



Teacher-led Learning Circles: Developing Teacher Leadership and Teaching Practice for the Use of Formative Assessment to Improve Students' Learning

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Education International (EI)

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Introduction

This report situates the Teacher-led Learning Circles project in relevant research evidence and examples from practice to support teacher leadership and professional development for teachers' understanding and use of formative assessment practices to improve student learning and related student outcomes. It has been long established in research that, within a school, teachers and their work is the most important factor influencing student achievement. Teaching is highly complex, requiring teachers' expertise, professional judgement, and practices to meet the diverse needs of students in a range of contexts. In recent years, the work of teachers has further intensified with the need to support diverse, multicultural, multilingual, and mixed ability student populations and to teach students to learn and be equipped to succeed in a world with rapid development of technologies, geo-political instability, climate crises, and changing global and local economic and employment opportunities. The impact of the COVID-19 global pandemic has further changed and challenged teachers' work. Periods of school closure, remote learning, and the mental and physical health impacts of the pandemic have had profound consequences for students' learning, equity, and well-being, with similar impacts on educators as well (Thompson, 2021). In the current global context, it is essential to provide professional development to support teachers' leadership and expert use of formative assessment to identify students' learning needs and to provide feedback to improve students' progress. In this report, we discuss:

- a.** the importance of the teaching profession, teacher quality, teaching quality, and teacher leadership;
- b.** effective professional development to support professional learning and student learning; and
- c.** definitions, strategies, and practices for understanding and use of formative assessment and feedback.



Overview of Teacher-led Learning Circles Project

The Teacher-led Learning Circles project is led by Education International with funding from the Jacobs Foundation. This project will involve seven countries: Brazil, Columbia, Côte d'Ivoire, Ghana, Malaysia, South Korea, and Switzerland. In each country, the project will support three Learning Circles to provide professional development for groups of teachers to support their leadership of educational development projects including understanding and use of formative assessment practices. Each Learning Circle will be comprised of local facilitators, a local union representative, and ten teachers.

Local facilitators and union representatives will be trained and supported by international facilitators from the [HertsCam Network](#), an international organization with an established process of facilitating teacher leadership development. In addition, national researcher(s) will support research activities for each country's Learning Circles. Local facilitator pairs in each country will prepare and facilitate Learning Circles workshops (virtually or in-person) for their group of ten teachers and provide ongoing classroom support to these teachers over one school year. Within the Learning Circle process, participating teachers will: develop an Action Plan for teacher-led development processes in their school; develop, adapt and evaluate formative assessment practices and their benefits for teaching and learning; complete ongoing reflections in a Record of Participation; construct a Portfolio of practice-based evidence; and create a Vignette to share their learning and experience within and beyond the project.

National researcher(s) in each country will support teachers' data collection and analysis to help them gather and provide evidence about effective formative assessment practices and associated impacts for teachers' teaching and for students' learning. National researchers will also develop country profile reports, including analyses of relevant policy and practice documents, and evidence from the Teacher-led Learning-Circles work with teachers in their contexts. The project also involves an international research team from the Ontario Institute for Studies in Education, University of Toronto, and Queen's University, Ontario, Canada. The international researchers will provide an overall international research framework, relevant research and evidence to inform teacher leadership, professional development, and formative assessment, and analysis and reporting on effective practices and linked impacts from the Teacher-led Learning Circles across all of the countries involved. This document is the first report from the international research team providing an overview of relevant research literature and practical evidence to inform approaches to teacher leadership and professional development and learning for teachers' understanding and use of formative assessment practices to support students' learning and improve student outcomes.

The Importance of the Teaching Profession, Teacher Quality, Teaching Quality, and Teacher Leadership

Fifteen years ago, the adage “the quality of an education system cannot exceed the quality of its teachers” (Barber & Mourshed, 2007, p.13) was promoted and has since become well known. While that adage continues to be used, we offer four important additional points in Box 1. We discuss each of these points below.

Box 1. The Development of High-Quality Education Systems: Teacher Quality, Teaching Quality, and Teacher Leadership

- Developing teacher quality and teaching quality is essential for high quality education systems;
- Teaching quality is influenced by teachers’ working context and conditions within their education system, school and classroom;
- “The quality of an education system cannot exceed the extend to which it supports, sustains and invests in the status of its teachers” (Thompson, 2021, P. 114);
- Valuing teacher leadership for educational change and improvement is vital for creating and sustaining high-quality education systems.

Developing Teacher Quality and Teaching Quality is Essential for High Quality Education Systems

Both teacher quality – the professional – and teaching quality – teachers’ day-to-day practices in specific contexts – matter. Based on analyses of education systems that are higher performing in terms of student achievement and more equitable in their student outcomes, Darling-Hammond et al. (2017) identified the importance of education systems valuing and developing both teacher quality and teaching quality (see Figure 1).



Figure 1. Teacher Quality and Teaching Quality (Adapted from Darling-Hammond et al., 2017, pp.17-18)

The importance of teacher quality, teaching quality, and support for the status of the teaching profession is integral to Education International and UNESCO's *Global Framework of Professional Teaching Standards* (2019). As outlined in Figure 2, the three main domains of the *Global Framework of Professional Teaching Standards* are: teaching knowledge and understanding, teaching practice, and teaching relations. As we have previously proposed: "Teaching is the knowledge profession (Campbell 2016) and valuing and advancing teachers' existing knowledge and providing opportunities to renew, expand and develop that knowledge is crucial." (Campbell, 2018, p. 76). Further, while the work of individual teachers matters, their work is influenced by, and must adapt to, the specific classroom and school context they are working in, including consideration of students' needs, engagement with parents and caregivers, and relationships and collaboration with colleagues.

Three Domains	Ten Standards	
I. Teaching Knowledge and Understanding Practising teachers know and understand:	1	How students learn, and the particular learning, social, and development needs of their students
	2	The content and related methodologies of the subject matter or content being taught
	3	Core research and analytical methods that apply in teaching, including with regard to student assessment
II. Teaching Practice Teachers' practice consistently demonstrates:	4	Planning and preparation to meet the learning objectives held for students
	5	An appropriate range of teaching activities that reflect and align with both the nature of the subject content being taught, and the learning, support, and development needs of the students
	6	Organisation and facilitation of students' activities so that students are able to participate constructively, in a safe and cooperative manner
	7	Assessment and analysis of student learning that informs the further preparation for, and implementation of required teaching and learning activity
III. Teaching Relations Teachers' professional relations include active participation in:	8	Cooperative and collaborative professional processes that contribute to collegial development, and support student learning and development
	9	Communications with parents, caregivers, and members of the community, as appropriate, to support the learning objectives of students, including formal and informal reporting
	10	Continuous professional development to maintain currency of their professional knowledge and practice

Figure 2. Global Framework of Professional Teaching Standards (Education International & UNESCO, 2019, p. 6)

Teaching Quality is Influenced by Teachers' Working Contexts and Conditions within their Education System, School, and Classroom

Teachers' professional lives and work are influenced by a range of personal and professional factors, including the policies, culture, and working conditions of the education systems, schools, and classrooms they work in (Cordingley et al., 2019). The OECD (2021) combined and analysed data from the 2018 Teaching and Learning International Survey (TALIS) and the Programme for International Student Assessment (PISA), involving data "from more than 30 000 students and more than 15 000 teachers from more than 1 000 schools on four different continents" (OECD, 2021, p.3). In his forward to the report of this analysis, the OECD's Director for the Directorate of Education and Skills, Andreas Schleicher, concluded:

So what have we learned? If there was only one conclusion to take away from this report, it is that what teachers do in and outside the classroom matters the

most – and the most directly – for the cognitive and social-emotional outcomes of the school’s students. Classroom practices that create opportunities to learn, teachers’ use of working time, as well as the well-being and job satisfaction of the teachers are among the most influential school factors. (OECD, 2021, p.4).

However, Andreas Schleicher continued to explain:

But this report does not only confirm the crucial role of teachers in young people’s development. It also sheds light on other actors. Students’ classmates and schoolmates, as well as the school’s culture and leadership (including the role parents play) are also found to matter a lot for student outcomes. (OECD, 2021, p.4).

