



Science and Mathematics Teachers' Experiences, Needs, and Expectations Regarding Professional Development

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Purpose

Conduct state-wide examination of the Professional Development (PD) experiences, needs, and expectations of middle and high school science and mathematics teachers.

How People Learn Framework

- Community-Centered
- Knowledge-Centered
- Learner-Centered
- Assessment-Centered

Survey Structure

- Likert scale
- Constructed response
- Open-ended
- Demographics

Sampling

- Stratified random sample: 1000 Missouri teachers, grades 6-12, from the state database (N=7150) by:
 - Subject (science, math, and both)
 - Grade level (middle or secondary),
 - County size (small, medium, and large).
- Respondents: 241 teachers, for a confidence level of 0.062

($\alpha = 0.05$)

Conclusions

- Science and math teachers participate in a minimal amount of PD.
- Science and math teachers do not experience effective PD learning environments.
- Rural teachers have significantly less opportunity to observe and interact with other teachers within or outside their school.
- Teachers want PD that is specific to their grade level, content, years experience, and classroom practice.
- Location is a constraint to attending PD.

Findings

Experiences

Time Spent in PD within the Last 12 Months and 3 Years

| Number of Hours | Percentage of Respondents | |
|--------------------|---------------------------|------------------|
| | 12 months n = 236 | 3 years n=235 |
| None | 7 | 3 |
| Less than 6 hours | 21 | 4 |
| 6-15 hours | 29 | 17 |
| 17-35 hours | 27 | 22 |
| More than 35 hours | 13 | 50 |

PD Experiences by School Setting

| | Percentage respondents | | | χ^2 |
|--|------------------------|--------------------|------------------|----------|
| | Urban (n=33) | Suburban (n=80) | Rural (n=124) | |
| Read professional literature | 93.75 | 97.44 | 81.97 | **12.36 |
| Observed other teachers teaching | 90.91 | 72.5 | 40.65 | ** 36.87 |
| Served as a mentor and/or peer coach as part of a formal arrangement | 33.33 | 37.97 | 22.13 | * 6.18 |
| Met with local teachers on a regular basis to study/ discuss teaching issues | 68.75 | 71.25 | 46.77 | **13.70 |

* p < 0.05
** p < 0.01

Needs

Perceived Needs for PD in Pedagogy

| Topic | Percent of Respondents | | χ^2 |
|--------------------------------------|------------------------|-----------------|----------|
| | Science (n=122) | Math (n=199) | |
| Developing critical thinking | 68 | 73.1 | 0.747 |
| Using technology to teach | 63.1 | 68.9 | 0.901 |
| Connecting to the real world | 55.8 | 60.5 | 0.562 |
| Inquiry or problem-based strategies | 55.7 | 67.2 | 3.356 |
| How students learn particular topics | 50.8 | 63.9 | *4.189 |
| Developing conceptual understanding | 48.4 | 47.1 | 0.041 |

Expectations

Teachers' Views of Effective PD

- Content and pedagogy relevant to their classrooms,
- Engagement as learners and as teachers,
- Opportunities to interact with teachers who teach the same, grades/subjects,
- Facilitators who are organized, knowledgeable, and familiar with 6-12 classrooms,
- Convenient location and good use of time.

Implications

State agencies, organizations, and school districts should:

- Seek input from teachers regarding PD through surveys, focus groups, or other mechanisms.
- Work together to consider the recommendations that have been identified in the PD research and policy literature.
- Invest more resources in preparing and supporting PD facilitators, especially those who have successful classroom experience.
- Consider the PD needs of teachers who do not have access to effective PD opportunities.