Expanding Horizons:
A Case Study of Extended Partnerships between Teacher Teams and Outside Content Experts

Condensed Research Report

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Short video presentation of the Expanding Horizons Study:
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Abstract

Despite increasing advocacy for teacher collaboration, reported changes in teaching associated with collaboration seldom represent the substantial instructional shifts called for by advocates of 21st century reforms. One reason is existing “horizons of observation” constrain instructional possibilities considered by teacher teams. This case study of two secondary school teams, explored the potential of collaborative partnerships with outside content experts (OCEs) for infusing resources and perspectives that move beyond persistent images of classroom instruction. Meeting observations, teacher focus groups, and OCE interviews revealed several pivotal episodes of interaction with clear evidence of OCE influence on teacher instructional plans. Cross-case analyses also point to several OCE facilitative actions that preceded these effects with implications for future design of teacher-expert partnerships.
Theoretical Framework

Advocates for teacher collaboration have steadily increased over the last three decades and recent studies have helped substantiate the premise that engaging educators in productive collaborative practice can lead to improvements in teaching and student achievement (Carroll, Fulton, & Doerr, 2010; Saunders, Goldenberg, & Gallimore, 2009). Despite the increasing popularity and evidence, some important caveats remain to be addressed. One of those caveats is that reported changes in teaching associated with collaboration are often subtle, seldom dramatic changes. They accumulate over time to slowly improve teaching practices and student achievement (Gallimore & Ermeling, 2012). While not insignificant, these incremental changes and improvements rarely involve the kind of substantial shifts in instructional practice called for by advocates of deeper learning and 21st century reforms (National Research Council, 2012).

A key reason why these more expansive changes remain elusive is that teachers construct visions of classroom practice based on deeply-rooted cultural routines, selected voices and epistemologies, and preconceived notions of effective and ineffective teaching (Hiebert, Gallimore, & Stigler, 2002; Roth et al., 2006; Stigler & Hiebert, 1999). These tightly bounded “horizons of observation” constrain the possibilities teachers consider and the solutions teachers develop as they collaborate to improve their practice and enhance student learning (Gallimore & Ermeling, 2012; Hutchins, 1996, p. 52; Little, 2003).

Purpose and Method

In the study reported here, one possibility we explored for expanding horizons of observation was engaging teacher teams in collaborative partnerships with outside content experts (OCEs), such as the Learning Studios model, developed by the National Commission on Teaching...
and Americas Future (NCTAF). Launched first in 2009, Learning Studios (LS) are project-based learning environments in which interdisciplinary teacher teams collaborate with local scientists and researchers to develop and implement year-long project investigations with students. As of 2013, 23 secondary schools in Maryland and five schools in New Hampshire were underway with NCTAF Learning Studios implementation.

While there is limited research on the effect of such partnerships (e.g., Briscoe & Peters, 1997; Brown, Bokor, Crippen, & Koroly, 2014; Faloon, 2013; Zhang et al., 2008), the frequently cited rationale for this approach is that outside experts might infuse new resources and viewpoints that assist teachers to expand their professional knowledge and modify enduring images of classroom instruction (Loucks-Horsley, Love, Stiles, Mundry, & Hewson, 2003; National Research Council, 1996). Leveraging the NCTAF program as a research context, this case study (a) documented planning meeting interactions between OCEs and LS teacher teams from two secondary schools, (b) explored perceived effects of these interactions on teachers’ instructional plans, and (c) examined specific OCE facilitative actions that preceded any discernable effects.