As depicted in Figure 3, the OECD analyses indicates the importance of school leadership and school context in supporting teachers’ development, professional experiences, and work; and of teachers’ classroom practices in the context of their classrooms, students’ characteristics, and school culture.

The Teacher-led Learning Circles project focuses on engagement in professional development (top left quadrant) to develop teachers’ classroom practices for formative assessment (bottom right quadrant). However, these factors cannot be considered fully in isolation from the other school and teacher dimensions; for example, school leadership and school culture are central to supporting professional development and valuing formative assessment.

The Quality of an Education System Cannot Exceed the Extent to Which It Supports, Sustains, and Invests in the Status of Its Teachers

As David Edwards, General Secretary of Education International, has cautioned, quality education cannot be seen solely as the responsibility of the “heroic extra effort by teachers” (in Thompson, 2021, p. 17), especially in the context of the emergency and continuing responses to the COVID-19 pandemic. Teachers and their teaching matter, and investment in the teaching profession and support to develop their professional work matters. Based on his analyses for Education International’s The Global Report on the Status of Teachers 2021, Thompson (2021, p.114) proposed it “is time to recalculate” the adage about education quality to become: “the quality of an education system cannot exceed the extent to which it supports, sustains, and invests in the status of its teachers.” We agree with this recalculation.

Education systems that invest in, value, support and develop a high-quality education profession tend to have higher student achievement and more equitable outcomes (Darling-Hammond et al., 2017; OECD, 2021). Thompson (2021) has developed the concept of “intelligent professionalism” to argue for a shift from professional autonomy being conceived as the downloading of government mandates and linked work intensification for educators to

an approach that “privileges the expertise in the profession itself” (p.5). This shift includes teachers having professional agency to develop and apply their professional knowledge and judgement within their work and teaching context. To achieve this, valuing and enabling teacher leadership, and investing in and supporting continuing professional development of teachers is essential.

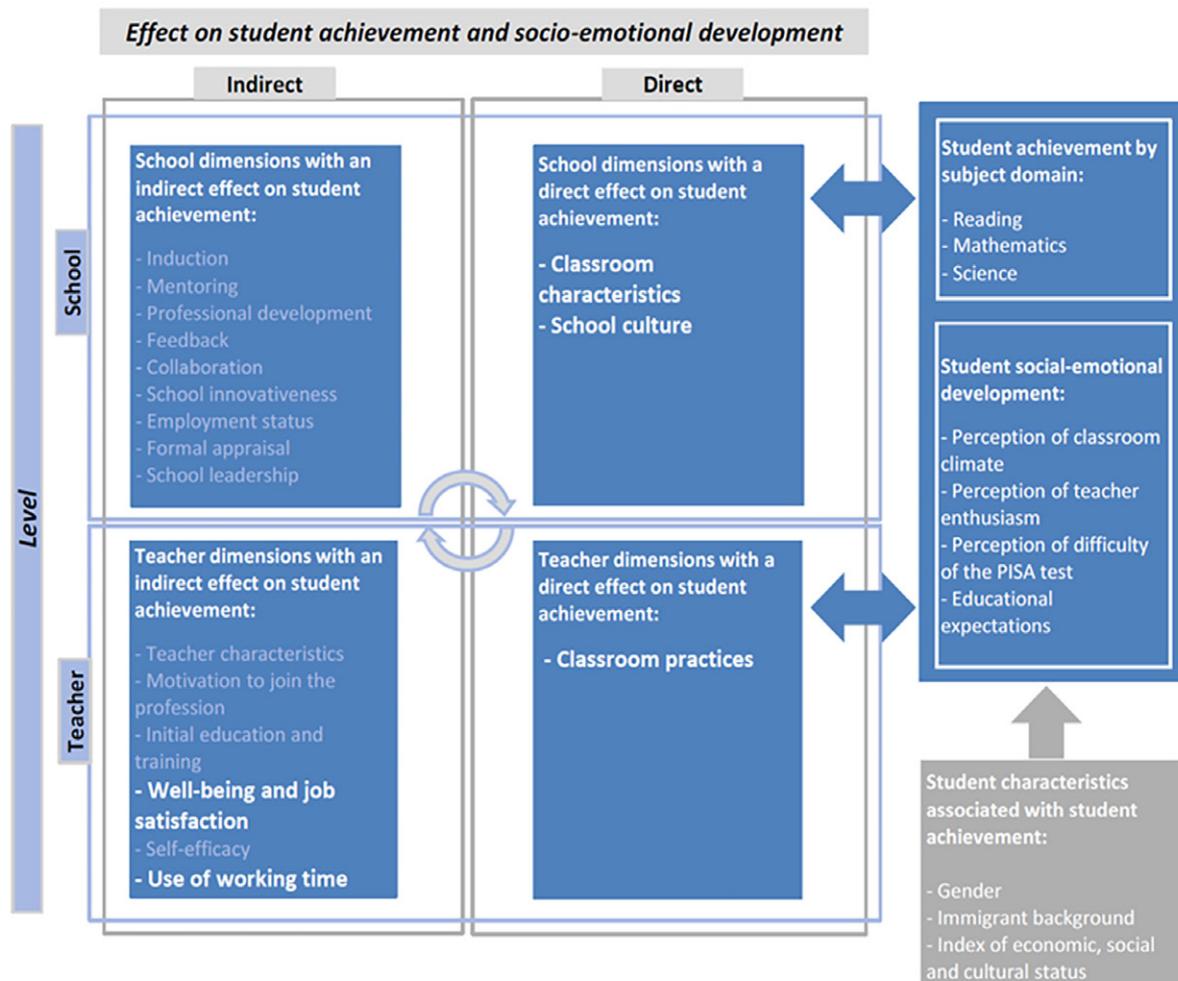


Figure 3. Teacher and School Factors that Matter both for Student Academic Success and Social-emotional Development (OECD, 2021, p.23)

Valuing Teacher Leadership for Educational Change and Improvement is Vital for Creating and Sustaining High-quality Education Systems

Based on research concerning teachers’ professional identities and work, and education system contexts and performance, Cordingley et al. (2019, p.107) found:

It is notable that it is in the very high performing jurisdictions that teacher leadership has most prominence and where the development of teachers’ leadership skills is supported extensively and substantively... The authors believe that there is evidence here to suggest that focussing on teacher leadership and explicitly developing teachers’ leadership skills can pay

dividends in increasing education capacity and enhancing system vitality and that both unions and policy makers would be well advised to consider ways of promoting teacher leadership.

This emphasis on the importance of governments and teacher unions promoting and supporting teacher leadership is central to the work of Education International, and in development work to support teacher leadership, including the processes within the Teacher-led Learning Circles. For example, describing a previous joint project involving Education International and HertsCam, Bangs and Frost (2015, p. 93) explained:

...a key characteristic of the International Teacher Leadership (ITL) project's view of distributed leadership is that all teachers are entitled, as professionals, to initiate and lead change, contribute to knowledge building and to have influence, both locally within their own schools, and more widely through collective action (Frost, 2011, 2014). It is essentially about voice, but not merely with teachers as the subject of consultation from above, rather it implies the right to set the agenda and to both create and validate solutions to educational problems.

In high-quality education systems, all teachers are considered to have the professional right and the capacity to exert leadership influence through their values, behaviours, relationships, practices, and impact.

Teacher leadership is important for improving policy, practice, and educational outcomes. As Bangs and Frost (2015, p. 104) argued:

There is now abundant evidence that teachers are able to embrace an extended mode of professionalism in which they are influential in matters of policy and practice. They can direct their own professional learning and support that of their colleagues. They can contribute to the development of policies on improving their own schools and the wider system. It is crucial to note, however, that this is not a matter merely of allowing this to happen, but one of positively enabling it. In such enablement, while school principals have the prime responsibility to create the conditions that favour teacher leadership, teacher unions can also have a significant role.

