Super PL: Supporting Partnerships Between Employers, Community Colleges, and Research Universities

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Abstract: This explanatory case study describes the collaborative process through which an ongoing research-practice partnership (RPP) between the Information Technology (IT) department of a local educational agency, the Information and Engineering Technologies (IET) division of 2-year institutes of higher education, and academic researchers from 4-year research institutions designed and iterated upon a professional learning (PL) model for internship supervisors in response to stakeholder needs and challenges. The PL model was developed with the goal of supporting information and communication technology (ICT) career readiness and improving student internship and employment outcomes. Data sources included artifacts (e.g., planning documents, communication between partners, annual evaluation reports, and external evaluator meeting notes). The four dimensions of Henrick's [1] framework for evaluating RPPs served as the conceptual framework and informed our inductive thematic analytic strategy [2]. Results have the potential to inform future RPPs between employers, community colleges, and research institutions to support students in internships.

Keywords: community college, professional learning, research-practitioner partnerships, information and communication technology

Introduction

The need for educators to prepare students to operate in a digital environment and for information and communication technology (ICT) careers is a global challenge that the COVID-19 pandemic has exacerbated. The pandemic has increased reliance on computing infrastructure and amplified the need for skilled workers to support this infrastructure [1], [2]. However, there is a widespread recognition that institutes of higher education should be more responsive to labor market needs and should prioritize successful employment for graduates [3], [4]. Internships are one way institutes of higher education can support the development of students' skills in the workplace. Internships may improve ICT program outcomes by decreasing time-to-degree completion, increasing odds of employment, and improving professional socialization [5], [6]. Internships also provide an opportunity for students to learn professional skills that complement but are not typically taught during classroom instruction [7]. Within such internships, supervision quality and characteristics are critically important in supporting high-quality student learning experiences and outcomes [8]. These internship models require a partnership between institutes of higher education and internship sites to ensure internships are mutually beneficial to all stakeholders.

Thus, the purpose of this explanatory case study [9] was to describe how an ongoing research-practitioner partnership (RPP) between a local educational agency, a 2-year institute of higher education, and a 4-year research university developed a supervisor-targeted PL to support ICT career readiness and improve internship and employment outcomes for students. Specifically, we describe how the RPP collaborated to develop a mutually beneficial PL model and responded to the needs and challenges of the partners in supporting supervisors and interns. The research question that will inform the analysis is: *How did the initially proposed PL and research plan change in response to stakeholder needs?*

Value of Internships

Internships have many potential benefits for students. Internship participation is associated with students' increased likelihood of becoming employed full-time, having a higher starting salary, and improved performance evaluations compared to their counterparts who did not complete an internship [5], [6], [10]. Furthermore, students who participate in internships do not experience as much of an "entry shock" adjustment period that often accompanies a transition from being a student in school to a professional in the workplace [11], [12]. Internships can scaffold a student's industry-specific skill development and introduce them to company norms, cultures, and values [13]. Finally, students who participate in internships experience accelerated professional growth [14].

These outcomes may result from the opportunities internships provide students to further develop technical skills introduced in traditional coursework (e.g., web systems and technologies, systems integration, and architecture) and soft skills such as professional communication and teamwork [15]. Soft skill development, critical for successful employment, is perhaps the most important potential benefit of internships. For example, students who participate in internships may improve their problem-solving skills [3] and social-emotional and organizational competencies [16], [17]. Companies expect graduates to have similar technical skills but varying soft skill competencies, and they use these differences to distinguish between candidates when making hiring decisions [15].

Employers may also benefit from the internship experience. Internships are a low-risk method to evaluate potential employees [18], [19]. Essentially, internships may provide mutual mechanisms for employers and possible employees to "vet" one another. Through this "vetting," employers can reduce hiring and recruitment costs and also limit employee turnover by increasing the likelihood the new employee is good match [5], [16].

