**Abstract Title:** The Effect of the Level of Transfer from Teacher Professional Development on Student Learning

**MSP Project Name:** Washington University Life Sciences Teacher Institute: Education for a Global Community, NSF MSP Teacher Institutes 0634470

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**120 word summary:**

Data collected through the Life Sciences for Global Community teacher institute have indicated that while teacher level variables explain a significant amount of the variance in student test scores, teacher content learning, alone, was not a significant predictor. This presentation explores, "Can a metric be developed that explains the variance in student outcomes by focusing on classroom transfer?" A conceptual analysis of institute data has been used to identify three components used to construct a level of transfer rubric. These were: the quality of the transfer, the intensity of the transfer, and the teacher's reflection on student learning. These were used to analyze eighty action research reports for levels of variation in transfer and examine the correlation with student outcomes.

## Section 1: Questions for dialogue at the MSP LNC

In order to effectively link teacher learning to student learning in K-12 classrooms a better understanding of how teachers transfer learning to their classrooms is needed. Can a clear articulation of variations in how teachers transfer new knowledge to the classrooms be used to develop a metric that accurately explains variance in student outcomes?

## Section 2: Conceptual framework

## Section 2.a: Context of the work within the STEM education literature and within your MSP project

Historically, the literature on classroom transfer from professional development identifies a frequent failure to transfer new knowledge and skills to classroom practice, or, if initial transfer was accomplished, a rapid attrition of new behaviors over time (Fullan, 1992). In addition, if the content and pedagogy of the professional development is radically different from the teachers' existing practice, transfer was unlikely to occur at all (Joyce and Showers, 1983; Showers, 1987). More recently, professional development programs have embedded transfer mechanisms as part of their programmatic expectations.

These are often designed to impact teacher learning, expecting that the teacher will transfer new knowledge of content and pedagogy into their classrooms, ultimately impacting student learning (Gusky, 2002). This logic model prompts the placement of benchmark assessments, frequently as 1) descriptions of the professional development, 2) measures of teacher learning through pre-post tests and 3) measures of student learning through pre-post tests, omitting measures of teacher transfer. This model assumes a kind of homogeneity of transfer to the classroom, i.e., all teachers who participated in the professional development experience are changing their instruction in similar ways, or that the differences in how they transfer are negligible compared to the amount of new knowledge learned and the impact of the new knowledge on student learning.

Data collected through the Life Sciences for Global Community teacher institute and analyzed by external evaluator using hierarchical linear modeling (Hanssen Consulting, 2009-10) have indicated that while teacher level variables explain a significant amount of the variance in student test scores (MSP-LNC, 2009-10), teacher content learning, alone, was not a significant predictor of variance in student test scores. These preliminary results have led to the need for a deeper understanding of the ways that teachers are transferring professional development experiences into their classrooms. More specifically, how can the levels of transfer be used to explain variation in student test scores?

## Section 2.b: Claim(s) or hypothesis(es) examined in the work :

If we develop a metric that assesses the level of transfer of professional development experiences to students in a classroom setting, then we would expect to see student test scores correlated to the level of transfer. Additionally, we expect to see teacher level of transfer as a significant predictor of student learning.

## Section 3: Explanatory Framework

## 3.a: Evaluation and/or research design

The questions addressed in this research design are:

Does variance in the transfer of teacher knowledge gained from the institute impact student learning?

Can a clear articulation of variations in how teachers transfer new knowledge to the classrooms be used to develop a metric that accurately explains variance in student outcomes?

The focus of this research is on the development of an instrument that will describe the level that teachers who participate in professional development experiences are transferring their new learning to classrooms. Once developed and validated, this instrument will be used to test hypotheses about the links between teacher learning

and student learning. The research has been conducted using both quantitative, quasi-experimental methods and qualitative analytical methods. The larger questions about the effects of teacher knowledge gains on student learning are supported in this investigation by looking at questions about what the teachers do in their classrooms with new knowledge and how their students respond.