To achieve the features of high-quality education systems outlined in Box 1, valuing and supporting teacher leadership and ensuring teachers have opportunities to engage in professional development and continuing professional learning throughout their career are essential. We turn now to discuss the features of teacher leadership and of effective continuing professional development.

Teacher Leadership

There has been growing interest in the concept and practice of teacher leadership, especially from the 1990s onwards. However, there is a wide array of definitions of teacher leadership. In what is regarded as a seminal review of the research literature, York-Barr and Duke (2004, pp. 287-288) offered the following definition:

...we suggest that teacher leadership is the process by which teachers, individually or collectively, influence their colleagues, principals, and other members of school communities to improve teaching and learning practices with the aim of increased student learning and achievement.

A more recent review of teacher leadership research drew on a previous definition from Katzenmeyer and Moller (2001):

...teacher leaders: 'lead within and beyond the classroom, identify with and contribute to a community of teacher learners and leaders, and influence others toward improved educational practice; and accept responsibility for achieving the outcomes of that leadership' (Katzenmeyer and Moller, 2001, p. 6).

From this definition, it is posited that teacher leadership can happen within and beyond the classroom, and that teaching and leadership are integrated. (Nguyen et al. 2019, p. 63).

Based on their review of 150 empirical articles published between January 2003 – December 2017, Nguyen et al. (2019, p. 71) identified the following “four common hallmarks of teacher leadership”:

... (a) Teacher leadership is a process of influence; (b) teacher leadership is exercised on the basis of reciprocal collaboration and trust; (c) teacher leadership operates within and beyond the classroom; and (d) teacher leadership aims to improve instructional quality, school effectiveness, and student learning. (p. 71).

While there are teachers who hold formal roles as specific leaders, such as Heads of Department and curriculum specialists; teacher *leadership* is about supporting all teachers to develop their leadership capacities, practices, influence, and impact. Cordingley et al. (2019, p. 21) provided a helpful clarification of the distinction between formal leaders linked to specific promoted positions and broader teacher leadership of all in the profession:

- **Positional leadership** based on authority conferred through an official position e.g. as a head of subject/department/phase, deputy or assistant head or head teacher

- **Non-positional leadership** occurring when teachers make decisions and enable things to happen across groups of stakeholders based on their expertise, experience and personal professional goals and values

Frost (2011) developed the term “non-positional teacher leadership” to refer to “a set of assumptions, beliefs and values, central to which is the conviction that any teacher or other educational practitioner can be enabled to exercise leadership” (Frost, 2019, p. 4). This concept of teacher leadership is central to the HertsCam development approach:

...(it) does not assume that leadership is linked with positions in the organisational hierarchy of the school. Instead it recognises the potential of all teachers to exercise leadership as part of their role as a teacher. We believe that all teachers and education practitioners have some leadership capacity. After all, leadership is a dimension of being human. In HertsCam and the wider International Teacher Leadership (ITL) network, we argue that it should be seen as an essential part of teachers’ professionalism. (Hill, 2014, p. 74)

This concept and approach to development of teacher leadership is integral to the Teacher-led Learning Circles project.

Teachers are asked to consider how they (individually and collectively) can expand their leadership influence and to rethink traditional conceptions of leadership as only being formal, positional and, generally hierarchical roles. As Harris and Jones (2015) discussed, in teacher leadership:

Teachers are viewed as the architects of their own professional learning and take chief responsibility for guiding the professional learning of others. So far so good, but for many teachers the word “leadership” gets in the way as it implies certain formal roles or responsibilities. On a daily basis, teachers tend not to see themselves as “leaders” in the formal sense, even though they are leading in their classrooms. Therefore, it is important to clarify that the idea of “teacher leadership” is not associated with role or position but rather it is about the practice of innovating and influencing others so that learning improves.

Teacher leadership involves teachers’ leading change and innovating practices to support educational improvements.

Central to effective teacher leadership is the intentional and thoughtful exercise of influence. Nguyen et al.’s (2019, p. 73) review identified:

Sources of influence can be grouped into two broad categories: human capital and social capital. The former includes a teacher leader’s expertise and experience (e.g., Allen, 2016; Avidov- Ungar and Tamar, 2017; Hatch et al., 2005), whereas the latter places an emphasis on the teacher leader’s professional relationships with peers including social networks (e.g., Firestone and Martinez, 2007; Fairman and Mackenzie, 2015).

We add a third category of influence and capital; the importance of teachers' decisional capital. Hargreaves and Fullan (2012) developed the term decisional capital to refer to professional experience, judgement, expertise, and agency in taking decisions and actions. They explain: "Making decisions in complex situations is what professionalism is all about. The pros do this all the time. They come to have competence, judgement, insight, inspiration, and the capacity for improvisation as they strive for exceptional performance" (Hargreaves and Fullan, 2012, p. 5). It is this professional capital that is central to teacher leadership.

Teacher leadership can influence many forms of educational change. In their review of teacher leadership research, Wenner and Campbell (2017, p. 146) identified the following themes:

- teacher leadership goes beyond the classroom walls;
- teacher leaders should support professional learning in their schools;
- teacher leaders should be involved in policy and/or decision making at some level;
- the ultimate goal of teacher leadership is improving student learning and success;
- [teacher leadership includes] working toward improvement and change for the whole school organization.

In our own work with Ontario's Teacher Learning and Leadership Program (TLLP), we identified the importance – and benefits – of teachers being leaders of their students' learning, their own professional learning, and other educators' professional learning (Campbell et al., 2018; Lieberman et al., 2017). And while this is about teachers' leading the way forward for educational change and improvement, it also requires governments, teacher unions and school leaders who will support and enable teacher leadership. Challenges to teacher leadership, such as conflict from colleagues, unsupportive school cultures, and practical constraints such as time for teacher leadership, need to be identified and addressed.

Several benefits of teacher leadership for educational change and improvement have been identified (Campbell et al., 2018; Harris, 2005; Nguyen et al., 2019; Wenner & Campbell, 2017; York-Barr & Duke, 2004). The most significant benefits of exercising and experiencing teacher leadership are for the teachers directly involved. The effects of teacher leadership identified for teachers include:

- Increased leadership knowledge and skills;
- Positive changes in instructional knowledge and practices;
- Increased commitment, motivation, and job satisfaction;
- Increased self-efficacy;
- Enhanced professionalism, and leadership identity and growth.

When teacher leadership involves actively leading/co-leading educational changes in collaboration with other educators; there can be benefits for those educators' professional learning, improving their knowledge and practices, and contributing to improved school cultures; and enhanced self-efficacy and collective efficacy.

Teacher leadership can model democratic leadership for students, and students can benefit from teachers' enthusiasm, motivation, and commitment to innovation and improvement in teaching and learning (York-Barr & Duke, 2004). More broadly, teacher leadership can influence school principals' work and teachers' work with indirect effects for student outcomes. Referencing a study by Supovitz et al. (2010), Nguyen et al. (2019, p. 81) summarized:

two paths through which teachers' influence upon peers affects students' learning outcomes: a) teacher-peer influence has a significant effect on student learning through the mediating variable of teacher classroom instruction; and b) teacher peer influence functions as a mediator of principal leadership and teacher instruction, that in turn, positively affects student learning outcomes.

Considering the overall impact of teacher leadership for educational change and improvement, Harris (2005, p. 206) summarized the following:

In summary, there are a number of important things to highlight about the definition of teacher leadership. Firstly, teacher leadership is associated with the creation of collegial norms among teachers that evidence has shown can contribute to school effectiveness, improvement and development. Second, teacher leadership equates with giving teachers opportunities to lead, which research shows has a positive influence upon the quality of relationships and teaching within the school. Third, at its most practical level, teacher leadership means teachers working as instructional leaders influencing curriculum, teaching and learning. Finally, teacher leadership is associated with re-culturing schools, where leadership is the outcome of the dynamics of interpersonal relationships rather than just individual action.

Therefore, the cultivating and valuing of teacher leadership is essential for high quality education systems. This involves attention to appropriate professional development and professional learning to support teachers' leadership, knowledge, and practices in order to provide high quality teaching and learning for improved student outcomes.