Internship Supervision

Supervision has been defined as "a means of transmitting the skills, knowledge, and attitudes of a particular profession to the next generation of that profession. This relationship is evaluative, extends over time, and has the simultaneous purpose of enhancing the professional functioning of the junior member(s), monitoring the quality of services offered, and serving as a gatekeeper for those who are to enter the particular profession" [20, p. 6].

The present project conceptualized internship supervision through the lens of the discrimination model of supervision [21], [22], which posits that (1) targeted learning goals need to be identified and that (2) learning goal achievement can be supported through (a) teaching; (b) counseling; and (c) consulting. During *teaching*, the supervisor may model desirable workplace habits and skills, provide explicit instruction, and provide formative feedback to the intern. When acting as a *counselor,* the supervisor fosters reflection through questioning. Finally, as a *consultant*, the supervisor acts as a collegial peer, a springboard for the intern to bounce ideas off of and to interact with as a peer rather than as an intern. It is important for supervisors to recognize the need to take on all of these roles to scaffold learning and autonomy and to support an intern's transition from an apprentice to a workplace peer [19].

The supervision role is complex, and high-quality supervision may not support all internships. Supervisors vary in personal dimensions, such as leadership skills, communication, and interpersonal skills, as well as how they implement an internship. For example, internships may differ in formality, degree of structure, and goals, such as autonomy, all of which are influenced by the supervisor. Variations in internship supervision quality may be one reason why all internships do not lead to employment and workplace success [23]. Differences in supervisor support may contribute strongly to an intern's desire to convert the internship into full-time employment [24]. Thus, supporting supervisors through PL is essential to their success and the success of the interns they support.

Research-practice partnerships

Research-practice partnerships (RPP) are partnerships in which researchers work in tandem with practitioners to create a project that will benefit both parties and have a broad impact across the educational community [25]. Henrick et al. [26] proposed five dimensions of RPP effectiveness, which served as the conceptual framework for the present study (Table 1). The RPP in the present study consisted of researchers from a 4-year research-intensive university, the ICT department of a 2-year institute of higher education, and an IT department of a K-12 local education agency.

Table 1. Dimensions and subdimensions of an RPP (modified from Henrick et al., 2017)

Dimension	Indicators
Building trust and cultivating partnership relationships	• Researchers and practitioners routinely work together • Routines promote collaborative decision-making and guard against power imbalances • Norms of interaction support collaborative decision-making and equitable participation • Members recognize and respect one another's perspectives and diverse forms of experience • Goals take into account team members' work demands and roles in their respective organizations
Conducting rigorous research to inform action	• RPP conducts research that addresses problems of practice • RPP develops systematic processes for collecting, organizing, analyzing, and synthesizing data • Decisions about research methods and design balance rigor and feasibility • RPP conducts research to clarify and specify problems of practice prior to identifying and assessing strategies for addressing those problems • Findings are shared in a way that takes into account the needs of the partnership organizations
Supporting the partner practice organization in achieving its goals	• RPP provides research and evidence to support improvements in the partner organization • Helps practice organization identify productive strategies for addressing problems of practice • RPP informs the practice organization's implementation and ongoing adjustments of improvement strategies
Producing knowledge that can inform educational improvement methods more broadly	• RPP develops and shares knowledge and theory that contributes to the knowledge base • RPP develops and shares new tools and routines that can be adapted to support improvement work in other settings • RPP supports two dissemination plans, one that supports partnership goals and a second for broader dissemination
Building the capacity of researchers, practitioners, and their organizations to engage in partnership work	• Team members develop professional identities that value engaging in sustained collaborative inquiry with one another • Members assume new roles and develop the capacity to conduct partnership activities • Participating in research and educational organizations provides capacity-building opportunities • Shifts in professional expectations for education researchers and practitioners occur that reward members from each organization for sustained participation in significant partnership work.

Methods

This explanatory case study sought to explain how and why changes were made to the PL model and its deployment in response to shifting stakeholder needs [9].

