

Aurora University
Master's Degree in Teacher Leadership Program
for Life Science

A Summary Evaluation of Year Two

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Introduction

This report summarizes the evaluation of the second year implementation of the Master's Degree in Teacher Leadership (MATL) Program for Teachers of Life Science provided by Aurora University with support from the U.S. Department of Education through an Illinois Mathematics and Science Partnership grant. This information was also included in the Annual Progress Report which has been submitted as a requirement of the grant funding this program.

During the 2009-2010 program year, twenty-five classroom teachers from six school districts were enrolled in the program. Of the current participants, fifteen are high school teachers, eight are middle school, and two are elementary. It should also be noted that not all teach in the area of science, with one teacher in career education at the high school level, one teaching fifth grade, and two teaching special education students. Teacher participants completed nine courses through the summer 2010 session at Aurora University.

The MATL Program for Life Science uses a one-group, mixed-method evaluation model, combining qualitative and quantitative elements. It focuses on five outcome areas defined by the Illinois State Board of Education (ISBE): (1) Change in Teacher Content Knowledge, (2) Change in Instructional Practices, (3) Student Achievement, (4) Quality of Professional Development, and (5) Sustained Administrative Support.

Change in Teacher Content Knowledge

Measures used in this project thus far to evaluate change in teacher content knowledge include course grades, course pre- and post-tests and pretests of understanding of the nature of science knowledge.

Course grades analysis as presented by Aurora University's office of the registrar shows that the mean GPA for courses taken to date is 3.69 on a 4.00 scale, with a range of 3.00-4.00. Nine teacher-participants have a cumulative GPA of 4.00 for the program.

Individual course pre- and post-test results demonstrate that teacher-participants are increasing their knowledge and skills through their coursework. An analysis of pre and post test results from science content courses indicates that teacher-participants showed significant gains in 66 of 75 assessments.

Teacher-participants took the Views on the Nature of Science (VNOS) assessment in September 2008 as a pretest, during the first semester of the program. They also took the Diagnostic teacher Assessments in Mathematics and Science (DTAMS) Probability and Statistics Pre-Test during the first semester of the program. These assessments will be administered again during the last semester of the program with analysis of results presented in the final annual progress report.

Change in Instructional Practices

Measures used in this project to evaluate change in instructional practice include the Survey of Enacted Curriculum (SEC), reflective teacher journals/logs, and classroom observations.

The SEC composite results from administration during the fall semester and based on the 08-09 school year show that teacher-participants reported spending 6% of time on the nature of science in their classrooms, 4% on science and technology, 9% on components of living systems, 4% on biochemistry, 3% on animal biology, and 4% on human biology. Relative to cognitive engagement of students, results show 23% of time spent in memorization or recall of information, 18% conducting investigations, 19% communicating understanding, 17% analyzing

information, and 23% making connections and applying knowledge. These results indicate that from fall 2008 to fall 2009, while time on topic remained fairly consistent, teacher-participants reported a decrease in time spent in memorization and recall (28% in 2008 to 23% in 2009) and an increase in time spent making connections and applying science knowledge (16% to 23%).

Twenty-five classroom observations using the Revised Teacher Observation Protocol (RTOP) and locally identified additional items were conducted during April-May 2010, one observation each for the twenty-five teacher-participants enrolled during the spring term. Observers were Aurora University professors. The typical observation was one class period in duration. Results presented here were selected based on alignment with the goals of the MSP program. Results indicate that virtually all teacher-participants demonstrated a solid grasp of the lesson's subject matter (mean=3.84 on 0-4 range). Observer ratings had a mean of 1.52 (0=never occurred, 4=very descriptive) in cases of teacher questions triggering divergent modes of thinking. Similarly, the mean rating was 2.76 (again 0-4 range) for evidence of students being encouraged to generate conjectures, alternate strategies and ways of interpreting evidence. Other mean ratings included (range 1=not at all, 5=to a great extent): 3.96 for evidence of "investigative" lesson design; 3.75 for time and structure provided for "sense-making"; and 4.21 for making appropriate connections. In ten classrooms, observers reported seeing evidence of a high quality investigative instructional model. They reported observing teachers using manipulatives in seventeen classroom observations, and teachers using other audio-visual resources in ten observations.