Effective Continuing Professional Development and Professional Learning

The necessity of continuing professional development is recognised in the United Nation's Sustainable Development Goals (United Nations, 2015), and specifically in the Framework for Action for Sustainable Development Goal 4: Towards inclusive and equitable quality education and lifelong learning for all (UNESCO, 2016). Continuing professional development (CPD) involves in-service teachers' development and learning over their career, as contrasted with initial teacher education for people being trained to become teachers (OECD, 2019). In this report, we focus on CPD and linked professional learning. In TALIS, CPD is defined as "activities that aim to develop an individual's skills, knowledge, expertise and other characteristics as a teacher" (OECD, 2014, p.64). Cordingley et al. (2019, p. 20) distinguished between:

- **Continuous Professional Development (CPD):** The sustained support offered to teachers to develop their skills, knowledge and experience, beyond their initial teacher training.
- **Continuous Professional Learning and Development (CPLD):** The processes and activities teachers undertake as they participate in and respond to CPD.

In this report, we utilise Cordingley et al.'s (2019) distinction. We refer to CPD as specific formal activities, events, and resources designed to support teachers' development. We refer to CPLD as the professional learning – including reflection, inquiry, professional collaboration, and experimentation – teachers use to adapt and apply the learning from CPD within their day-to-day practice. For example, the Teacher-led Learning Circles facilitated workshops are CPD; the resulting reflection,

Box 2. Features of Effective Professional Development

Effective professional development:

- is linked to teachers' identified priorities for their work to support student's needs, improve student learning, and enhance related student outcomes;
- is differentiated for teachers' professional values, experiences, and work in their school and classroom contexts;
- provides useful, research- and practice- informed, quality content relevant to identified professional development needs;
- supports evidence-informed active professional learning, inquiry processes, critical reflection, and collaborative professional learning to value and develop teachers' leadership and profession agency;
- requires adequate provision of funding, time, and expert resources;
- involves system, school, and teacher leadership supporting the importance of professional development.

inquiry, collaboration, and action occurring in teachers' day-to-day work and classroom practices are CPLD.

Meta-analyses of the outcomes from professional development indicate that there can be a positive effect on teachers' instruction (Garrett et al., 2021), and on students' learning and academic achievement (Sims et al., 2021). Analysis of TALIS data by the OECD found that: "receiving pre-service training and/or in-service training in a given area is associated with a higher perceived level of self-efficacy in this area by teachers, and/or a higher propensity to use related practices" (OECD, 2019, p. 41). It is important to recognize that the effect of professional development is mediated through a process of changes in, first, teachers' self-efficacy, professional knowledge, and practices and then, second, in students' learning and achievement (Garrett et al., 2021).

However, not all professional development is effective or equally so. We draw on several existing reviews, syntheses, and meta-analyses of research on professional development and learning (for example: Campbell et al., 2017; CUREE, 2012; Cordingley et al., 2015; Dagen & Bean, 2014; Darling-Hammond et al., 2009; Desimone, 2009; Garet et al., 2001; Garrett et al., 2021; Jensen et al., 2016; Learning Forward, 2022; OECD, 2019, 2021; Sims et al., 2021; Timperley, 2008; Timperley et al., 2007), plus other relevant research studies to identify six key features of effective professional development (see Box 2). We discuss these features below.

Effective Professional Development is Linked to Teachers' Identified Priorities for their Work to Support Students' Needs, Improve Student Learning, and Enhance Related Student Outcomes

Effective professional development starts with a teacher identifying a particular priority professional development need, which is usually linked to supporting their students' learning in their classroom context. Professional development and professional learning can be linked to a wide range of priorities and intended outcomes; for example, improving student learning and achievement, engagement, equity, social-emotional learning, and well-being (Learning Forward, 2022; OECD, 2021). For example, a teacher could ask: What areas are my students struggling in? How can I support all learners? They could use formative assessment information, for example through observations, student work and/or conversations with students, to identify priority student learning needs. This would inform the identification of a priority focus for the teacher's own professional development priorities (e.g. what do I [the teacher] need to learn in order to further support my students?). Advancing teacher leadership also involves identification of teachers' priorities for their leadership development. Teacher leadership is often associated with instructional leadership – the expertise and capacity to develop and support instructional knowledge, skills, and practices – and with a form of transformational leadership to lead/co-lead and collaborate to bring about educational change (Frost, 2019). This requires the development

of skills in teaching and in leading. This process of identifying a professional development priority is sometimes referred to as identifying a 'problem of practice' directly connected to teachers' daily work (Cordingley et al., 2015; Croft et al., 2010; Timperley, 2008).

Teacher agency, choice, and voice should be central to teachers' professional learning. According to Thompson (2021, p.116): "In a system that prioritises intelligent professionalism, CPD will be a central focus that responds to the needs identified by the profession." As Taylor et al. (2011) commented:

If teacher leaders are told what to learn, how to learn, and why to learn, their learning is controlled by others and their capacity to lead is stunted. To learn to lead, then, teachers must place their own issues and concerns at the center of their learning process, know themselves as learners, reflect on their learning and share it with others. (p. 922)

Deciding the specific priority content of professional development requires careful consideration of, and balance between, system and school priorities for students' learning and outcomes, and teachers' identified needs for their students and for their own professional learning priorities (Campbell et al., 2017). This balance can be challenging to achieve. Sims et al.'s (2021) analyses of implementation fidelity and effectiveness suggest that professional development priorities and linked changes are more likely to be achieved and sustained if there is a clear linkage to school priorities and classroom contexts. There are also times when larger system priorities require linked professional development resources; for example, in the rollout of a new curriculum or in current COVID-19 emergency responses and longer-term recovery plans. Priority topics for improving teaching and learning can also change over time, for example, current priorities include: integration of technology; supporting diverse, multicultural, and multilingual students in inclusive classrooms; and appropriate teaching and supports for students identified as having special education needs (OECD, 2019). It can be anticipated that the ongoing impact of the COVID-19 pandemic, increasing population diversity, migration, and displacement, plus technological advances will continue to influence priority professional development needs.

Effective Professional Development is Differentiated for Teachers' Professional Values, Experiences, and Work in their School and Classroom Contexts

As we concluded in the *State of Educators' Professional Learning in Canada* study: "there is no one size fits all approach to professional learning and nor should there be. The specific professional development needs identified will vary over a teacher's career, teaching responsibilities, changing student populations, and classroom and school contexts" (Campbell et al., 2017, p. 41). The OECD's (2019, p. 157) report on the latest TALIS findings explains:

The literature indicates that training is potentially more effective when teachers are able to participate in a wide range of formats (Jensen et al., 2016; Hoban and Erickson, 2004; Scheerens, 2010). Some formats, such as participation in courses or seminars or reading professional literature, may develop knowledge-based skills (Hoban and Erickson, 2004), while others, like participation in professional networks or coaching, foster collaborative and social skills (Kraft, Blazar, and Hogan, 2018). These characteristics help to build a more rounded profile of teachers and principals (Chen and McCray, 2012).

Furthermore, professional development that connects with teachers' personal and professional values, and with their prior experiences and professional knowledge, tends to be more effective (Desimone, 2009; OECD, 2019). Therefore, teachers should be supported to engage in a range of professional development activities differentiated to their professional needs.

Effective Professional Development Provides Useful, Research- and Practice-informed, Quality Content Relevant to Identified Professional Development Needs

Once teachers have identified a priority professional development need, it is important that the professional development provided includes relevant, useful, research- and practice-informed quality content. Developing strong instructional, curricular and assessment knowledge is more effective than generic skills development (CUREE, 2012; Dagen & Bean, 2014; Desimone, 2009; Desimone & Stuckey, 2014; Garet et al., 2001). Shulman (1986, pp. 9-10) identified that developing teachers' expertise required professional development to support a combination of subject matter content knowledge (i.e., knowing the principles and detailed information about a subject's content), pedagogical content knowledge (i.e., knowing how to appropriately and effectively teach and support students' learning of the subject), and curricular knowledge (i.e., understanding the relevant subject curricula and linked instructional materials). Developing teachers' knowledge and practices for use of formative assessment and feedback is particularly important (OECD, 2021). Furthermore, it is important to develop teachers' expertise in "developing content knowledge to underpin such strategies and exploring how they work for different groups of pupils" (Cordingley et al., 2015, p. 5); this includes consideration of how teachers can support the diversity of students in their classrooms (OECD, 2019).