Description of the Case

The case included the members of the RPP and their institutional contexts, as well as the RPP member activities in developing the supervisor PL model and implementing the internship. The partnership included the IT department of a large local K-12 school district, a 2-year institute of higher education, and a 4-year research institution. The goals of the RPP were to support ICT students in internships, develop and implement a PL experience for IT supervisors, and conduct research on the associated outcomes for both interns and supervisors. The primary activities of the RPP, as initially proposed, are detailed below, and the partner that took the lead in enacting the activity is indicated in Table 2.

Table 2. Project stakeholders and their proposed activities

Partner	Primary Activities
2-year Institute of Higher Education	Prepare IT students for internships, recruit students for internships, develop and implement supervisor PL
K-12 School District	Identify internship supervisors, interview and hire student interns, host internships, and support internship supervisors in completing data collection
4-year University	Develop research and survey instruments, collect and analyze data, lead dissemination and publication of research

Internship Preparation

Students from the 2-year Institute of Higher Education ICT programs were recruited to participate in a spring semester program designed to prepare students to apply for and work in summer internships (Table 3). This professional preparation program is an ongoing program that adapts common career preparation elements (e.g., resume writing, interview practice) into an ICT and regionally specific format. Each project year, the goal was to enroll 50 students in this program, with program completers encouraged to apply for competitive internships.

Table 3. Internship preparation program components

Activity	Time	Description
Recruitment	Fall Semester	Recruitment of students from AAS information systems technology, AAS cybersecurity & ICT-based certificate programs in IET division.
Orientation and Pre-Assessment	December & January	Students attend orientation, complete pre-assessment, and submit SMART (specific, measurable, achievable, realistic, and timely) goals.
Resume Writing	January	Students learn the components of an effective resume from career development professionals. Students review sample resumes in small groups, then create a resume and submit it for review and feedback from a program mentor. Students then review their resumes with hiring managers and recruiters from industry partners.
Interview Preparation	February	Students review common interview questions and discuss appropriate responses. Hiring managers from employer partners explain how they evaluate candidates. Students complete a mock interview with program mentors and hiring managers and receive direct feedback.
Networking	March	Students learn and practice networking techniques and develop a LinkedIn profile.
Leadership	March – April	Students attend one additional career or leadership workshop of their choice (e.g., diversity equity and success, conflict resolution, communication, security clearances, and certifications).
Completion	April	Students create a final project that includes a reflection and a final dossier (i.e., resume, LinkedIn profile, SMART goal) of all materials necessary to apply for summer internships. Completion event with employers, students, and staff.

Supervisor Professional Learning

Prior to working with students, internship supervisors participated in a 4-session PL that focused on improving internship outcomes by learning and planning the integration of research-based strategies (Table 4). PL centered around three foundational topics: mentoring (building relationships between established professional and a protégé), task/goal clarity (structuring work tasks to ensure tasks are clear, goals are mutually understood, and opportunities for feedback are built-in), and autonomy (balancing intern independence with more structured and guided work tasks).

The PL was informed by elements of effective PL, including (a) actively engaging participants, (b) providing opportunities for collaboration, (c) supporting context specificity, and (d) fostering reflection to facilitate learning regarding effective supervision and support adoption of desirable strategies [27], [28], [29]. PL implementers model and distinguish between implicit/explicit instruction, questioning to foster learning and

reflection, and rubrics to provide feedback. Modeling and subsequent debriefing of desirable strategies is a core principle of PL [30], [31]. During PL, supervisors develop and receive feedback on products designed to support effective supervision and internship learning, including (a) a list of targeted skills, planned opportunities for development, and a record of achievement; (b) a feedback/reflection document to provide formative and ongoing feedback and to foster internship reflection. Supervisors are supported in developing their own supervision instruments to further support active learning, reflection, and to provide an opportunity for feedback from PL implementers and colleagues. Finally, just-in-time ongoing support is facilitated through email and more formal virtual "check ins". Such support is a critical PL component that facilitates individual and systemic change by differentiating support according to individual needs and facilitating ongoing collaboration [31].

