



Externships and Beyond: Work-Based Learning for Teachers as a Promising Strategy for Increasing the Relevance of Secondary Education

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Louisville, Kentucky, teachers participating in an externship with Alexander Bergman, Body Shop Process Coach, at the Ford Assembly Plant, August 2014. Courtesy of Ford Next Generation Learning.

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Introduction

This is the second Education Development Center, Inc. (EDC), white paper that seeks to map the current and future career and technical education (CTE) landscape. Both papers draw on a survey of 850 secondary CTE educators and interviews with 11 state-level CTE leaders that EDC conducted in September 2013. In addition to documenting the increased interest in career preparation that is fueling exciting opportunities for growth in CTE, the survey and interviews highlighted a need to expand partnerships between secondary CTE programs and industry and to strengthen professional development (PD) for CTE educators (Kantrov, 2014). This paper explores work-based learning (WBL) for teachers, a strategy that appears to have significant potential to address both of these needs.

Work-Based Learning at a Glance

For teachers and students alike, the goal of WBL is to provide deeper insight into the needs, realities, and challenges of the workplace. WBL for teachers can take many forms (see page 5 for a typology and examples). One of the most common is employer externships, in which teachers “spend time in a workplace to learn through direct experience about trends, skill requirements and opportunities in industries related to their subject in order to enrich and strengthen their teaching and bring relevance to student learning” (College and Career Academy Support Network, 2010, p. 3). Findings from a Ewing Marion Kauffman Foundation retreat that engaged leaders of STEM-focused teacher externship programs (including two described in this paper—Industry Initiatives for Science and Math Education, and Leadership Initiatives for Teaching and Technology) in identifying promising practices and challenges in externships suggest that combining WBL for teachers with other kinds of PD and ongoing support is key to achieving maximum impact (Kauffman Foundation, 2009).

WBL for students can also take many forms—from field trips and classroom visits by employers to more intensive job shadowing and internships—all of which share the goal of helping students explore careers, develop work-related knowledge and skills (e.g., problem-solving, critical thinking, collaboration, communication), and connect their school learning to the real world. Researchers have identified WBL for students that is closely tied to the curriculum as a crucial part of effective CTE programs (Darche, Nayar, & Bracco, 2009; Rogers-Chapman & Darling-Hammond, 2013).

Although meaningful WBL can happen outside of actual workplaces—for example, both classroom visits by people employed in various industries and school-based enterprises have important benefits (Linked Learning Alliance, 2012; National Academy Foundation, 2011)—opportunities to spend time at businesses and other work sites, to participate in real work in these settings, and to interact with employees are invaluable. To provide large numbers of students with the most authentic and intensive WBL opportunities, teachers and schools must spend significant time reaching out to and establishing relationships with employers. Even field trips and classroom visits require access to and relationships with local businesses and other employers. As this paper will show, teachers who participate in WBL are able to develop and nurture strong relationships with employers that position them to provide more WBL opportunities for their students, and build their capacity to design high-quality classroom WBL, including challenging project-based learning—a form of learning that facilitates the integration of academic and career education.

WBL for teachers can be a strategic investment in advancing the nation's college and career readiness goals for students. As Sue Roshon, Director of Adult and Career Education in Lee County, Florida, notes, "If you send one kid on an internship, it affects that one kid. If you send a teacher, the impact reaches their 200 students!"

(Ford Next Generation Learning, 2014, p. 37)

Access to Industry Partners, Status of Professional Development: Relevant Findings

Two sets of findings from EDC's 2013 survey on the current CTE landscape are relevant to this paper's discussion of WBL for teachers: access to industry partners and status of PD. As noted, WBL requires a significant initial investment in time and effort to forge connections with employers. Thus, it is not surprising that the secondary CTE educators who responded to EDC's 2013 survey reported a sizable gap between the level of importance of "Finding industry partners and mentors" (93%) and their level of satisfaction (51%) with this key feature of their CTE programs.

Despite WBL's strengths, opportunities to participate in externships and other forms of WBL are not widely available to CTE educators. Furthermore, both survey findings and EDC's interviews with state-level CTE leaders revealed that the field faces significant challenges related to PD. Although almost all respondents (91%) placed a high value on PD (rating it "Important" or "Very Important"), only 60% were "Satisfied" or "Very Satisfied" with existing PD opportunities. One likely contributing factor: CTE programs have experienced steep cuts in funding for PD. Nearly one-third of respondents who reported funding reductions in the past year had experienced them in PD, and respondents ranked PD as one of their top priorities for investment (Kantrov, 2014, p. 6). The state CTE leaders that EDC interviewed concurred that PD is a major area of need and noted that resources to support PD are inadequate.