Teacher-participants completed "Change in Instructional Practices" logs during each course as well as a final reflection paper, summarizing their reactions to each course and its impact. During the fall and spring terms, teacher-participants logged 109 entries reflecting on how they implemented content, strategies, and resources into their classes. With 25 teacher-participants submitting logs during the spring term, their logs reflected 28 entries in the area of science content knowledge, 10 in using instructional resources, 14 in implementing teaching strategies, and 13 in using classroom technology. The remaining 44 entries are the aggregate from the fall term. These logs also reflect 88% of teacher-participants achieving half or more of the content implementation goal, 59% achieving half or more of the resources implementation goal, 79%

achieving half or more of the teaching strategies goal, and 80% achieving half or more of the STEM implementation goal.

During the summer 2010 science content course, teacher-participants logged 99 entries reflecting how they might or how they planned to implement content, strategies, and instructional and technology resources into their classes. This slightly different focus accommodated the lack of contact with students during the summer course. With twenty-three teacher-participants enrolled, their logs reflected 27 entries in the area of implementing science content knowledge, 21 in using instructional resources, 36 in implementing teaching strategies, and 15 in using classroom technology.

Student Achievement

Measures used in this project to evaluate impact on student achievement thus far include relevant data from the Illinois Standards Achievement Test (ISAT) and the Prairie State Achievement Exam (PSAE). It should be noted that assessment in science on the ISAT is done only at grades 4 (no teacher participants in the program taught fourth grade) and 7 and on the PSAE at grade 11; thus data from students of teacher participants is somewhat limited relative to other IMSP projects. Additionally, longitudinal data for the same group of students is not available for students at this time.

Illinois state test results for 2010 82.3% (n=164) of seventh graders met or exceeded expectations on ISAT science, while 54.2% (n=190) of eleventh graders met or exceeded expectations on PSAE science. No teacher-participants taught fourth grade. We consider these results encouraging despite the limited data due to Illinois testing in science only at grades 4, 7, and 11, making use of state tests as pre/post impossible, and high percentages of at-risk students in participating districts.

Students of teacher-participants also took the Views on the Nature of Science (VNOS) assessment in the fall as a pretest and in the spring as a posttest. The mean posttest scores showed modest improvement, although not statistically significant for students in grades 6, 7, 9, 11, and 12, while the mean showed a decline for tenth grade students (pre=10.39, post=9.73).

The range of possible scores on the VNOS is 0 to 21. The greatest increase in mean from pretest to posttest was seen in seventh grade (pre=11.0, post=12.32) while eleventh graders showed the smallest increase (pre=11.93, post=12.89). The VNOS assessment was selected as an instrument for this program because it aligns with the goals of the program and is appropriate for the broad grade range of students involved. Teachers have expressed that the format of this assessment is atypical for their students and speculate that this makes it a difficult task for middle and high school students. However, we will continue to use this instrument for continuity and as per the program evaluation plan.

Quality of Professional Development

Measures used to evaluate the quality of professional development include course evaluations made by the teacher participants and a focus group of teacher participants.

Course evaluation results were compiled using a locally developed instrument designed to align with program expectations completed by teacher-participants following each course. This instrument replaces the SIR II instrument which is no longer in use by Aurora University.

Aggregated results for course design indicate: 43% rated as average, 31% as high or very high. For course content: 41% rated average, 41% rated high or very high. For instructional materials: 25% rated average, 36% rated high or very high.