The overall goal of the teacher institute is to enhance student learning by deepening teacher content knowledge and expanding their teaching strategies. These were the primary elements of the professional development design. If the institute were successful in impacting student learning the gain scores on a content test and attitude scores on a survey would be higher among students of teachers who had been in summer professional development compared to those students who's teachers had not yet entered the first semester of coursework. Student attitudes and scores on an institute content test were considered short-term measures of student success relative to the professional development experience. Measures of student success in the sciences would require longer-term benchmarks such as, scores on relevant state, national and international tests. Linking validated items within professional development metrics as utilized in this program with items on broader state, national and international assessments would contribute to an understanding of how student success might be impacted by long-term professional development experiences, such as this institute. This study will contribute to the possibility of connecting professional development to more distant student learning metrics, but is beyond the scope of this presentation. A first step, taken here, is to describe transfer in a way that proximal student impact can be attributed to the professional development experience.

To describe transfer, a conceptual analysis of institute data has been used to identify three components that were used to construct a level of transfer rubric (Table 1). Important to understanding the level of transfer were: 1) the quality of the content/pedagogy transferred, 2) the intensity of the transfer, and 3) the teacher's reflection on student learning. These components were chosen because they could be observed directly through classroom observation and indirectly through a document analysis of action research.

The institute is structured such that new knowledge of content and teaching is presented during the summer session which teachers are then asked to integrate into their classroom in a manner relevant to their context. The process of action research is taught during the first academic semester in which teachers are asked to base their findings on at least three sources of data and discuss findings in a final report. These reports constitute a reservoir of teacher self-report data including both a deep description of the strategies they used to transfer institute experiences and a three-way analysis to assess the impact of their transfer on their students. Eighty teachers have completed reports that have been scored according the rubric (Table 1). Approximately 35 of these rated documents have been subjected to external review, with 25% of these ratings corroborated through video analysis.

Table 1. Rubric for Components in the Level of Transfer Rating

| Component | Strong=3 | Moderate=2 | Weak=1 |
|---|---|---|---|
| Quality of Pedagogy & Content Transferred | Integrated into a successful unit to strengthen a problem area | Replacing a unit or component that has been unsuccessful or trying a new component for first time | Adding on an activity or teaching one of the institute labs in isolation from curricular content |
| Intensity of Transfer | Integrated into instruction lasting > 1 week | Replacing a unit or component in 2-4 instructional contact periods | Teaching an activity a single time; trying out a new lab in isolation or enhancing a unit |
| Impact on Students | Teachers' analyses = highly significant improvement in student performance | Teachers' analyses= moderate improvement in student performance | Teachers' analyses= little or no improvement in student performance |

Findings indicate that 1) researcher ratings derived from the action research reports are highly correlated to external reviewer ratings of documents and of video. Preliminary analyses (t-test) of the effect of transfer levels on student post-test or gain scores on the institute content test and attitude surveys indicate that students of teachers with a higher level of transfer score higher on post-test/gain scores than students of teachers with a lower level of transfer. Additional statistical tests will be conducted (HLM) to see if this teacher level variable explains a significant proportion of the student variance in test scores.

**Section 3.b: Key insights that have value for the learning network**

Analyzing the impact of professional development on student learning without illuminating the complex and variable ways that teachers transfer new knowledge

to the classroom can lead to error in our conclusions. This study has shown that teachers transfer knowledge in multiple ways, at varying levels of intensity and with meaningful insights into how the transfer impacted their students' learning. Treating this variance as insignificant can result in both overestimating and in other instances, underestimating the impact of a professional development experiences on student learning.

References:

Fullan, Michael, 1992. Understanding Teacher Development. Teachers College Press, New York: 243 pages.

Guskey, Thomas R., 2002. Does it Make a Difference? Evaluating Professional Development, Educational Leadership, v59(6), p45-51.

Joyce, Bruce R. and B. Showers, 1983. Power in Staff Development through Research on Training, Association for Supervision and Curriculum Development, Alexandria, VA, 50 pages.

Showers, et. al, 1987. Synthesis of Research on Staff Development: A Framework for Future Study and a State-of-the-Art Analysis, Educational Leadership, v45(3), p77-87.