Both survey respondents and interviewees identified industry training or credentialing (as well as use of technology and integration of academic and career education) as a key area of focus for PD for CTE educators.¹ The vast majority of respondents (97%) said that alignment of CTE programs with industry standards and expectations is "Very Important" or "Important," and 85% rated alignment with regional economic development opportunities as "Very Important" or "Important." In interviews, state CTE leaders noted the shortage of teachers who are currently able to tie their instruction to today's industry and workforce demands. Together, these results suggest that increasing WBL opportunities for teachers could play a pivotal role in ensuring that teachers have up-to-date knowledge of industry needs and the ability to translate that understanding into their instruction to best prepare their students for college and career success. It may be especially important to provide teachers with WBL in the program areas that most respondents believe will expand: STEM, Health Science, Information Technology, Manufacturing, and Agriculture, Food, and Nature Resources.

¹ See Kantrov (2014, pp. 7–9) for a discussion of the importance and challenges of integrating academic and career education.

A Closer Look at WBL for Teachers: A Typology and Examples

As noted, one of the most common types of WBL for teachers is teacher externships, in which teachers gain insight into the demands of specific careers and workplaces through onsite experiences at employers' facilities. Externships can range from a workplace visit (usually for a group of teachers) lasting several days to a week, to an intensive five- to eight-week summer work experience, in which individual teachers typically carry out a project for an employer onsite. In this paper, however, I use the term WBL to apply to the full range of learning opportunities for teachers that share four key characteristics, whether they take place in a school for several hours or onsite in an employer's facility for eight weeks:

- Engaging teachers in learning about the nature of the work environment
- Familiarizing teachers with the academic, technical, and 21st century knowledge, skills, and dispositions required for success on the job
- Keeping teachers abreast of current and emerging career opportunities
- Expanding teachers' knowledge of the education and training requirements required for different positions

In the sections that follow, I present a rough typology of WBL programs for CTE teachers and their academic colleagues, accompanied by examples of each type of program. Figure 1 depicts the typology and shows where each example fits within it.

Figure 1. Typology of WBL for Teachers



I conclude the paper by providing a synthesis of the WBL programs' successes and challenges, including funding and sustainability issues that the participants in the aforementioned Kauffman Foundation retreat also identified as challenges. Although this synthesis provides some anecdotal evidence on how WBL programs for teachers can have the greatest impact on employers, teachers, and students, in the most cost-effective and sustainable way, it also serves to underscore the urgent need for rigorous studies to provide data on impact that can be used to guide CTE decision-making related to WBL and PD.

Extended, Individual Externships

Both CTE programs and programs for STEM teachers use externships of various types as a PD strategy. Several STEM-focused externship programs have published evaluations that document the impact of the experiences on business partners, teachers, and (less well-documented) students. These STEM externships tend to be time-intensive; typically, participants spend five to eight weeks during the summer individually working on a project identified by the employer. Teacher participants document their work experience in some way and develop a plan for using what they have learned in the classroom. The extent to which these externships provide additional PD that supports teachers in applying what they have learned in the workplace varies.

The Industry Initiatives for Science and Math Education (IISME) Summer Fellowships and the Real World Externships for Teachers of Mathematics, Science, and Technology are robust individual externship programs that provide PD support for STEM teachers during multi-week externships; external evaluators have examined both programs and documented their impact on teachers. Leadership Initiatives for Teaching and Technology (LIFT²), an extended, individual externship program for STEM teachers, provided more intensive yearlong PD. All three externships are stand-alone programs and are not part of a more comprehensive school change effort. Their shared goals, as summarized in a Theory of Change presented at the Kauffman Foundation retreat (Kauffman Foundation, 2009), include the following:

- Increase teacher motivation
- Enhance teacher knowledge (of STEM and of 21st century workforce needs) and ability (new teaching strategies)
- Promote changes in classroom practice, including assigning hands-on, collaborative projects based on real-world problems; integrating math, science, and technology; taking students on field trips to research labs; and acquainting students with STEM careers and educational opportunities

The IISME Summer Fellowship Program is a long-running California initiative (IISME, 2014a) that requires participating teachers to return to their schools and directly apply their experiences. For example, one middle school science teacher drew on her IISME fellowship experience at Lockheed Martin Space Systems Company—where she used the company's peer review process to test commands and report errors to the software engineers—to design a computer science lesson for her students using the programming language Alice. In another example, a high school technology

The Industry Initiatives for Science and Math Education Summer Fellowship Program

Date Founded: 1985

Location: California

Goals: To infuse real-world applications into math and science lessons, motivate teachers in the profession, and inspire students toward majors and careers in STEM

Target Audience: K–16 teachers

Design: Eight-week, full-time summer work experience during which teachers complete a project for their business hosts

Stipend: \$900 per week (participants must spend 10% of their paid time planning how to “transfer their Summer Fellowship experience back to their students and colleagues” [Industry Initiatives for Science and Math Education (IISME), n.d., ¶1])

Cohort Size: 150 to 175 teachers take part each summer

Number of Business Partners: 40 to 50

Number of Program Graduates to Date: 3,287 teachers from 696 schools and 124 districts

Website: <http://iisme.org/>

teacher used his fellowship experience—in which he created videos to increase brand awareness and engage the open source community with Citrix’s cloud environment—to design a project in which students developed simple, effective video demonstration techniques to help others learn how to carry out an unfamiliar task (IISME, 2014b).