Table 4. PL sessions and products

Session and Supervisor Role	**Framework**
Session 1: Internship Details and Overview	Introduction to PL topics, work structure, project details, communication and assessment.
Session 2: Teacher Weeks 1-2: Supervisor supports intern as a teacher through modeling, assessment, and formative feedback.	**Mentoring**: set goals for the internship, establish working norms, modeling workplace skills, environmental overview. **Task Clarity**: granular mode of communication, explicit device-level technical problems and solutions. **Autonomy**: direct instruction, modeling of technical processes, detailed task breakdown in written form.
Session 3: Counselor Weeks 3-4: Supervisor supports intern as a counselor fostering reflection through questioning.	**Mentoring**: discuss technical skills, coaching, discuss IT certifications and educational strategies. **Task Clarity**: batch work, utilizing a variety of skills at intern's discretion. **Autonomy**: side-by-side coworking, counseling solutions to novel technical problems, and some end user interaction.
Session 4: Consultant Weeks 5-6: Supervisor supports intern as a consultant to bounce ideas off like a peer.	**Mentoring**: career development, future goals, networking, and resume building. **Task Clarity**: device and laboratory diagnostics, networking, and project-based learning. **Autonomy**: independent projects with frequent check-ins, daily log review, and consult with supervisor as needed.
Products 1. Mentoring Plan 2. Internship Assessment and Learning Objectives by week 3. Communication Log and Feedback Mechanism	

Internships

Students from target program areas applied for summer internships with the partnering K-12 school district. Two-year institutes of higher education and school district staff collaboratively identified students who applied for internship placement. Internships consist of students spending six weeks working on-site for 30 hours per week with a supervisor. Interns are paired with a school or center-based supervisor to support the IT infrastructure while providing frontline customer service to teachers, staff, and students with devices, networks, and instructional technology. Supervisors are provided with their intern's dossier and coursework completion. Supervisors review their assigned intern's dossier and educational background to provide their intern with (1) an overview of the expected projects, (2) a weekly schedule, (3) instruction and support for specific tasks, and (4) an introduction to the work environment (e.g., personnel, facility). Supervisors have broad latitude in structuring the internship experience as they deem appropriate by assigning tasks that meet the technology needs of the school. Project staff from the local K-12 school district and 2-year institute of higher education check in with each intern biweekly to verify work hours and ensure the work environment is productive.

Research Design

The research component of this project was designed to investigate the extent to which project components (a) improve outcomes (i.e., professional socialization, attitudes toward ICT disciplines, career goals, degree completion, persistence in ICT careers) for students placed internships compared and (b) improves supervisors mentoring of interns (i.e., confidence for supervising, effective mentoring, leadership skills). The project implemented a quasi-experimental mixed methods research design to track longitudinal outcomes for three cohorts of 25 interns placed in IT internships at the local K-12 school district partner. The first cohort of interns had supervisors who did not complete the PL (treatment level 1, cohort 1), and the 2nd and 3rd cohorts were each comprised of 25 students placed in internships whose supervisors completed the PL (treatment level 2, Table 5). A pre-/post-test design was used to assess outcomes for two cohorts of 25 supervisors. This design was intended to allow for comparison of outcomes and documentation of the relative impacts of the internship and PL program independently and additively for students and supervisors. These outcomes will be described in a separate paper. In the current manuscripts, the modifications to the proposed project plan are detailed to document the necessary flexibility and responsiveness that may be required for RPPs to be effective.