Data Collection and Analysis

The research participants included 10 veteran teachers and two OCEs from two secondary schools in Maryland, identified by NCTAF as strong examples of successful Learning Studios-Outside Content Expert (LS-OCE) partnerships. Both of the schools had at least one year of experience with sustained productive collaboration, as evidenced by NCTAF’s observational records of both LS team results and OCE interactions. The cases included one middle school and one high school, both located in the same urban school district, with LS team members representing a range of subject areas, including math, science, English, social studies, and technology education. A profile of each participating school and corresponding OCE is included in Table 1.
Table 1. *Partnership Case Profiles*

<table>
<thead>
<tr>
<th>Partnership case label</th>
<th>Case #1</th>
<th>Case #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>School (pseudonym)</td>
<td>Nobel High School (NHS)</td>
<td>Nobel Middle School (NMS)</td>
</tr>
<tr>
<td>Percent of students receiving free-reduced meals</td>
<td>28%</td>
<td>40%</td>
</tr>
<tr>
<td>Number of LS teachers</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Years of teaching experience</td>
<td>0 = Less than 5</td>
<td>0 = Less than 5</td>
</tr>
<tr>
<td></td>
<td>1 = 5 to 10</td>
<td>0 = 5 to 10</td>
</tr>
<tr>
<td></td>
<td>5 = More than 10</td>
<td>4 = More than 10</td>
</tr>
<tr>
<td>Team member subject areas</td>
<td>Science</td>
<td>ELA</td>
</tr>
<tr>
<td></td>
<td>Tech Ed</td>
<td>Social Studies</td>
</tr>
<tr>
<td></td>
<td>English</td>
<td>Science</td>
</tr>
<tr>
<td></td>
<td>Math</td>
<td></td>
</tr>
<tr>
<td>Years of LS experience prior to 2013-14</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Big idea or theme for 2013-14 LS projects</td>
<td>Survival needs for extended space exploration (Tomatosphere)</td>
<td>Safeguarding our environment through the use of green energy</td>
</tr>
<tr>
<td>Driving question (project focus) during period of case study analysis</td>
<td>What effect does ‘priming’ have on the germination rate, growth, and fruit yield of tomato plants?</td>
<td>How does color affect absorption?</td>
</tr>
<tr>
<td>OCE label</td>
<td>OCE1</td>
<td>OCE2</td>
</tr>
<tr>
<td>Years of LS experience prior to 2013-14</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1 with NMS)</td>
</tr>
<tr>
<td>OCE job title/area of expertise</td>
<td>Research Fellow: Health Science</td>
<td>Science Education Specialist: Environment, Earth and Soil</td>
</tr>
</tbody>
</table>
We obtained informed consent from all teacher and OCE case participants and removed all names and other potential identifiers to maintain anonymity.

Data collection for this project took place during the 2013-2014 school year using a qualitative case study design. Data included live observation and narrative transcription of collaborative planning and design sessions, semi-structured focus groups with the two LS teams, and semi-structured interviews with the two OCEs. OCEs and LS team leaders also agreed to copy researchers on email correspondence and share access to web-based planning documents.

We used a constant comparative method to analyze data for the two cases throughout the twelve-month study (Glaser & Strauss, 1967). We used triangulation to corroborate findings from multiple data sources, across individuals, time, and settings, comparing participant self-reported perceptions with researcher observations (Denzin, 1978; Miles & Huberman, 1994). For each case, we compiled key transcript excerpts and project records across all data sources into a single integrated file and used these files to outline a more complete narrative description.

In particular, we focused our data analysis on collaborative design session episodes coded as “teacher uptake from OCE” to identify key episodes of planning interaction. Uptake was defined as a discernable shift in the pattern of discourse evidenced by heightened teacher interest, curiosity, or engagement in response to the OCE. We further examined each episode of uptake to distinguish between those that were intermittent or short-lived, and any sustained, pivotal episodes that might represent expanded horizons of instructional possibilities. Only a fraction of these uptake episodes warranted further analysis. We used two criteria to classify episodes as expanding horizons: (a) We looked for evidence of teachers adopting an instructional approach from the OCE that was notably different than the approach they might otherwise have pursued for their project design or lesson plans (i.e., something beyond their existing horizons of observation); and (b) we looked for evidence that the insight or approach was directly oriented to a key learning goal or fundamental skill related
to the standards and curriculum. Finally, we also analyzed the specific OCE actions that preceded these pivotal episodes of uptake and expansion.