Findings from the IISME Summer Fellowship Program’s 2013 evaluation by Quality Evaluation Designs document a positive impact on participating teachers. Based on a survey of teachers who had participated in the program since 2001 (880 teachers received e-mailed surveys and 476 responded, for a 54% response rate), the evaluation found that 20% of teachers described the experience as “transformational.” The evaluators concluded that “consistently high results on related variables reinforce an over-arching conclusion that the IISME experience is uniformly effective across a broad spectrum of teachers with diverse teaching contexts, years in the field, subject area expertise, and life experience” (Simons & Lichtenstein, 2013, p. 19).

Specific impacts on teachers included the following:

- Greater awareness of the importance of 21st century skills—critical thinking, technology, and collaboration—and greater integration of these skills into teaching practice
- Improved knowledge of and skills in using technology
- Greater understanding of the workplace expectations students will encounter
- Increased professional confidence
- Improved capacity to use real-world examples in the classroom
- Better advising for students about STEM jobs

In interviews with teachers, the evaluators found that those who were most passionate about the impact of the fellowship experience indicated that they were most strongly affected by the culture of the workplace and the ways in which employees carried out their work—particularly their collaboration and teamwork. As one teacher commented, “Exposure to the corporate culture was the MOST valuable part of the fellowship experience” (Simons & Lichtenstein, 2013, p. 13).

The IISME evaluation also showed that rather than encouraging teachers to leave the profession, the fellowship experience increased their commitment to teaching. Their principals reported growth in the teachers’ leadership and ability to energize and inspire other teachers, students, and even administrators (Simons & Lichtenstein, 2013, p. iii). In an earlier IISME evaluation of participants in the program between 1985 and 2000, which specifically focused on teacher retention, the evaluators found that participants in the fellowship program were more likely to remain in teaching than non-participants (Weisbaum & Huang, 2001, p. iii).

The themes of the transformative power of the externship experience and the impact of learning the importance of collaboration in the workplace, highlighted by the IISME evaluation, are consistent with the findings of the evaluation of the National Science Foundation (NSF)-supported Real World Externships program.

The Center for Social and Behavioral Research at the University of Northern Iowa serves as the evaluator of Real World Externships. The center’s most recent (2013–2014) evaluation report features data on the impact of the program on business hosts, teachers, and a small number of students.

Real World Externships for Teachers of Mathematics, Science, and Technology Offered by Iowa Mathematics and Science Partnership

Date Founded: 2009 (NSF funding beginning in 2011 allowed the program to expand)

Location: Iowa

Goal: To help teachers engage students in learning activities that apply subject-area concepts to real-world applications and integrate 21st century skills into their curriculum

Target Audience: High school mathematics, science, and technology teachers

Design: Five- to six-week work experience in which each teacher extern “contributes to company operations by applying mathematics, science, and technology skills”; with the help of their business hosts, teachers document and reflect on their work experiences each week and develop “a detailed project-based learning experience that translates the summer externship experience to the classroom” (Weld, 2014, p. 1)

Stipend: \$150 per day, for a total of \$4,500, as well as a \$300 mini-grant to support teachers in bringing what they learn back to the classroom

Cohort Size: 50–60 teachers take part each year

Number of Business Partners in 2013: 42

Number of Program Graduates Through 2013: 208 teachers

Website: <http://iowastem.gov/externships>

According to the report, perceived benefits to the hosts include not only the work completed by the externs, but also the partnership between the business and the school and having the school as an ally in encouraging and preparing students for the workplace. Business hosts report that they were most motivated to offer externships in order to “improve the classroom experience for students” (Pollock & Losch, 2014, p. 3)—providing real-world experiences or, more generally, increasing students’ interest in STEM fields.

Teachers responded to questionnaires prior to the externship, immediately after the externship, and at the end of the first semester (Fall 2013) following the externship. Around 75% of teachers agreed or strongly agreed that the externship was relevant to the courses they taught. These teachers also agreed or strongly agreed that it affected the way they taught, their understanding of 21st century skills, and their views on math and science, and they agreed or strongly agreed that more students expressed an interest in STEM careers as a result of their having participated in the externship (Pollock & Losch, 2014, p. 12). Nearly all the teachers (93%) described the externship as “more valuable than any other PD in which they had ever taken part” (Pollock & Losch, 2014, p. 13). However, after the semester following the externship, teachers reported somewhat less impact on their actual teaching practice than they had anticipated immediately after the summer experience (Pollock & Losch, 2014, pp. 7–12). In terms of building business-education partnerships, about 50% of teachers reported that they had been in touch with their business hosts after the externship, and more than 75% expected the relationship to continue (Pollock & Losch, 2014, p. 13).