Table 5. Data collection timeline for quasi-experimental research design

	Year 1		Year 2		Year 3		Year 4
Intern and Supervisor Cohorts	Pre Internship	Post Internship	Pre Internship	Post Internship	Pre Internship	Post Internship	Summer
Control (25/cohort)	C1	C1	C2	C2 C1 follow up	C3	C3 C1 and C2 follow up	C1, C2, C3 follow up
Treatment Level 1 (25/cohort)	T1	T1		T1 follow up		T1 follow up	T1 follow up
Treatment Level 2 (25/cohort)			T2	T2	T3	T3 T2 follow up	T2 and T3 follow up
Supervisors (25/cohort)			Post PL	Post Internship	Post PL	Post Internship	
			S1	S1	S1	S2 S1 follow up	S1, S2 follow up

Note. *C1, C2, C3 = control students by year, T1 = internship with no PL for supervisor); T2 and T3 = internship with supervisor PL), S1, S2 = supervisor cohorts with PL in years 2/3. See also Figure 1.*

Data Sources and Analysis

Data sources to answer the research question included artifacts (e.g., planning documents, communication between partners, annual evaluation reports, external evaluator meeting notes). Thematic analysis was used to holistically analyze the data corpus and involved identifying, analyzing, and reporting patterns within the data to summarize the modifications that were implemented based upon stakeholders' needs [32].

Results and Discussion

This section is structured according to the research question, "*How did the initially proposed PL and research plan change in response to stakeholder needs?*" and documents how this RPP deviated from and modified the initial project plan.

Some changes to the structure and implementation of the RPP described above were driven by factors external to the project partners. Funded by the NSF's Improving STEM Education at 2-Year Colleges program, a short-term grant created through COVID relief legislation, the project start date was delayed from the initially proposed start date of September 2021 to late December 2022 while the NSF advanced the proposal through their funding recommendation process. This delay led the lead 2-year institution to refrain from communicating the outcome of the proposal until funding was confirmed by the NSF. As a result, year 1 project activities began without lead time to establish communications norms, build intra-stakeholder relationships that reaffirmed project goals, or develop robust student and supervisor recruitment plans. The 2-year institution instead had to implement the career development program described above at the start of the Spring 2022 semester within weeks of receiving the funding announcement. Without the planned lead time, communication schedules were compressed and became largely responsive to immediate concerns related to short-term implementation (e.g., scheduling student workshops and setting up application and interview procedures) rather than developing and affirming partnership goals between stakeholders. It is important to note that we conceptualized the stakeholders as the larger entities (e.g., institutes of higher education, K-12 school district) as well as at a more individualized level that were directly and indirectly involved or affected) (interns, supervisors of interns, K-12 students, and teachers using Chromebooks during the school year).

Initial project implementation was also complicated by personnel turnover at the lead 2-year institution. The two staff members tasked with leading the career development program and student internship recruitment both departed the college shortly after the project formally began. These departures intensified the communication pitfalls identified above, as project tasks needed to be reassigned to other staff and the student-facing communication handed off without creating undue confusion or disarray for student participants. Another departure prior to the first cohort of summer interns necessitated another project handoff and further complicated communication timelines and procedures.

The structure, format, and administration of the internship program also changed from the initial project plan. Hiring requirements for the participating K-12 school district also complicated internship recruitment and placement. As government-run institutions, K-12 school districts' hiring processes typically take longer and are thus less responsive to the shorter timeline of the summer internship. To work around this limitation, the 2-year institution agreed to handle student payment and work tracking while the school district onboarded the interns as volunteer staff. While these changes resulted in minimal disruption to student participants, they necessitated significant administrative coordination between the 2-year institution and the K-12 school district that required the designation of a dedicated staff member to manage the administrative burden and to act as the liaison between the two institutions.

Since the internship itself was conceived in response to the expanded acquisition of devices during the COVID-19 pandemic, the work tasks during the internship were focused on the maintenance needs of the newly acquired devices (largely Chromebooks). This work, required during the summer to refresh the devices for the next year's users, consisted of repetitive tasks that involved little to no interaction with students, teachers, or staff at the school. As a result, though interns were performing necessary work for the K-12 school district, that work was not reflective of the average day-to-day of school district IT personnel. During project year 3, the K-12 school district and 2-year institution worked collaboratively to offer an additional internship cohort during the Spring semester. This change provided students the opportunity to experience the school setting while students and teachers were present, thus more closely matching the typical duties of school IT staff.

