learning that reflects current research about how people learn, with particular emphasis on STEM education, and; d) fostering communication and collaboration among stakeholders at all levels in STEM education. Teachers define research areas based on professional interests and classroom needs, make decisions about their own professional needs, work collaboratively in school-based teams, and engage in cycles of planning, acting, observing, and reflecting.

Teachers' organizations are also providing opportunities to support school collaborative learning and inquiry. For instance, the ATA were involved in initiating two international collaborations. Launched in 2011, the FINAL partnership between Alberta and Finland is a joint venture of the ATA, Alberta Education, and the Ministry of Education in Finland. Focusing on the overarching question of "what makes a good school," the project was conceived as a way for teachers and school administrators to gain cross-cultural learning experiences with the purpose of generating transformational educational reform from the bottom-up (Lam & Shirley, 2012). The project partners Alberta schools with schools in Finland. A second international network – NORCAN – brings together schools from Alberta and Ontario in Canada and Norway.

Within Canada, networks and collaboration within provinces are also being supported. For example, using funding from the Ontario Ministry of Education, the Ontario English Catholic Teachers' Association (OECTA) funds and supports *Collaborative Learning Communities* (CLCs) (OECTA, 2012). According to an interviewee, the purpose of CLCs is to "enable teachers to meet in groups to discuss mutual interests and concerns about teaching and learning." Teachers can submit applications for projects on topics connected to differentiated instruction, early learning, French, math, literacy, technology, social justice, and virtues. In our interviews with teachers participating in CLCs, participants were highly positive about the opportunity for teachers to collaborate on a priority need that they had identified and have the time and opportunity for shared dialogue, inquiry, and learning.

Across our research, we found evidence of benefits from collaborative professional learning for the teachers involved with a focus also on supporting their students' learning experiences and outcomes. *The State of Educators' Professional Learning in Canada* study findings indicate the value and prominence of a range of collaborative professional learning opportunities within and across schools and wider professional networks. However, as discussed below, there are challenges of time and supports for collaborative professional learning opportunities integrated within the working day and work lives of educators.

Job-Embedded Learning

Summary of Research Literature

Teacher professional development has historically been an "add-on" activity often disconnected from the daily work-life of teachers. Separated from school contexts and networks of peers, such approaches yielded little for supporting the actual development of the teaching profession or changes in classroom practice (Garet et al., 2008, 2010; Rafael et al., 2014). There has, therefore, been increasing attention to "job-embedded" professional learning. Opfer (2016) conducted analyses of the TALIS findings (OECD, 2014) to examine the differences between non-school embedded and school embedded professional development. According to Opfer, *non-school embedded* are activities understood to "pull teachers out of their schools and classrooms in order for them to learn a new technique or skill" (Opfer, 2016, p. 12). Examples include conferences, workshops, in-service training, and qualification programmes. Opfer reports that, on the whole, teachers participated in these types of professional development activities more than other kinds of professional development. By contrast, *school embedded* professional development activities include professional development networks,

undertaking collaborative research on problems of practices, peer observation, and coaching; Opfer notes that these activities are more closely aligned with the literature indicating that "ongoing, intensive and collaborative activities…have a greater impact on teaching practice" (Opfer, 2016, p. 12). Opfer (2016) reports that there is an inverse relationship in participation between the two types of professional development: "systems where teachers report high levels of participation in school embedded PD also tend to be the systems where teachers report lower levels of participation in non-school embedded PD; and vice versa" (p. 15).

Opfer (2016) suggests that teachers' own beliefs and sense of efficacy may affect the types of professional development that they participate in. Furthermore, teachers' engagement in job-embedded professional development can be affected by school leadership actions and school conditions. According to Opfer (2016, p. 21):

> Results from TALIS 2013 are thus consistent with the available literature on conditions that support teacher participation in more effective types of professional development. When teachers have high levels of co-operation in a school, they tend to participate more often in professional development that is co-operative, sustained and focused on problems of their practice. Likewise, when there is more instructionally focused leadership action taking place in the school, teachers are more likely to participate in more effective types of professional development. When teachers lack these conditions, they are more likely to participate in less effective professional development that takes place outside of their school environment. The consistency of the relationships across these conditions suggests that there could be types of schools where engagement in different types of professional development activities takes place.