**Discussion of Results**

Analysis of each partnership-case data set revealed multiple episodes of intermittent uptake with limited or no perceived effect, but each case also contained at least one pivotal episode of sustained interaction that demonstrated clear evidence of the OCE’s influence on teacher instructional plans. These key episodes are the focus of our analysis in the full report. For each partnership case, we compiled a detailed narrative summary of the pivotal episodes constructed from design session transcripts, field notes, correspondence, and available project records from NCTAF. We also incorporated teacher focus group/OCE interview descriptions of OCE contributions and summarized the perceived effect on teachers’ instructional planning. Below is one example from the high school case study.

**Nobel High School Case Study.** The high school case involved a partnership between a research fellow (OCE1) from the National Institute of Health and an interdisciplinary teacher team from an urban high school in Maryland (pseudonym = Nobel High School; NHS). The NHS team included six veteran teachers responsible for English, math, science, and technology education. OCE1 volunteered to assist with the program after learning about NCTAF from a co-worker who partnered with the NHS the previous year.

For the 2013-14 school year, the high school team was working on a project called Tomatsosphere sponsored by the Canadian Space Agency. The goal of the project was to engage students in the study of life support requirements for extended space exploration. Students would design and conduct a scientific experiment with dependent and independent variables by comparing germination rates and plant growth for an experimental group of primed tomato seeds (i.e., pre-soaked in water) and a control group of un-primed seeds. The project also included resources for
cross-curricular application in areas such as nutrition, energy, weather, and environmental studies (Canadian Space Agency, n.d.).

During the initial summer collaborative design sessions (hosted by NCTAF), the NHS teachers and OCE1 agreed that it would be valuable to connect some of her studies with health and aging to why lycopene or other nutrients might be beneficial, and why tomatoes, which are rich in lycopene, might be a viable crop for space travel. However, while conducting research on lycopene over the summer, OCE1 discovered there was limited evidence to support the nutritional benefits of lycopene supplements. She explained:

…after I left them I did a bunch of research online…And so when I was looking I found a website through Mayo Clinic, and they go through and they grade the science of different supplements, and so seeing them grade science made me think about that as an in-class activity…But when you get down to something like lycopene, they showed in one study that it maybe kind of did something one time, but nobody could replicate that, you know, really like there's this one study, but it wasn't really done very well… (NIH Interview, March, 2014)

OCE1 sent the teachers an email between the summer and fall planning session, providing three specific scenarios for how they might approach a lesson involving the idea of supplements and health. The options included: (1) ignore the role of lycopene and just focus on antioxidants in general; (2) discuss the studies pointing to limited evidence for lycopene and use them as an opportunity to engage students in critical thinking; or (3) press forward with their plan to discuss the benefits of lycopene and focus on the few available studies that demonstrated an effect. This email and corresponding list of options served as a launch point for the team’s planning discussions at the next design session in September. The following transcript excerpt captures a pivotal moment of teacher uptake that resulted from OCE1’s suggestions:
...Since most of us have introduced the Tomatosphere project design, the overall purpose to our students...I was thinking maybe we could actually have you come in and they could learn like, “Why tomato?”—with the lycopene.

Dr. L: Ok. So, like I said in my email, I was looking online for evidence of lycopene and human health, and unfortunately there is not very strong support. Like, there will be one study saying that it kind of helps this and another person can’t reproduce it. So the direct role of lycopene itself seems to be pretty tenuous. It doesn’t seem to have a great connection to human health. But I think that this could either be like a learning opportunity...Another option is that you can use it as a critical thinking opportunity to have them like maybe look at the evidence, see what there is, and have them decide if it’s good evidence.

T2: I was going to go with that.

OCE1: It could be a little bit trickier, but it may rewarding.

T2: Well, I like both things but what I was thinking when you started talking is...not just learning facts from a textbook, but actually learning how scientists actually learn the science that we teach in our classrooms. So when you just said that there’s not a whole bunch of evidence to say that lycopene is perfect...I thought it was good for students to see that, that’s it’s an ongoing process...