The IISME and Real World Externship evaluations suggest that documenting the impact of these externship experiences on students is more challenging than learning about their impact on teachers and business partners. The IISME evaluation provides only teachers’ and principals’ accounts of the impact of the fellowship experiences on students, and the evaluators of Real World Externships, despite adjusting their methodology based on previous years’ evaluations, found it very difficult to obtain meaningful data on student impact directly from students themselves because of low response rates. However, energizing and improving the workplace awareness of teachers and keeping these energized and more knowledgeable teachers in the profession are valuable in and of themselves. During a May 2014 Successful STEM Education workshop held at Olin College of Engineering in Needham, Mass., Jeffrey Weld, who directs the Real World Externships program, reported that not a single teacher participant has considered leaving the profession to work in industry; rather, participating teachers become more committed to teaching and to making their teaching more relevant (Weld, 2014).

The experience of another intensive STEM externship program, Leadership Initiatives for Teaching and Technology (LIFT²), may shed some light on why teachers’ efforts to implement what they learn through their externship experience tend to be more limited than they would wish.

LIFT² was distinctive in that it combined its externship with intensive PD: participating teachers took three graduate courses at Framingham State University that focused on teaching 21st century skills, teaching with technology, and project-based learning (PBL). In later years, the program wove PBL into the first two courses; the teaching with technology course focused on implementing a flipped classroom approach, and teachers developed a professional learning experience for their colleagues in the

**Leadership Initiatives for Teaching and Technology (Lift²)
Offered by the Technology Initiative, Metro South/West (Mass.)
Regional Employment Board**

Dates: 2002–2013

Location: Massachusetts

Goals: To develop teachers' capacity to implement experiential and inquiry-based teaching and learning, apply 21st century technologies to STEM curriculum and instruction, integrate 21st century workplace skills into the curriculum, and integrate STEM career awareness into classroom culture

Target Audience: Middle and high school mathematics, science, and technology teachers

Design: Six-week, paid summer externship plus three graduate courses

Stipend: \$800 per week

Cohort Size: 15–20 teachers each year

Number of Business Partners: Approximately 40

Number of Program Graduates: 165 teachers from 35 districts

PBL-focused course. The program offered one graduate course during the summer, while teachers were engaged in the externship, and provided the other two during the subsequent academic year. Initially, grants from the Massachusetts Department of Elementary and Secondary Education and funds from No Child Left Behind supported the program. In later years, participating businesses fully supported the program.

Unfortunately, there was no formal evaluation of LIFT², so it is difficult to know to what extent the intensive, yearlong PD teachers experienced contributed to their ability to implement what they learned and impact their students. However, an interview with Jim Stanton (personal communication, April 30, 2014), who directed the LIFT² program, offers useful insights into the program's implementation, successes, and challenges.

Stanton noted that in addition to the plans the LIFT² teachers made in their graduate courses on how to implement their externship learning in their classrooms, each week they reported on their progress to their company supervisors. At the end of the externship, they presented to the company and their school and district administrators on what they did, what they learned, and how they expected to integrate what they learned into their teaching practice. Stanton reports that participating teachers maintained contact with their business hosts and were able to bring students on field trips to the businesses. This observation is in line with the experiences reported by the Real World Externships evaluators and underscores the potential of such programs to build and maintain industry partnerships. Stanton also saw participating teachers expand their use of collaboration in the classroom and encourage students to use technology more extensively.

Although developing teacher leaders was not a stated goal of LIFT², Stanton notes that the participating teachers exhibited great potential to become leaders, and some eventually became department heads. However, as the program unfolded, he observed that while these teachers brought

what they had learned into their own classrooms, many found it difficult to influence other teachers in their schools; they tended to meet resistance from colleagues, even when their administrators were supportive. To address this issue, were he to offer the program again, Stanton says he would make developing teacher leadership skills an explicit component and extend the professional learning community that developed among each year's cohort of teachers beyond their year of active involvement. He believes that continuing to engage participants, and having each cohort connect with previous cohorts, would have helped them sustain and build on the learning they did during the year they participated directly. As the Academies of Nashville program described in the next section suggests, embedding externships and ongoing PD into a more comprehensive school change effort that engages teachers in sustained professional communities can address some of the challenges experienced by LIFT² participants.

Shorter-Term Team Externships

A second type of WBL for teachers is the shorter-term team or group externship, usually ranging from three to five days, which provides PD support for teams of CTE and academic teachers to design PBL experiences that integrate academic and career education. The goals of these programs resemble those of the more extended STEM externships:

- Improve teachers' understanding of the knowledge, skills, and dispositions required in today's workplaces and the kinds of technology used there
- Help teachers learn about the range of job opportunities available in the fields their academies focus on, the education and training requirements for these jobs, and the connections between these jobs and the subjects they teach
- Encourage and support teachers to provide hands-on, interdisciplinary PBL experiences based on real-world examples
- Help to establish partnerships between schools and businesses in their community

Though their goals are similar to those of the longer-term individual externships, these shorter-term team externships seek to capitalize on the collaborative group structure to focus more directly on using the industry experience to develop and implement integrated learning experiences for students and strengthen relationships between local businesses and schools.