Rooted in problems of practice, job-embedded learning is intended to provide authentic, contextualized opportunities for educators to engage in inquiry learning around the immediate work they do with their students (Croft et al., 2010).

Findings from The State of Educators' Professional Learning in Canada Study

Across our case study interviews, a key element of effective professional learning was that it is practical and relevant to teachers' need. In focus groups conducted with a total of 79 participants for our British Columbia case study, "relevant" was the second most important factor for effective professional learning (time was the first).

One potentially powerful approach to relevant and practical job-embedded professional learning is through induction and mentoring for new teachers. A pan-Canadian analysis by Kutsyuruba et al. (2013) showed that "support in the form of either induction based programs and policies and/or mentoring related support exists in all Canadian provinces" (p. 48). However, only Ontario and the Northwest Territories require teachers to participate in a formal induction program and the Yukon requires teachers to complete 50 hours of professional learning to receive their permanent teaching certificate. In most jurisdictions, induction and mentoring is a more informal process that takes a variety of forms including beginning teacher conferences and mentoring programs operated by teachers' organizations (Alberta, Manitoba, Saskatchewan, New Brunswick, Nova Scotia) or hybrid programs jointly run by school boards and professional organizations, which are sometimes funded (at least in part) by the Ministry (British Columbia, Yukon, Quebec, Prince Edward Island, Nunavut, Newfoundland and Labrador). Kutsyuruba et al.'s (2013) report also indicated that many school boards across the country operated their own induction and mentoring programs, with varying

levels of support for new teachers. However, there can be considerable variation within provinces and between districts. It is very concerning that 71% of teachers responding to Kamanzi, Riopel and Lessard's (2007) survey of teachers across Canada had not been offered any mentoring activities.

Concerns about local inconsistencies in availability of mentoring contributed to the development of the New Teacher Mentorship Project (NTMP) in British Columbia, funded by the Ministry of Education and developed in partnership between the BCTF, the University of British Columbia, and the British Columbia School Superintendents Association (BCSAA). Since its inception in 2012, the NTMP has provided mentorship opportunities for 270 beginning teachers and mentor teachers in pilot programs, and additional in-service and post-secondary educational learning opportunities for several hundred educators through a variety of workshops and institutes (New Teacher Mentoring Project, 2016). The NTMP advocates that beginning teachers' professional learning models "be responsive to the diversity and distinctiveness of district cultures and practices in all regions of BC," "ensure that mentorship is non-evaluative and non-remedial, and that participation is voluntary," and emphasize "learning through inquiry and critical reflection on practice" (Mentoring BC, 2016). Concurrent with the work of the NTMP, there is a longitudinal research initiative carried out by the UBC Faculty of Education: *Pedagogical Assemblage: Building and sustaining teacher capacity through mentoring programs in British Columbia*. Among the preliminary findings of this research was the necessity of respecting the diverse and particular "place based" needs of British Columbia's beginning teachers—whose geographical circumstances range from inner city urban to rural settings and encompass the complex needs and demographic characteristics of the students they serve. Effective and sustainable mentorship programs are also expected to take into account "reciprocal professional learning communities, the complexity of teachers' needs, the variety of inquiry foci, increasing cultures of collaboration among schools, teachers and students, and effective leadership" (New Teacher Mentoring Project, 2016, p. 7).