Teacher participants shared perceptions in a focus group during July 2010. They said that sharing experiences with colleagues from their own and other districts, the opportunities to dialog about science and about their schools, and learning from each other were strengths of the program. Being part of a cohort allowed them to build strong friendships and professional relationships. Among the challenges of the program, the teacher-participants mentioned the fact that the diverse science backgrounds and background knowledge of the participants often resulted in content that was review for some and extremely difficult for others and that a disconnect between program courses did not allow for smooth transitions and integration of content from one course to the others. They suggested that future programs develop a better flow from course to course and a higher degree integration of science and teacher leadership content.

When asked about the relationship of the program to their personal professional goals, teacher-participants had several positives to share. They spoke of feeling that they were becoming better teachers and that they were preparing for work beyond the classroom, specifically in the area of teacher leadership. They see the program was a better fit to their goals and aspirations than an administrative leadership program would offer. One teacher spoke of feeling well prepared and encouraged to take on a leadership role when asked to do so as a result of his participation in this program.

Teacher-participants expressed an awareness and appreciation for the fact that this program is in its first implementation and offered suggestions for future programs. They encouraged future examination of the sequence of the courses and the scheduling of the courses, especially as it relates to the internship opportunities and courses offered during the shortened time periods of summer sessions. They again talked about the diversity of science backgrounds being a negative and encouraged consideration of programs designed specifically with the level of science experience of the teacher-participants in mind.

Overall, teacher-participants expressed that the program included mostly valuable components, they have a great appreciation for the opportunity to be a part of the program, and it was a positive experience.

Sustained Administrative Support

The Aurora Partners for Leadership in Teaching consist of Aurora University faculty and administrators, administrators and teachers from the school districts with program participants, the Illinois Mathematics and Science Academy, the Robert Crown Center for Health Education, the SciTech Interactive Museum, and the Packer Foundation Center for Applications Based Learning. Beyond the required interviews with representatives of the state evaluation team, this summary is based on a partnership focus group, observations at team meetings, and program documents.

In June 2010, the program administrative team participated in a focus group that included the principal investigator and representatives from participating school districts, the university, and

community and area-wide partners. Focus group participants spoke about their perceptions of their own roles in the partnership. The theme of communication was dominant here where they spoke of openly and productively discussing the partnership itself, working through issues, providing support and feedback. Additionally, they said there was a level of accountability to the group and to the program, mentioning both fiscal and programmatic accountability. Team members also spoke about the value of their roles as both educators and learners, as they disseminated information to the team and to others outside the team who needed to know. They said that at times, they also learned from each other about the program, about its needs, expectations, and challenges, and about the continuity of partnerships and programs like this one.

Administrative team members spoke of the advantages of the partnership in providing opportunities for learning, exposure to new technology, and a testing ground for this new master's degree format.

When asked about the culture of the team, several members spoke about the respect and trust shared within the team. They talked about a genuine interest in teacher and program improvement, increased appreciation for the larger community and involvement with agencies outside their own. They mentioned the willingness of the team to discuss and offer input and that the team was consistently consensus driven.

They mentioned that one of the high points of this year has been the team seeing increase teacher involvement and interest in professional growth and development.

Team leaders, the principal investigator, and evaluators of all Aurora University programs met regularly throughout the year to assure that the programs are on track and being implemented as designed. These regular meetings assured that there was consistency and a measure of continuity among the programs. Common assessment documents were developed, reviewed and revised as needed. Assessment schedules and data collection was coordinated to assure that all programs secured assessment results in a timely fashion and that data was as complete as possible.

Conclusions

The Mathematics and Science Partnership Program in Life Science has completed its second year of implementation. The program is progressing as intended with twenty-five participants from six school districts and representing elementary, middle and high school levels.

Teacher participants are finding success in achieving high grades in their coursework, are generally satisfied with the course design, course content, and instructional materials. They report that they are implementing new knowledge, strategies, and materials into their teaching and curriculum. Despite finding the science content challenging, they are appreciative of the opportunities afforded them through the program. Through the first two years of implementation, this program is seen as a success. Consistent with the goals of the program, there is opportunity for growth in knowledge and skills for teacher participants and ultimately for their students.