The development of teacher leadership also requires intentional use of professional development content appropriate to developing leadership knowledge, skills, and actions. In their review of teacher leadership research, York-Barr & Duke (2004, p. 282) identified:

In terms of content emphases for teacher leadership development, three primary themes emerged: continuing to learn about and demonstrate advanced curricular, instructional, and assessment practices; understanding

the school culture and how to initiate and support change in schools; and developing the knowledge and skills necessary to support the development of colleagues in individual, small group, and large group interactions.

In addition, in her review of teacher leadership, Harris (2005, p. 212) summarized:

professional development for teacher leadership needs to focus not just on the development of teachers' skills and knowledge, but also on aspects specific to their leadership role. Skills such as leading groups and workshops, collaborative work, mentoring, teaching adults, action research, collaborating with others...

Teachers need professional development content, scaffolding, and support to grow their leadership and to inform their teaching.

Effective Professional Development Supports Evidence-Informed Active Professional Learning, Inquiry Processes, Critical Reflection, and Collaborative Professional Learning to Value and Develop Teachers' Leadership and Professional Agency

Effective professional development involves providing quality, relevant content *and* active professional development and professional learning processes. As the OECD (2019, p.162) explained:

Active learning refers to pedagogical approaches that put learners at the centre of instruction (OECD, 2014). Policy reviews and research literature have recommended incorporating this approach into CPD training, as it envisions teachers as co-constructors of their own learning and provides interactive strategies to contextualise teaching instruction to their local settings (Desimone, 2009; Garet et al., 2001; Villegas-Reimers, 2003).

Based on analysis of TALIS data, the OECD (2019, p. 162) found:

On average across the OECD, among teachers who report that their training was impactful, the characteristics of this dimension were that the training: 1) "provided opportunities to practise/apply new ideas and knowledge in [their] own classroom" (86%); 2) "provided opportunities for active learning" (78%); 3) "provided opportunities for collaborative learning" (74%); and 4) "focused on innovation in [their] teaching" (65%).

Active professional learning can involve an inquiry process cycle. As we have previously discussed:

In considering the evidence-informed aspect of teachers' professional judgement, it is important to conceive of—and use—a broad definition of evidence... Evidence includes data, research, evaluation, as well as

evidence from professional knowledge, experiences, practices, observations, conversations, and documents. Judgement also requires being informed through a process of inquiry, reflection, discussion, analysis, critique, contextualisation, consideration and potentially adaptation of evidence. (Campbell, 2018, p.77).

Figure 4 provides Timperley et al.'s (2007) teacher inquiry and knowledge-building cycle, focusing on using evidence, professional judgement, and reflective questions to identify students' learning needs and linked professional learning needs, followed by a process of inquiry and action to further improvements in practices and outcomes. In addition to inquiring into teaching and learning practices, such professional inquiry processes also involve teachers in developing "professional, self-regulatory inquiry skills so that they can collect relevant evidence, use it to inquire into the effectiveness of their teaching, and make continuing adjustments to their practice" (Timperley, 2008, p.24). In such processes, teachers' use of formative assessment data is important for identifying students' learning needs, and for observing and monitoring student learning and progress when implementing changes in instructional and assessment practices.

Active learning is also essential for leadership development. Based on our research of Ontario's Teacher Learning and Leadership Program (TLLP), we concluded:

Intentionally developing teachers' leadership skills through opportunities and experiences to actually lead in practice are vital. A clear finding from our TLLP research is that teacher leaders learn leadership by doing leadership! This does not mean that teachers must take on formal leadership responsibilities, rather teachers—within and beyond their classrooms— should have opportunities to lead learning, (co)development of knowledge, de-privatisation of practices, and generating networks to share ideas and practical resources to bring about change. (Campbell, 2018, p. 79).

Furthermore, while individual professional development is important; collaborative professional learning opportunities can be particularly powerful. When collaborative professional learning is done effectively, benefits for teachers' self-efficacy, professional knowledge, skills, and practices, and for students' learning and achievement have been identified (Bolam et al., 2005; DuFour & Eaker, 1998; Cordingley et al., 2015; CUREE, 2012; Lieberman & Wood, 2003; Stoll et al., 2006; McLaughlin & Talbert, 2001; 2006). Careful attention to the agreed shared purpose and intended outcomes of collaboration, and to developing authentic and genuinely collaborative professional relationships and processes, are required. Therefore, "it is not simply collaboration that is required; it is forms of collaboration that enable co-learning, co-development, and joint work for educators" (Campbell et al., 2017, p. 42), including sharing knowledge and improving each other's practices. Deeper forms of professional collaboration include "team teaching, providing feedback based on classroom observations, engaging in joint activities across different classes and participating in collaborative professional learning"

(OECD, 2021, p.49). The use of professional learning communities, or similar forms of joint collaboration for teams of educators, can support providing regular feedback to teachers and sharing of innovative and effective practices to improve instruction and student achievement (OECD, 2019).

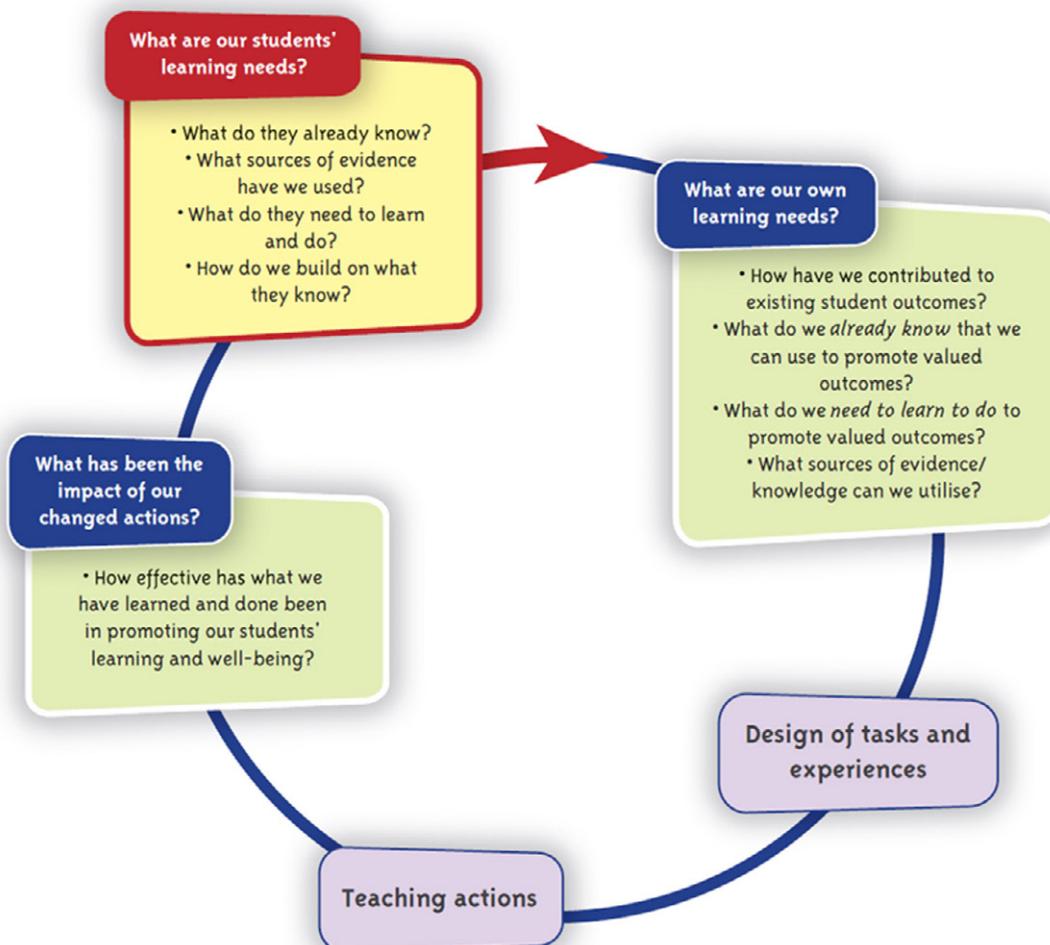


Figure 4. Teacher Inquiry and Knowledge-Building Cycle to Promote Valued Student Outcomes (Timperley et al., 2007)