Teachers from career academies—a form of CTE that emphasizes interdisciplinary PBL that has been proven to have a positive impact on students' attendance, graduation rates, and achievement (Brand, 2009; Dayton, Hester, & Stern, 2011; Kemple, 2008)—participate in the two short-term team externship programs described below.² Although neither program has carried out a formal evaluation, in informal evaluations, teachers have described the externships as “transformative” and as one of the most

² Career academies in communities affiliated with Ford Next Generation Learning (Ford NGL) offer the two programs. Ford NGL takes a comprehensive approach to transforming secondary education, building business and community partnerships to support and sustain redesigned high schools based on the career academy model. While such externship programs are not unique to Ford NGL communities, Ford NGL encourages them as strategies that capitalize on and strengthen community engagement, align secondary education with regional economic development opportunities, and enhance teacher professional development.

Academies of Nashville Teacher Team Externships Nashville, Tenn.

Date Founded: 2010

Location: Tennessee

Goals: Enable academy teachers to experience the inner workings of a real-world business process at a host organization and develop their capacity to turn their experiences into rigorous, relevant integrated curriculum units that help students develop 21st century skills and learn about careers, work environments, and postsecondary education requirements

Target Audience: Interdisciplinary teams of academy teachers

Design: Three- to five-day team externships; the first part is devoted to learning about the operations of the host company, and the second part focuses on tapping into the expertise of business partners to develop interdisciplinary PBL experiences for students

Stipend: \$100 per day (\$85 goes directly to teachers; \$15 pays for benefits)

Cohort Size: Teams of four to five teachers each year; since 2010, teams from all 41 academies have participated, some more than once

Number of Business Partners: 300 (though not all offer externships)

Number of Program Graduates: 55 teacher teams, or approximately 1,200 teachers

Website: www.mnps.org/Page74440.aspx

powerful kinds of PD they have experienced (P. Chaon, personal communication, May 5, 2014; Herrman, 2013, p. 1). Participating in the externships together also offers teachers a rich and challenging team-building opportunity, which they carry back to their collaborative work in the academies.

In Nashville, where all 16,000 high school students learn in 41 academies, nearly all high school teachers have participated in the externship program at least once. At the end of the program, participating teams return to their academies with interdisciplinary PBL experiences—designed and finalized with input from their business partners—that help students connect the subjects they are learning in school to the delivery of a product or service. The program invites business partners to the school to see students present their completed projects. Starr Herrman, former director of the Academies of Nashville, helped coordinate the externship program when it began with support from the Chamber of Commerce. She describes the teacher externships as “a way for teachers to learn about the most up-to-date skill sets and career expectations that are out there in the real world for students” (Kotz, 2013, p. 2). Math teachers, for example, are able to see firsthand how professionals in jobs ranging from architect to contractor to engineer use the academic knowledge and skills they teach.³

In Louisville, Kentucky, where Herrman and colleagues from Nashville introduced a selected group of academy teachers to team externships in 2013, Debbie Anderson, a career theme specialist with the Jefferson County Public School District, noted that information technology teachers “were

³ See posts from Nashville teachers who participated in externships in summer 2014 on the Academies of Nashville Blog (<http://myacademyblog.com/category/academies-of-nashville/teacher-externships/>).

blown away by the kind of data that businesses were using to make decisions. They realized, 'I don't take my kids far enough so they know the data is right and where it comes from'" (Kotz, 2013, p. 3). A Louisville English teacher whose externship was at a local advertising firm has worked with her academy's advertising teacher to develop a project that focuses on the collaborative nature of the workforce. According to Anderson, these teachers team up to develop group assignments: Students "create and contribute to a job ticket that follows the assignment through each phase of completion. They have to own the work they do and be responsible to others to make sure the job gets done in the time the client requires" (Kotz, 2013, p. 4).

Those leading the team externship experience in Nashville have learned through experience how important it is to provide PD support to participating teachers. They have developed an extensive set of materials and tools that help guide teachers through the work site experience, and provide intensive support to help teachers develop interdisciplinary projects that integrate academic and career education and focus on building workplace knowledge and skills. According to Paula Barkley, an academy coach at Nashville's McGavock High School, "A teacher externship can have a profound impact on a team of teachers if there is professional development prior to the experience and follow-up with the academy coach and the [business] partners afterward. . . . [W]ith the proper support for developing and implementing projects, the team externship experience is truly transformational" (Kotz, 2013, p. 4).

In St. Johns County, Florida, Paula Chaon, the district's Director of Career Education, started the Teachers in Business Externship (TIBE) Program when she was an employee of the local Chamber of Commerce. As funding has ebbed and flowed, the program has changed somewhat (including expanding beyond the St. Johns County district to serve the region), but the core design remains the same, as described by Chaon in an interview (P. Chaon, personal communication, May 5, 2014).