OCE1: Yeah...looking at different studies and identifying why they’re flawed or why they don’t agree with one another is also teaching the material of what evidence there is for lycopene in health but also critical thinking skills.

T2: So I thought that maybe, I don’t know if you can do this, but give them something and then say, “Does this look like it’s reliable data?”
OCE1: So…maybe. I don’t know, tell me if this would work in an actual classroom. What if I went to the studies and I looked at the abstracts and…if it’s super heavy write a simplified format. And then provide a couple of abstracts about lycopene and let’s say prostate cancer. And I don’t know, maybe the students could read over it…and hold up a letter grade for how good they think the study supports it….and why do you think it’s a great study…or why do you think it’s a bad study? And you know back it up. I don’t know.

T2: That’s a good idea.

T3: I like that idea.

*General nodding and “yeah” across the group…*

T1: I think it directly relates to what we’ve been talking about for our writing samples for claim, evidence, reasoning. So we’ve been recently discussing having students as a goal for the year increase their ability to write a scientific explanation. And the components of a scientific explanation are claim, evidence, reasoning. So if they can actually evaluate a simplified version of the abstract, “Does the information from the abstract match the claim?”…they’re processing through that filter of, “Does this evidence support this claim or not and why?” And then have them do a writing at the end…

OCE1: I could write up the abstracts and you guys could print them out and give them to the students to read the night before so they have some time to digest it. And then I could come give a 15 minute talk about lycopene and human health or what makes a good research study solid.

T2&3: I like what makes a good research study solid. (NHS Design Session Transcript, September, 2013)
These interactions and corresponding reflective comments represent a clear example of teachers expanding horizons of instructional plans as a direct result of outside expert contributions. After alerting teachers to over-simplified claims about the benefits of lycopene, OCE1 presented the team with a wider range of instructional options to consider that might better support their project learning goals. In the following focus group excerpts, teachers describe how their lesson plans became more focused on helping students think critically about the scientific process than would have likely been possible without the outside assistance. They also describe how these lesson changes directly supported important learning outcomes for students:

T: I'll just say what I was talking to you about earlier, that question that I was—that discussion I had with [OCE1]. It’s making me reflect and try to figure out ways that I can connect, not just the fundamental conceptual knowledge they get of our science topic, but also like how the science is actually done...

T: …we realized that students had a weakness when it came to the skills and processes of science, that [Maryland State Department of Education] goal and indicator specifically… And so [OCE1] really set up a, you know, kind of a foundation for this project…the foundation in experimental design… (Nobel High School Focus Group, March, 2014)

Key facilitative actions. Further analysis of this case as well as the middle school case revealed three facilitative actions by external experts that contributed to teachers’ rethinking of project designs and instructional plans. Each of those actions is summarized below including specific illustrations from the high school example.

Adapting expertise to local needs. During her interview comments, OCE1 stressed the importance of listening, genuinely tuning-in to the needs of the group, and learning from the group’s knowledge and experience to effectively adapt and assist the emerging project:
I think the number one thing is to be a good listener. I think that if I had just come in with my ideas of what I wanted to do and just barreled through, like, “Oh, well if it’s not my area, I don't want to do it…” I mean originally I had thought about talking about genetics, like I had this whole idea of what we would talk about, and I think that if somebody’s not willing to listen to what the teachers want and need, and if they're not flexible, I think that things wouldn't go very far. (OCE1 Interview, March, 2014)

This approach not only laid a foundation of trust and shared understanding, but also helped the outside partner gain insight into teachers’ thinking, sometimes revealing important gaps in lesson plans or a specific “blind spot” where assistance might be needed.