With regard to collaborative professional learning for teacher leadership development, Harris concluded (2005, p. 213):

...for teacher leadership to become truly transformative the literature indicates that structured programs of collaboration or networking need to be set up to ensure that teacher leaders can fully develop their leadership potential (Clemson-Ingram & Fessler, 1997; Gehrke, 1991). Through collaborating with teachers in other schools, engaging in trials of new teaching approaches, disseminating their findings to colleagues, and engaging in action research, the potential for teacher leadership has been shown to be significantly enhanced (Darling-Hammond et al., 1995). Such activities have been identified in helping to develop teachers' confidence and reflection on their practice (Romerdahl, 1991; Munchmore and Knowles, 1993).

In our research on teacher learning and leadership development, we found:

Overall, the twin strategies of developing professional collaboration – for example, through professional learning communities, online networks and other forms of networking/collaboration – and of developing practical resources for use by teachers, appear to be both the most prevalent and impactful approaches to sharing learning... (Campbell et al., 2018, p. 29).

Collaboration can involve co-leading professional learning, co-developing instructional resources, strategies, and practices, and sharing learning more widely in schools and across professional networks.

Effective Professional Development Requires Adequate Provision of Funding, Time, and Expert Resources

The provision of, and participation in, professional development requires funding to cover resources involved and costs incurred. Jay et al. (2017, p. 31) described allocation of time for professional development as “the most crucial condition” for success. There are several aspects to the provision of adequate time. First, teachers need release time to participate in professional development activities outside of their own classroom (and/or school). Second, teachers need time integrated within their workday to engage in reflection, inquiry, and continuing professional learning to apply, evaluate, and adapt changes in their teaching practices and to observe impacts for students’ learning. Third, teachers need time to collaborate with peers within their schools and in professional networks beyond their school. Fourth, effective professional development involves professional learning supported and sustained over a longer period of time to enable cumulative improvements in teachers’ knowledge and practices. For example, in their review of professional development and learning, Darling-Hammond et al. (2009, p. 9) summarised:

An analysis of well-designed experimental studies found that a set of programs which offered substantial contact hours of professional development (ranging from 30 to 100 hours in total) spread over six to 12 months showed a positive and significant effect on student achievement gains. According to the research, these intensive professional development efforts that offered an average of 49 hours in a year boosted student achievement by approximately 21 percentile points. Other efforts that involved a limited amount of professional development (ranging from 5 to 14 hours in total) showed no statistically significant effect on student learning.

Therefore, the provision of time is essential for effective professional development.

Resources to provide quality content and facilitate learning are also required. Access to expertise through the provision of coaches, external experts/facilitators, and teachers with specialist knowledge, plus opportunities to attend professional

development events and training, are important (Cordingley et al., 2015; CUREE, 2012; Sims et al., 2021; Timperley, 2008). Teaching resources and materials to support the integration of teachers' changing practices are also important. For example, in their evaluation of effective implementation of changes from professional development, Sims et al. (2021, p. 51) noted:

Resources took three crucial forms: guidance documents, teaching resources (such as lesson plans or resources for students), and technological resources (such as iPads or computer programmes). The unifying theme across these categories was clear: teachers welcomed resources which met their needs simply and effectively but abandoned resources which did not do so. The precise nature of the resource depended on the intervention.

Importantly, professional learning also involves teachers leading the development and sharing of resources to provide expert, practical content for other teachers. In the case of the HertsCam teacher development approach, Frost et al. (2019, p. 8) indicate such resources support sustainability of knowledge and learning:

Related to that is the challenge of ensuring legacy of the project. This involves planning ahead to try to ensure the development work continues to grow but also to try to ensure that it becomes part of the institutional memory (Sergiovanni, 1992). Strategies for the latter include the production of handbooks for colleagues, catalogues of teaching materials, evaluation reports and the like.

One of the most powerful tools for extending the impact of development work and for ensuring legacy is the narrative arising from the development project. This might be in an oral form shared in various networking scenarios, but it might also be published.

Therefore, effective professional development requires materials that teachers can use in practice, and the further development and sharing of resources developed during the professional learning.

Effective Professional Development Involves System, School, and Teacher Leadership Prioritizing and Supporting the Importance of Professional Development

The provision of effective professional development involves the active leadership, engagement, and support of government leaders and the education profession, including teacher unions and educators. In Thompson's (2021, p. 116) proposed shift to "intelligent professionalism," "CPD will be centrally resourced and available to support workers, teachers, and principals as part of their workload, not in addition it."

The active engagement and support of school leaders for professional development is vital. As indicated in Figure 3, the OECD (2021) conceptualize the

importance of school leadership and professional development as influencing school culture, classroom practices, and student learning. Robinson, Hohepa, and Lloyd's (2009) best evidence synthesis of 134 studies to examine *School Leadership and Student Outcomes: Identifying what works* and why identified the importance of "pedagogical leadership," with the most impactful practice by school leaders being "promoting and participating in teacher learning and development" (pp. 38-39). School leaders can: (co)establish a shared vision, priorities, and plan for professional development; ensure provision of relevant opportunities and resources; establish collaborative professional learning as an essential part of the school culture; and model the importance of professional learning by engaging with staff and in their own professional development (Campbell & Osmond-Johnson, 2018; Cordingley et al., 2019; Hord, 1997; Sims et al., 2021).

School leaders' advocacy for, and support of, teacher leadership is necessary and important. As Crowther et al. (2002, p. 33) observed: "Where we have seen teacher leadership begin to flourish, principals have actively supported it or, at least, encouraged it". School leaders can enable teacher leadership by: cultivating a school culture that values and provides opportunities for teachers to exercise their leadership influence; attending to practical constraints such as time and resources to enable teachers' leadership development; fostering professional collaboration; and providing opportunities for teachers to lead and engage in decision-making and educational changes (Nguyen et al., 2019). This means that school leaders also need to intentionally learn how to effectively support teacher leadership (York-Barr & Duke, 2004).

Finally, as has been indicated throughout this review, teachers' leadership of their own professional development and their leadership of colleagues' professional learning is important. Teachers value opportunities for teacher-led professional development, where teachers can collaborate, learn together, co-develop, and share knowledge and practical resources, and de-privatise their practices by sharing and learning beyond their own classrooms (Campbell et al., 2018). In their review of teacher leadership research, Wenner and Campbell (2017, p. 152) explained:

one of the primary duties of teacher leaders tends to be supporting the professional learning of colleagues. As such, it was encouraging to find that many teachers benefited from PD presented by teacher leaders. Not only did teacher leaders provide more opportunities for PD (Carpenter & Sherretz, 2012) but also better quality and more relevant PD (Hickey & Harris, 2005; Vernon-Dotson, 2008; Westfall-Rudd, 2011). Additionally, teacher leaders were seen as resources capable of providing assistance and support with pedagogy and content in a non-PD format (Gordin, 2010; Margolis & Deuel, 2009).

Teachers' leadership of professional development and collaborative professional learning matters.

In Table 1, we outline how the features of effective professional development are embedded in the design and implementation of the Teacher-led Learning Circles project.

