knowledge base about what would be effective in recruiting and retaining STEM teachers as well as to make statements about the value of the Noyce program.

Our approach is also utilization focused in that our evaluation has an extensive dissemination component in the hope that our evaluation processes and findings will be useful to the STEM and evaluation communities. The centerpiece of the dissemination is an on-line resource, Resources for Recruitment and Retention of STEM Teachers (R^3), pertaining to STEM K-12 teacher recruitment and retention and the Noyce program evaluation. This resource contains a searchable data base of literature, sets of instruments, policy papers and reviews of literature about critical topics.

Our review of the existing literature is being conducted to provide a rich context for the other components of the evaluation project. Presently the data base of literature abstracts contains over 600 references. After careful discussion of potential categories and their definitions, all of the abstracts were read by two STEM evaluation specialists and categorized in terms of the topics covered, the grades and subject matter discussed and the methodologies used. Any discrepancies in the categorizations were discussed and resolved before the final categorization. The abstracts are also searchable for specific words or word strings. This data base is periodically updated to include new abstracts.

Our thematic synthesis of the existing Noyce project evaluation information has produced a matrix of issues and variables that are being addressed. The synthesis revealed a tremendous range in both the type and amount of data used. Sites commonly gathered frequency and location data for graduates. Yet disparities in plans were also found including: (a) emphases on differing aspects of effectiveness: examining alternatively certified teacher's instructional effectiveness using surveys, portfolios, or structured observations versus studying preparation program effectiveness via an end of the program interview, annual questionnaire, or tracking program; (b) examining graduates' efficacy and identification with school while teaching versus tracking only their length of teaching stay; and (c) gathering both qualitative and quantitative data versus only quantitative data. A complete listing of the variables is available in REF.

The Noyce annual monitoring data were identified by NSF and the Noyce projects. Data are gathered via online surveys of: scholarship and stipend recipients (e.g., demographics, intended level and subject area to teach, amount of Noyce monetary support, highest degree earned and previous occupation); post-secondary institutions (e.g., programmatic activities offered, number of stem career changers completing teacher preparation, average GPA of Noyce applicants versus recipients); and school districts (e.g., name, location, and number of schools involved in student teaching/providing mentors) with data collection continuing as recipients receive certification and begin teaching. In addition to the identification of pertinent variables, this part of the evaluation project includes the compilation and posting of data collection instruments used by the Noyce projects so that how the variables are measured can be compared and improved. Analyses of the monitoring data include descriptive statistics, comparisons among types of programs, and identification of variables which predict recruitment and retention.

The major component of the Noyce program evaluation project is the development of a multi-site participatory evaluation (Lawrenz & Huffman, 2003). This evaluation will build on existing efforts of the Noyce projects, most notably the variables and instruments but go beyond those efforts to examine the effects of the Noyce program overall. We are beginning this participatory process through our collection of existing

information and initial analyses of the monitoring data. All of this information will be presented to the sites through a virtual conference and then face-to-face meetings at the annual PI conference. These discussions will provide the basis for the development of an overall evaluation plan which will be vetted with the projects and NSF and then implemented.

In our initial consideration of the evaluation of the Noyce program, we are focused on its unique approach to STEM teacher recruitment and retention. This approach is designed to provide more STEM teachers for high risk school districts. The logic model has some underlying assumptions and several steps. Two major assumptions are that there is a need for more teachers for high risk districts and that teacher preparation programs can help alleviate that need. Another assumption is that there are STEM content majors available. The logic model is that available STEM content majors can be lured into teaching by being given money to support their teacher training. These preservice teachers can then be affected by the elements of a teacher preparation program so that they will be able to work effectively in high risk districts. Furthermore the logic model assumes that once these new teachers teach in a high risk district for two years they will be inclined to continue to work in high risk districts.

As mentioned above, we believe an evaluation could have any of the three orientations: improvement, knowledge or judgment. In our case improvement means improvement to the Noyce program overall not necessarily to any of the individual projects. Knowledge relates to what the evaluation of the Noyce program can add to existing understandings about what affects teacher recruitment into teacher preparation programs, teacher recruitment into school districts, retention of teachers in preparation programs and retention of teachers in school districts. Judgment considers the effectiveness of the Noyce program in terms of its goal of more highly qualified STEM teachers in high risk school districts. Our evaluation focuses on improvement and knowledge somewhat simultaneously. There is a large amount of prior research in the areas of recruitment and retention hence the summary of the existing research discussed above. Information about how effective different techniques are and how the program could be improved will help

to fill in some of the gaps in the knowledge base. Judgment will be provided by the STEM community and the NSF based on the information gathered about Noyce program impact.

Our multi-site participatory evaluation will develop a consensus of opinion about what aspects of program impact should be measured and how, as well as what contextual variables are important to monitor. Once consensus on the evaluation questions is obtained, sources of information and data gathering devices will be developed. Finally data will be gathered and presented in a variety of formats to meet the needs of the different stakeholders in the evaluation.

Reference

Lawrenz, F. and Huffman, D. Multi site participatory program evaluation. *American Journal of Evaluation*, 2003, 24 (4): 471-482