Teachers in Business Externship Program St. Johns County, Florida

Date Founded: 2008

Location: Florida

Goal: Provide a learning experience that enables educators to prepare their students for careers of their choice

Target Audience: Teams of CTE teachers and academic teachers from career academies

Design: One-week externship that kicks off with an orientation; teachers spend part of the next four days at one or more businesses and are required to develop at least three integrated units related to the work they observe

Stipend: \$1,000

Cohort Size: Has ranged from 2 to 38; between 2009 and 2014, the average was 25

Number of Business Partners: 105

Number of Program Graduates: 154

During the externship, business partners host the teachers and review teachers' unit plans. In addition, they agree to participate in the students' learning experiences, so the program is able to schedule field trips, guest speakers, and other activities in which the business partners directly engage with students in advance of the school year.

For the last two hours of each day during the weeklong externship, teachers work together in teams. Ideally, said Chaon, a CTE teacher will be teamed with academic teachers. Chaon noted that in an earlier incarnation of the externship, teachers spent the whole day at the business and only came together on the last day. She tweaked the format when she found that teachers needed time to reflect together each day, immediately following their work site experience, to make the best use of what they had learned.

TIBE has an Edmodo site for sharing background materials, templates for unit planning, and teachers' completed units. Chaon provides ongoing follow-up for participating teachers and encourages the career specialists at their schools to follow up as well. In addition, Chaon ensures that teachers who participate in the externships have some prior PD in PBL, have some experience teaching integrated lessons, and receive training in effective teaming strategies.

A feature that the shorter-term team externships share with the more extended individual externships is that both the businesses and the schools benefit from these partnerships. Chaon reported that businesses better understand the level of knowledge and skills that students will bring to internships and other WBL opportunities, and teachers can better prepare students for those experiences, as well as encourage businesses to consider offering them. Businesses also appreciate having the opportunity to talk with teachers about the characteristics and competencies they look for in potential employees—and that students will need to possess to compete in the local job market.

Chaon said that the biggest challenge she has faced is sustaining funding for the externships. The number of teachers she has been able to accommodate has dwindled in recent years due to reduced funding from the regional workforce development board—channeled through the Chamber—and she has begun seeking corporate and district funding to support and sustain the program. This is in contrast to Nashville, which has been able to sustain the team externships and expand its reach to nearly all high school teachers in the district. The difference is likely attributable to the ongoing structure that Nashville has developed through Alignment Nashville (Alignment Nashville, 2012, 2013; Kantrov, 2014, pp. 12–13) to coordinate community support (financial and otherwise) and the success of the Academies of Nashville in building and sustaining partnerships between academies, local businesses, postsecondary institutions, government agencies, and community-based organizations. The Nashville team externship program illustrates the value of a systemic, community-wide approach in scaling and sustaining such an initiative.

Non-Externship WBL: Field Trips, Meetings, and Informational Interviews

In addition to externships of varying lengths, WBL for teachers may include field trips, where teachers visit a workplace for a day or part of a day; meetings or panel discussions with people who hold positions in relevant fields, where teachers learn about different jobs and their requirements;

and videos and online interviews with such individuals. In some instances, teachers design PBL opportunities for students based on these WBL experiences, and the experiences can help foster ongoing relationships between teachers or schools and employers. All these forms of WBL yield some of the same benefits as externships, lend themselves to being combined into comprehensive programs, and/or can be paired with externships.

An example of a quite intensive effort of this kind is a “teacher immersion” program offered in Lee County, Florida, which brings teams of academy teachers to a variety of workplaces five or six times over the course of a school year and engages them in hands-on projects. The program’s goal is to help teachers understand what students need to know and be able to do in order to be successful in the Southwest Florida workforce. In an interview, Sue Roshon (personal communication, May 5, 2014), who initiated and directed this program, noted that initially only CTE teachers were invited, but now at least one science or math teacher accompanies the CTE teacher—increasing the chances that the experience will impact students’ learning in an integrated, meaningful way. This program includes an orientation for teachers and a session following the workplace experience, in which teachers work together to develop classroom activities that apply what they have learned. Teachers also share the activities they develop online.

Although the program has been successful, Roshon identified several challenges. For example, the burden of following up with and providing support to teachers fell on her as the coordinator of the immersion program, as did the work of identifying and recruiting business partners and arranging the logistics of the workplace visits. Having one person responsible for all of these key supports and program elements could hinder the program’s sustainability and widespread implementation.

Other kinds of PD for teachers may include components—such as structured visits to workplaces and/or interactions with industry professionals—that serve purposes similar to WBL. For example, EDC designed and provided four- to five-day summer institutes to support teachers in implementing *Digital/Media/Arts (D/M/A)* (EDC, 2013) and *Law and Justice* (EDC, 2012)—two high school curricula designed for Linked Learning Alliance career pathways that engage students in solving real-world problems and carrying out authentic workplace scenarios. Participants in *D/M/A* institutes—both CTE and academic teachers—visited either Pixar/Dreamworks or Universal Studios. In an interview, Eliza Fabillar (personal communication, May 5, 2014), who led the design and facilitation of the *D/M/A* institutes, noted that teachers who took part in the visits saw firsthand the industry culture, including the importance of collaboration and teamwork (echoing the experience of the teachers who participated in IISME fellowships). Both the *D/M/A* and *Law and Justice* institutes enabled teachers to question, and to share their insights with, panels of professionals who represented a range of jobs in these career pathways, and illustrated the diversity of individuals who work in these fields. In an interview, Jessica Juliuson, who, with Fabillar, co-designed and led the *Law and Justice* institutes, said that teachers felt honored that these busy professionals, including two judges, took the time to be on the panel (J. Juliuson, personal communication, May 5, 2014).