In Ontario, all first-year new teachers hired to a permanent contract are expected to participate in the New Teacher Induction Program (NTIP). Established in 2006 and funded by the Ministry, NTIP is informed by four goals to enhance teachers' efficacy, practice, confidence, and commitment to continuous learning. NTIP includes three components: 1) an orientation to the school and school board; 2) ongoing mentoring by more experienced teachers throughout the first year (with option for a second year also) and; 3) professional development and training appropriate to the needs of new teachers. Principals conduct two performance appraisals throughout the first twelve months, and if not satisfactory, teachers are given up to twenty-four months to improve. Mentorship is voluntary, although school administrators may invite individuals to take on the role to support a beginning teacher or teachers may identify and invite someone to be their mentor. Mentees may also select to develop a "mentoring web" involving more than one mentor. Mentors are provided with support and professional development also by the Ministry and/or school boards. In line with the personalized and learning-focused nature of the mentorship program, there are no formal requirements with respect to activities. Mentors and mentees select activities based on the professional learning plan they co-create. Shared release time for mentors and new teachers to collaborate is provided by the NTIP and can be used for co-planning, classroom observation, and collaborative assessment of student work, among other areas. Mentors and mentees interviewed for this study described shared release time as highly beneficial. They also described learning opportunities in the classroom as having one of the most significant impacts on mutual professional learning. As well as practical support, providing emotional support, such as encouragement and empathetic listening, was emphasized by all of the mentors as a critical aspect of their roles. Participation in the mentorship

program has reciprocal professional learning value, as it necessitates self-reflection for both mentors and mentees.

Outside of formal mentoring programs, opportunities for peer coaching and mentorship can also be valuable. For example, Dr. Donald Massey school in Alberta has undertaken a range of approaches to peer coaching over the past six years. Together, the peer mentors decided which classes they were going to observe each other teach and what kinds of practices they wanted to be coached on. Pairs were intentionally cross-graded to eliminate the feeling of being judged by someone teaching the same grade level. Teachers were paired throughout the whole year and the administration supported the project by providing release time for the classroom visits and post-visit debriefing sessions. Classroom visits were also videotaped so teachers could watch and reflect on their lesson with the critical friendship of their mentoring partner. The focus in Dr. Donald Massey school later expanded from one-on-one mentoring to larger team collaboration.

Opportunities for peer coaching, observation of classroom teaching, and feedback can be powerful and important. However, peer mentoring or coaching is not a widespread practice. In a survey of elementary teachers in Ontario (Directions Evidence and Policy Research Group, 2014), less than 25% of respondents indicated that they were involved in peer coaching, mentoring, or peer observation activities during the past year. More commonly, observations and feedback appear to be the responsibility of the school principal. In the 2013 TALIS, 93% of junior high school teachers surveyed in Alberta responded that they received formal or informal feedback from a number of different sources; however, they were considerably more likely to have received that feedback from their principal – 81% of teacher responses in Alberta compared with TALIS average of 54% (Alberta Education, 2014, pp. 7, 103). Of concern, from those teachers who reported receiving feedback, only 51-60% reported positive impacts on their confidence, motivation, and job satisfaction, compared with the TALIS average of 63-70% (OECD, 2013, p. 1). In addition, fewer teachers in Alberta (compared to the TALIS average response) reported that the feedback they received led to positive changes in their teacher practices (52%, compared to 62% TALIS average), their methods for teaching for students identified as having special needs (39%, compared to 45% TALIS average), or their use of student assessment to improve student learning (54%, compared to 59% TALIS average) (OECD, 2013, p. 2). The further development of appropriate mentoring and use of feedback appears needed.

As well as school-based, "job-embedded" professional learning, it is important to recognize that professional development can be 'embedded' in relevant and practical learning without being physically located within a school or classroom.

Our interviewees commented on the importance of opportunities for teachers to get out of their own school and to expand their professional networks, to learn new ideas, to see new practices and to access new resources, for example through conferences, workshops, institutes, participating in professional organizations, completing graduate studies, or other qualifications. Increasingly, social media and online networking are important and valued activities. For example, interviewees spoke positively about the collaborative and practical learning through TeachOntario, an online platform for teachers.

Overall, *The State of Educators' Professional Learning in Canada* study findings indicate that importance of professional learning that is relevant and practical for teachers. Professional development can be "embedded" in someone's work without being physically located within someone's workplace; rather the importance is new learning and co-learning that has the potential to be embedded in the professional's needs and can contribute to changes in their knowledge, skills, and practices.