*Following-up between meetings.* After learning from teachers and gaining knowledge of their local context, one way OCE1 applied her expertise and contributed ideas was through diligent follow-up work between meetings. As demonstrated by the email she sent before the fall session, OCE1 not only made a substantial effort to review existing literature on lycopene, she carefully outlined three specific instructional options for how they might approach this teaching opportunity. Teachers expressed appreciation for this follow-through and responsiveness:

…they have to be accessible…if you're going to get feedback, you have to have somebody that's going to give you feedback pretty quick turnaround. Like we’ve all been saying, if we asked [OCE1] something, she was very quick to respond to us. (Nobel High School Focus Group, March, 2014)

*Judiciously applying pressure.* After taking time to listen and develop a shared understanding of project plans, OCE1 also looked for critical junctures to stretch teachers’ thinking. In the pivotal episodes we captured, she patiently guided teachers to new insights and judiciously applied pressure to expand their vision of instructional possibilities. While she had clear ideas of instructional activities that might help increase scientific rigor and critical thinking, she introduced these ideas
through a sequence of understated facilitative moves rather than aggressively asserting opinions or overtly leveraging her authority as an outside “expert” or “researcher.” She frequently softened her tone with words like “maybe” or phrases like “tell me if this would work” to engender respect and cultivate openness, while at the same time pushing teachers to consider an alternative instructional approach. She reinforced initial uptake with slightly more direct statements such as, “It could be a little bit trickier, but it may be rewarding.” She then added a few specific points of rationale as interest was building, “Yeah… looking at different studies and identifying why they’re flawed or why they don’t agree with one another is also teaching the material of what evidence there is for lycopene in health but also critical thinking skills.”

These subtle and judicious applications of pressure provided just enough stretch to help teachers grow beyond their existing visions of practice while not demanding so much as to close off communication or create resistance. She confronted gaps without being confrontational. She intentionally and carefully pursued opportunities to help teachers improve the design of project lessons and address important learning goals.

**Significance**

The pivotal episodes we captured provide some initial evidence to support previous researchers’ hypotheses that extended collaborative engagements between teacher teams and OCEs can facilitate teacher learning in ways not readily achieved through traditional partnership models. The joint productive activity and depth of interaction observed in these cases, opened up opportunities to infuse knowledge and insights seldom documented in other teacher-expert studies involving loosely structured programs or short-lived externships. The two cases also provide some initial evidence that outside experts can help to expand the horizons of possibilities teachers consider during the instructional planning process.
To be clear, this is not to suggest that outside expertise is the only way teachers might generate or expand professional knowledge. We agree with Cochran-Smith and Lytle (1999) that “knowledge of practice” is generated “when teachers treat their own classrooms and schools as sites for intentional investigation at the same time as they treat the knowledge and theory produced by others as generative material for interrogation and interpretation” (page 250). We posit that the changes in project plans documented in these examples would be unlikely to occur without the combination of well-structured collaborative teacher inquiry (to leverage teachers’ existing craft knowledge) and well-timed, purposeful involvement of OCEs (to help teachers look beyond existing conceptions of practice). We hope that future studies might explore the specific dosage, frequency, and types of OCE contributions that are most likely to yield these desired effects.

The results of this study have immediate implications for NCTAF LS and other STEM partnerships but they also present broader implications for any context or program where outside experts partner to assist teacher teams. Our full report outlines several specific recommendations for research and practice related to these contexts. For example, program leaders might consider how the key facilitative actions highlighted in these cases might help define criteria used for OCE candidate recruitment as well as the skills emphasized in OCE mentoring and training. The facilitative actions depict a different image of OCEs than the typical profile documented in other observations throughout the partnership literature (e.g. Brown, et al., 2014; Faloon, 2013). Rather than operating as “purveyors of knowledge,” the OCEs worked to adapt expertise to local contexts and judiciously applied pressure to stretch horizons of practice. This required listening, flexibility, and a genuine investment in understanding teachers’ project goals, plans, and rationale. It also required significant time and patience as OCEs carefully selected language and strategically positioned suggestions to nudge thinking forward in small increments of change.
As with all case-study research, these findings are bounded by the specific context of this implementation and case study population (Merriam, 1998). In addition, since the scope and resources for this study focused only on the lesson planning process, we cannot say definitively whether these examples represent trace amounts of influence or whether they have sufficient dosage and effect to yield substantial outcomes for classroom practice and student learning. These remain important questions for future research.
References