Panel members were encouraged to talk about particular skills that young people entering higher education and careers tend to lack. The *D/M/A* panel focused on storytelling, whereas the *Law and Justice* panel emphasized written communication and understanding and using data. Teachers were

sometimes surprised to learn that these were the skills considered most important by professionals. For example, a member of the Los Angeles Police Department startled the teachers by reporting that more police academy students fail because they cannot write a simple incident report, rather than for lack of physical prowess or any other reason. Teachers also learned about careers with which they were less familiar—including some of the types of technical support positions in the media industry, and jobs in court administration. Even the minimal amount of contact between teachers and panel participants in some cases led to ongoing interactions following the summer institutes. Both Fabillar and Juliuson said they found that combining workplace visits and panels had a greater impact on teachers than either strategy used individually. They concluded that these experiences helped teachers buy in to the career pathways approach overall and gave them a better idea of where their students might be heading, as well as what they could do to help their students be more successful.

Roshon, Fabillar, and Juliuson all expressed a desire to increase the intensity of these alternate forms of WBL. For example, Roshon indicated that in an ideal world she would provide teachers with more extensive workplace experiences than the Lee County immersion program allowed—true externships—and would pay teachers for their participation. Fabillar and Juliuson also advocated providing teachers with more intensive externship experiences, combined with PD, and engaging more business partners in working with teachers to design student projects, participate in student learning, and help develop and carry out project assessments. Like Stanton, both Fabillar and Juliuson stated that they would have liked to establish ongoing professional learning communities through which teachers could share their experiences and learn from one another. Nevertheless, these non-externship WBL experiences can, as suggested in the next section, have a place in a coordinated, long-term WBL PD strategy for teachers.

Synthesis of Programs' Experiences, and Implications for Research

The Value of Work-Based Learning

The overview of the range of WBL experiences for teachers provided above points to their potential to enable teachers to continue to learn and to implement what they have learned, particularly when tied to significant PD and ongoing support. Teachers who participate in these WBL experiences get a firsthand view of what a modern workplace looks and feels like, what skills and knowledge are required and valued in those workplaces, what kinds of career opportunities are available to qualified applicants, and to what extent those qualifications require further education and training beyond high school. That so many teachers describe their externship experience as “transformative” suggests how profound this impact can be—and just how disconnected many educators, including CTE teachers, are from current workplace realities. When WBL experiences are accompanied by PD that guides teachers to use what they have experienced to revisit their learning goals for students and their instructional approaches, as the accounts of the programs described above suggest, teachers can develop the capacity to reinvent their practice in ways that prepare students for success in today's workplaces.

In addition, CTE and academic teachers who participate together in team externships can begin to coordinate and integrate their instruction to provide students with the rigorous, relevant learning that

academic and CTE standards both demand. Moreover, by connecting teachers and schools directly to employers, WBL can build new relationships, or strengthen existing relationships, between them, and pave the way for ongoing interactions that enable more students and teachers to experience WBL directly. However, when WBL and the PD accompanying it are not part of ongoing, systematic efforts to ensure that teachers can sustain and continue to build on what they have learned—and particularly when individual teachers must solely shoulder the application of the learning—the impact of the program and its likelihood of sustainability are likely to be more limited.

The Need for Evidence

Overall, the small amount of data on the impact of WBL experiences for teachers, particularly on their students, and on the relative benefits of their particular features, leaves us with two major questions, especially in light of the EDC survey and interview findings about CTE educators' budget constraints and PD priorities:

1. Given the greater costs and limited reach of extended, individual externships compared to shorter-term team externships with the potential for greater reach (e.g., in Nashville) and other forms of WBL, are the benefits of individual externships sufficient to justify the extra costs?
2. Given that all the WBL programs intend both to increase teachers' knowledge and to change their teaching practices (e.g., to encourage more project-based teaching and learning and greater focus on building students' 21st century skills, including critical thinking and collaboration), what configuration of WBL (individual or team) combined with what kind and extent of PD is most likely to ensure that the WBL experiences have the greatest impact on both teaching and learning?

Each question is considered in more detail below.

Are the benefits of extended, individual externships sufficient to justify the extra costs?