Table 1. Features of Effective Professional Development and Teacher-led Learning Circles Project

Effective Professional Development	Design and Implementation of Teacher-led Learning Circles Project
<i>is linked to teachers' identified priorities for their work to support students' needs, improve student learning, and enhance related student outcomes;</i>	Teachers engage in facilitated development processes to identify priority foci to create an Action Plan for leading development processes in their school and use of formative assessment practices to support their students' learning
<i>is differentiated for teachers' professional values, experiences, and work in their school and classroom contexts;</i>	Teacher-led Learning Circles includes processes to support teachers' reflections on, and connections to, their professional values, experiences, and work, including use of written reflections, portfolio of evidence, and teacher vignettes
<i>provides useful, research- and practice- informed, quality content relevant to identified professional development needs;</i>	Teacher-led Learning Circles project provides research- and practice-informed quality materials and resources to support understanding, application, review, and adaptation of leadership of educational change and use of formative assessment and feedback practices
<i>supports evidence-informed active professional learning, inquiry processes, critical reflection, and collaborative professional learning to value and develop teachers' leadership and professional agency;</i>	Teachers will be involved in a series of facilitated professional development workshops, collaborative professional learning circles, leadership development processes, and active professional inquiry and reflection in their day-to-day work and will also create written reflections, portfolios, and vignettes
<i>requires adequate provision of funding, time, and expert resources;</i>	The Teacher-led Learning Circles project provides adequate time for professional development activities and for inquiry and professional learning over a full school year, plus expert facilitators, researchers, and materials to support teachers' learning and practices
<i>involves system, school, and teacher leadership supporting the importance of professional development.</i>	Teacher-led Learning Circles project involves developing and valuing teachers' leadership. Teacher union, education system leaders, and school leaders will be engaged in understanding the Teacher-led Learning Circles project and the resulting identified promising practices for use of formative assessment



Having discussed the features of high-quality education systems and how to support teacher leadership and effective professional development, we turn now to discuss formative assessment and feedback as particularly powerful approaches to support teachers' teaching and students' learning.

Formative Assessment

Assessment is one of the most profound drivers of student learning in classrooms, defining and prioritising learning goals for students, and directing how students approach learning. Classrooms that emphasise formative assessment involve students in actively participating in the assessment process throughout their learning; students use assessment information to guide their own learning forward. When formative assessment is implemented, assessment is seen as a transparent pedagogy mediated by dialogue, ongoing feedback, and a mutual commitment to learning by both students and teachers. In Box 3, we summarise features of formative assessment. As noted by Birenbaum, Kimron, and Shilton (2011), prevalent in classrooms that focus on formative assessment are “collaboration, mutual help, knowledge sharing, and reflection as a habit of mind” (p. 36), with formative assessment activities linked to deeper learning and increased self-efficacy and motivation for learning (Boekaerts & Corno, 2005; Entwistle & Ramsden, 1983; Pajares, 1996).

Formative assessment works as a classroom assessment practice in conjunction with summative assessment practices (i.e., assessments that seek to evaluate and report on student learning). Together, formative and summative assessment support a programme of assessment that monitors, supports, and reports on student learning. In assessment contexts with a strong emphasis on traditional summative assessments (e.g., testing and large-scale examinations), formative assessment is still highly valuable. In essence, formative assessment bolsters the role of assessment in classrooms, and helps students be better prepared for summative assessment activities. Research suggests that when formative assessment is implemented in classrooms, students’ scores on summative and large-scale assessments are increased with additional gains to student motivation, self-efficacy, and metacognition: “Over the past 25 years, at least 15 substantial reviews of research, synthesizing several thousand research studies, have documented the significant positive impact of classroom assessment practices on students” (Leahy & Wiliam, 2009, p. 2).

Box 3. Features of Formative Assessment

Formative assessment involves the purposeful integration of feedback throughout teaching to support and accelerate student learning through a variety of daily assessment activities that:

- *Clarify learning goals and success criteria*
- *Engage students in meaning questioning and classroom discussions*
- *Involves peer- and self-assessment activities*
- *Monitor progress towards learning goals through diverse forms of feedback about next step for development*

History and Implementation of Formative Assessment

The roots of formative assessment are located in the field of program evaluation. Initially recognized by Scriven (1967) as an assessment process to provide information for program improvement, formative assessment was then applied more generally to educational contexts. In classrooms, the notion of formative assessment was first associated with teachers' use of assessment information in order to adjust and tailor their teaching practice to better support student learning. The emphasis was on teachers as the active users of assessment information rather than students.

In 1998, Black and Wiliam wrote a seminal paper that reviewed over 250 feedback studies, noting "several studies show firm evidence that innovations designed to strengthen the frequent feedback that students receive about their learning yield substantial learning gains" (p. 7). Based on this review, the Assessment Reform Group in the UK developed a set of foundational principles under the banner, *assessment for learning*. This purposeful change from 'formative assessment' to the term 'assessment for learning' was intended to bring further precision to the formative assessment concept, emphasising the distinction between formative and summative assessment activities as well as the active role students should play in assessment processes. Box 4 provides the definition of Assessment for Learning (AfL) developed by the Assessment Reform Group, and their ten principles, a fully integrated part of teaching and learning, and a shared activity by students and teachers.

It was not soon after the Assessment Reform Group's work that AfL started to gain attention globally as an impactful practice that supported effective teaching and enhanced student learning. AfL has since become widely adopted in educational policies and practices across countries in every continent (see Birenbaum et al., 2015; Laveault & Allal, 2016). As a worldwide phenomenon, it is unsurprising that AfL has been adapted through its implementation across contexts, now leading to a variety of understandings of how to implement AfL. As initially noted by Marshall and Drummond (2006), AfL implementation varies from the *letter* (i.e., procedural and piecemeal implementation) to the *spirit* (i.e., a pervasive pedagogical change where AfL becomes a driver of teaching and learning). Given the range of implementation, the effects on learning vary widely (Laveault & Allal, 2016). As Baird et al. (2014) conclude in their state of the field review, the consistent finding in the empirical research suggests a "modest, but educationally significant, impact on teaching and learning" (p. 6).

Importantly, what has been observed through repeated efforts of AfL implementation across contexts has been the potential challenges to widespread adoption. Challenges include:

- enacting effective system-wide professional development and supporting teachers' AfL knowledge, beliefs, and practices (DeLuca et al., 2015; DeLuca et al., 2019; Heitink et al., 2016);

- shifting assessment cultures from highly summative to formative (Baird et al., 2014; Heitink et al., 2016; Shepard, 2000); and
- moving beyond procedural implementation of AfL to embrace the spirit of AfL in schools (Brooks et al., 2021; DeLuca et al., 2019; James & McCormick, 2009; Marshall & Drummond, 2006).

Overcoming these challenges has proven to require sustained commitments to ongoing professional learning that often involve collaborative professional learning models, leveraging assessment experts and educational coaches, and an ongoing emphasis on reflective practice (DeLuca et al., 2015; DeLuca et al., 2019).

Box 4. Definition and Principles of Assessment for Learning Developed by the Assessment Reform Group (2002)

Definition of AfL:

“the process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they need to go and how best to get there.”

Principles of AfL:

- 1. Assessment for learning is part of effective planning***
- 2. Assessment for learning should focus on how students learn***
- 3. Assessment for learning is central to classroom practice***
- 4. Assessment for learning is a key professional skill***
- 5. Assessment for learning has an emotional impact on students and teachers***
- 6. Assessment for learning affects learner motivation***
- 7. Assessment for learning promotes commitment to learning goals and assessment criteria***
- 8. Assessment for learning helps learners know how to improve***
- 9. Assessment for learning encourages self-assessment***
- 10. Assessment for learning recognises all achievements***

Definitions and Essential Features of Contemporary Formative Assessment

AfL has continued to evolve as a concept since its initial definition as presented by the Assessment Reform Group in 2002. In 2004, Black et al. clarified AfL as distinct from other purposes of assessment:

Assessment for learning is any assessment for which the first priority in its design and practice is to serve the purpose of promoting students' learning. It thus differs from assessment designed primarily to serve the purposes of accountability, or of ranking, or of certifying competence. An assessment activity can help learning if it provides information that teachers and their students can use as feedback in assessing themselves and one another and in modifying the teaching and learning activities in which they are engaged. Such assessment becomes "formative assessment" when the evidence is actually used to adapt the teaching work to meet learning needs. (p. 10)

Later, in 2009, Klenowski highlighted the essential integrated nature of AfL with teachers' and students' everyday practices: "Assessment for Learning is part of everyday practice by students, teachers and peers that seeks, reflects upon and responds to information from dialogue, demonstration and observation in ways that enhance ongoing learning." (Klenowski, 2009, p. 264). In their text on

the global implementation of AfL, Laveault and Allal (2016) defined AfL as: "the collection and interpretation of assessment information whose intentional use enables teachers and students, acting individually or interactively to reach decisions that have a positive impact on instruction and learning" (p. 7).