The structure and method for the PL delivery also needed to be modified significantly from the initial proposal. The initial implementation of the PL had long gaps between sessions, offered no incentives for supervisor participation, and did not emphasize the requirement to pair trained supervisors with interns. As a result, supervisor participation in the PL was inconsistent, with only 4 participants completing each required element. Of these 4, only one was paired with an intern for the summer. As a result, the first year of the treatment yielded little usable data in relation to the proposal's initial research questions.

Project partners addressed this issue through multiple overlapping programmatic changes. First, project funds were allocated to provide a stipend for supervisors to participate in PL outside of their scheduled work hours. The addition of the stipend served both to ensure full participation from supervisors and to justify introducing more in-person sessions to the PL. The first iteration of the PL was largely virtual, which made it difficult for

PL facilitators to effectively conduct and evaluate small-group discussions of PL-related topics. The shift to a more in-person and compensated PL structure allowed for higher expectations for supervisor participation and encouraged supervisors to complete related documentation (e.g., mentoring plans). The PL schedule was also compressed, with the total duration of all sessions reduced to less than a month rather than the original 3 months. This more rapid delivery, enabled by more flexible scheduling outside of school hours, allowed for PL content to be provided in a timely manner just prior to the intern's arrival at the workplace.

Project stakeholders also modified the method of introducing the discrimination model of supervision from the original conception. Instead of each session moving sequentially through the stages of the model (i.e., teacher, counselor, consultant), the PL was redesigned to reinforce the full model at different levels of detail during each subsequent session. During the first, facilitators reviewed the source of the model in literature and provided relevant examples from experience. During the second session, facilitators prompted participating supervisors to make direct connections between their own experiences, the discrimination model, and an assigned asynchronous training focused on the benefits of internships for employers. The final session placed participating supervisors into small groups with mixed levels of experience and guided them through developing personalized plans to implement the model into their supervision of their intern. In this way, the PL was redesigned to better fit the needs and workplace routines of the participants. This responsiveness, paired with the added financial incentive, boosted the PL completion rate to 100% of intern supervisors during the most recent cohort.

Conclusion

RPPs are a viable structure to build collaborative relationships between 2-year technical and community colleges and 4-year research institutions. 2-year institutions typically lack the capacity for conducting rigorous research and evaluation, as their institutional mission is centered around teaching. Four-year institutions do have this capacity but may be less embedded within specific communities, regions, and communities. Since both 2- and 4-year institutes of higher education have a vested interest in diversifying and reducing barriers to participation in STEM fields, RPPs offer a framework to lead toward evidence-based improvement for these critical pathways.

Henrick et al. [26] call attention to the centrality of ongoing partnership work during successful RPPs. This work reaffirms shared commitment among stakeholders and ensures that each stakeholder's priorities are taken into account during project development. Some of the difficulties in implementing this project are a likely result of not placing a direct priority on partnership development and maintenance. While the pitfalls identified above are to some degree external (e.g., the delayed project start date), others might have been averted through establishing structured communication channels and norms. Many details emerged regarding the hiring process and pay structure of the K-12 school district, which were discovered only during implementation and required modifications to ensure engagement and participation. This highlights the initial work in the form of planning and communication that needs to happen for RPPs to be successful. Regular meetings that include the K-12 school district's leaders are also essential to maintain the "partnership" aspect throughout the life of the project.

The ongoing project adjustments described above also demonstrate the need for ongoing iterative improvement based on evaluation. Especially in the case of the PL treatment's initial deployment, project stakeholders worked in tandem to redesign the PL delivery to be more responsive to participant needs. While the initial development work on an RPP should propose a detailed and robust structure, that structure cannot remain rigid during its deployment in the field. Instead, effective RPPs must continually improve project alignment with each stakeholder's institutional needs and goals.

RPPs provide a compelling framework for leveraging the strengths and differences between 2- and 4-year institutions. As this paper describes, RPPs are challenging to implement, but ultimately offer a venue for rigorous evidence-based work centered around improving practice in critical STEM fields.

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