Costs for teacher stipends for the individual externship programs described above ranged from \$4,800 per teacher (LIFT² and Real World Externships—both giving each teacher about \$800 a week for six weeks; the latter also provided \$1,200 for each mentor, for a total of \$6,000) to \$7,200 per teacher (IISME—\$900 a week for eight weeks). In LIFT²'s later years of operation, each business partner paid both the teacher stipend and a \$4,000 fee to the program to cover some of the administrative costs and allow the teachers to take the Framingham State University courses free of charge. In contrast, per-teacher stipends for the weeklong team externships ranged from \$1,000 for the five-day TIBE program in St. Johns, Florida (P. Chaon, personal communication, May 5, 2014) to \$300–\$500 per teacher for the Academies of Nashville three- to five-day externship (A. Wyatt, personal communication, August 6, 2014).⁴

Funding for all these programs comes from a variety of sources, including business partners themselves, workforce boards, federal grants (e.g., the NSF ITEST grant that has supported the Real

⁴ Information about the administrative costs of these programs or additional costs for PD accompanying the externships and/or provided as follow-up support is difficult to find for most of these programs, so the comparisons in this paper rely largely on per-teacher stipends.

World Externships), foundation grants, state funds, and school district funding, and sustaining these programs is a major challenge. For example, as described previously, LIFT² ended when Stanton found it too difficult to continue to secure corporate funding. On the other hand, the state of Iowa has agreed to invest \$150,000 annually to sustain the Real World Externships once the NSF grant ends. Iowa will require a one-to-one match from partner companies; between 50 and 75 teachers will be able to participate each summer, depending on how many companies are able to cover the entire cost for hosting a teacher, as some currently do (J. Weld, personal communication, August 12, 2014). Recruiting business partners willing to host long-term individual externships, and individually orienting them, is also time-consuming and thus requires a significant investment by either the district or an intermediary organization whose staff typically carry out this work.

Of course, team externships also require investment of financial and in-kind resources on the part of both the district and the industry partners. As noted, Chaon has begun to reach out for corporate and district support to sustain the TIBE team externship program as workforce development funding has waned. However, team externship programs need fewer business partners to reach the same number of teachers, since multiple teachers participate in the externship offered by each partner.

The non-externship WBL experiences for teachers discussed above carry few additional costs beyond those of the PD already offered. Thus, it is worth investigating the extent to which their benefits compare to those of more costly externship experiences. In the case of WBL for students, a continuum of WBL experiences—career awareness (e.g., workplace tours, guest speakers, career fairs), career exploration (e.g., virtual interviews or job shadows), career preparation (e.g., internships), and career training—has been posited as a practical and effective way to integrate WBL over the course of a student's schooling (Darche et al., 2009). Research might look at what combination of less- and more-intensive WBL for teachers—perhaps combining a series of “light-touch” WBL activities (e.g., panels, informational interviews, field trips, videos) with a team externship opportunity at some appropriate point—will provide the optimum, and most cost-effective, benefits.

What configuration of WBL combined with what kind and extent of PD is most likely to ensure that the WBL experiences have the greatest impact on both teaching and learning?

The most recent evaluation of the Real World Externships showed that even with significant PD support during individual externships, in the absence of ongoing support, teachers' intent to change their practice immediately following their externship experience tended to exceed their capacity to implement those changes. In LIFT², teachers received intensive PD support over an entire school year, but still struggled when they returned as individuals to their schools to sustain their new practices in the face of resistance from colleagues. These experiences suggest that the team approach, combined with ongoing district and business partner support, may be preferable to the individual externship approach on its own. In Nashville, the team externship is part of a comprehensive approach to PD that provides coaching, common planning time, and other support for teachers to align their practice with their learning in the workplace, and business partners maintain strong, ongoing relationships with the schools (Kantrov, 2014, pp. 12–13). When WBL is part of a systemic, community-wide effort, implementation of learning from the externship—and, likely, other WBL experiences—seems to have the greatest opportunity to flourish and be sustainable.

Taken as a whole, this synthesis of program experiences points to what the best configurations of both externships and accompanying PD are likely to be. But districts making decisions about how to allocate scarce PD resources, and corporate and other partners deciding how best to support schools and districts, would greatly benefit from research that assesses which specific features of WBL programs and associated PD (both concurrent and ongoing) have the greatest potential to impact teachers' practice and student outcomes. The matrix introduced at the beginning of this paper (Figure 1) identifies as key features of WBL the duration of the experience, the intensity of accompanying PD (which includes the extent of ongoing and community-wide support), and the individual or team nature of the experience. This matrix can serve as a framework for future research.

Conclusion

While not backed by rigorous research, WBL for teachers—combined with substantive and ongoing PD to support changes in practice—is a potentially powerful way to help CTE and academic (STEM and other) teachers connect what and how they teach to current workplace demands. All the types of WBL described in this paper, including even the most limited interactions of teachers and employers, also enable businesses and schools to build partnerships. Comments from business partners about their experiences—whether in the formal evaluation conducted on the Real World Externships or informal comments from participants in the team externship programs—are almost uniformly positive. Business partners praise the dedication of the teachers, are eager to assist teachers in developing a better understanding of the demands of the 21st century workplace, and are eager to help teachers improve their instruction in order to prepare students to meet those demands.

Making WBL an integral component of teacher PD for both CTE and academic teachers can help school districts maximize their PD investments and strengthen CTE programs' connections with industry. Doing so in combination with pursuing more systematic research that furnishes data on the effectiveness of particular combinations of WBL program features will empower CTE programs and districts to choose the wisest investments.

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