Underpinning these definitions are essential features of contemporary formative assessment, distinguishing it from other assessment purposes and processes in schools. Embedded within teaching and learning activities, AfL essentially involves the four interrelated strategies outlined in Box 5, which are based on the gathering of evidence related to student learning through various daily assessment activities (Lysgaht, O'Leary, & Ludlow, 2017, 2019).

Box 5. AfL Strategies (Lysgaht, O'Leary, & Ludlow, 2017, 2019)

- 1. Clarifying, sharing, or co-constructing learning intentions and success criteria with students;**
- 2. Leveraging questioning and classroom discussion to deepen student learning and provide in-the-moment feedback for next steps;**
- 3. Engaging in self- and peer-assessment practices to promote a community learning, student ownership in learning, and learner agency;**
- 4. Providing ongoing feedback to close the gap between where the student is and their learning goals.**

When used in combination, the strategies:

- enable learners to take ownership of their learning and understand what success looks like, which motivates learning;
- encourages student agency in their learning through engagement in self- and peer-assessment processes; and
- accelerates learning by providing targeted feedback to close the gap between where learners are in their learning, where they need to go, and how best to get there.

Conceptual Underpinnings of Formative Assessment

AfL is situated within a socio-cultural and constructivist view of learning, which recognizes that learning is dependent upon a collaborative community of learners within classrooms. From this perspective, student learning is shaped not only by their own achievement and by teacher pedagogy but also by the learning of others in the class (Baird et al., 2014). A fundamental premise of formative assessment is the recognition that learning is a result of shared meaning making within a community of practice propelled by daily assessment practices (Willis, 2010).

A second conceptual underpinning of contemporary formative assessment is the necessary transfer of power from teacher to student within the assessment process, which has traditionally resided with teachers. In contemporary formative assessment practices, students have agency and are active creators and users of assessments and assessment information. Encouraging students to become more active within assessment processes results in the cultivation of foundational self-regulation and metacognitive skills:

- **Self-regulation** is understood as individuals adjusting their behaviour and learning practices in ways that better enable them to achieve their goals.
- **Metacognition** involves one's awareness of such a practice.

Through self- and peer-assessment processes, students support one another and themselves in setting learning goals, identifying gaps in their learning, and planning next steps for their development. As Greene (2020) recognises, these processes are necessarily tied to and simultaneously work to enhance students' self- and co-regulation (i.e., when regulating behaviours are influenced by others). Through such processes, students become more autonomous, self-regulating, and agentic in their learning. They become less reliant on teacher feedback and more able to sustain their learning interdependently and by using various assessment and feedback practices (Hawe & Parr, 2014).

Finally, contemporary formative assessment rests fundamentally on the giving and receiving of feedback to propel student learning forward. Feedback is at the heart of self- and co-regulation processes. In classrooms, feedback practically

involves identifying where students are in their learning and where they need go to achieve the learning goals. Feedback should also support students in identifying productive learning strategies to move forward with their learning. In essence, feedback is the fuel in the self-regulation engine.

The Important Role of Feedback

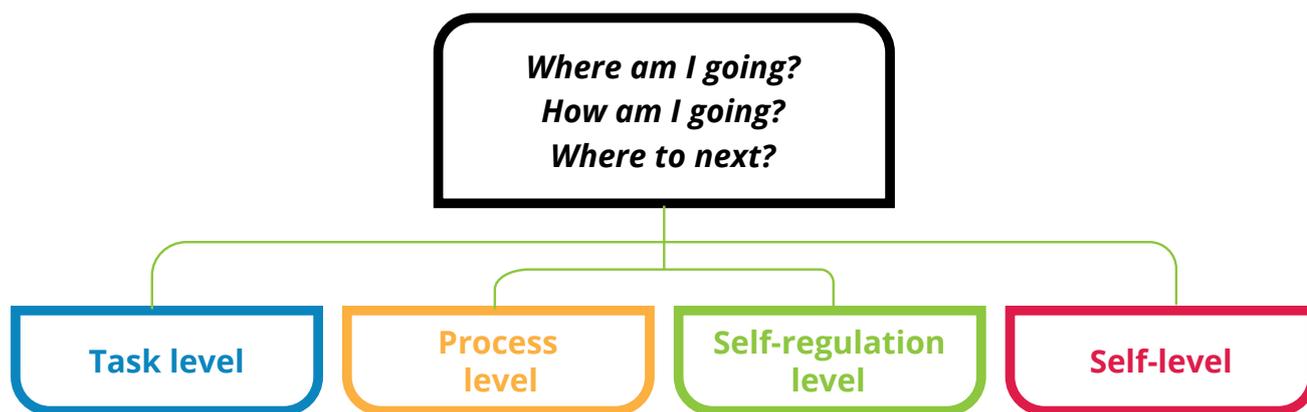
Central to effective formative assessment is continuous engagement with high quality feedback processes generated from self-, peer-, and teacher-assessments. The OECD report (2021), *Positive, High-achieving Students? What Schools and Teachers Can Do*, emphasised the importance of feedback in advancing all students' learning, regardless of background, culture, or ability level. Research on feedback has a long history, with studies consistently showing that high quality feedback can positively support and promote student learning, but also that poor-quality feedback can limit and deter learning (Wisniewski, Zierer, & Hattie, 2020). Based on various systematic reviews of feedback research, the effect size of feedback practices on student learning ranges from 0.48 (Wisniewski et al., 2020) to 0.79 (Hattie and Timperley, 2007), signalling that feedback is one of the most powerful pedagogies teachers can leverage in their classrooms.

The key factor in unlocking the power of feedback is understanding the various kinds of feedback and how best to implement them within teaching and learning. As noted in the 2021 Education Endowment Foundation's *Guidance Report on Teacher Feedback to Improve Pupil Learning* report, feedback can

- emphasize different content areas,
- be delivered via different methods,
- be directed to different people/pupils, and
- be given at different points in the learning process.

As such, feedback is a complex but highly valuable process in teaching and learning. Wisniewski et al.'s (2020) study confirmed that feedback is more effective when it contains substantive information; simple feedback, particularly feedback that offers basic reinforcement (i.e., praise) or punishment has low effect on student learning, and potentially negatively impacts students' motivation to learn.

As outlined in Figure 5, Hattie and Timperley (2007) developed a model for various kinds of feedback based on a conceptual analysis of feedback literature and evidence. In this work, they succinctly articulated the purpose of feedback in classrooms was fundamentally: "to reduce discrepancies between current understandings/performance and a desired goal" (p. 87).



Feedback from teachers, peers, or student themselves can respond to three broad questions:

1. **Where am I going?** Which serves to clarify the learning goals and is known as 'feed up';
2. **How am I going?** Which serves to reflect on the students' current performance level and is known as 'feed back'; and
3. **Where to next?** Which serves to support students' next steps and learning actions, and is known as 'feed forward'.

Each of these questions can be answered at four different levels, representing different qualities of feedback to students. The four levels are:

- a. **Task level:** reflecting on how well the specific task was being performed or understood;
- b. **Process level:** reflection on how well the underpinning processes needed to perform the task (e.g., writing skills for a persuasive essay) were being performed or understood;
- c. **Self-regulation level:** reflection on the student's self-monitoring, self-assessment, and regulation actions; and
- d. **Self-level:** reflection on personal qualities and affect of the student.

Figure 5. A model of feedback for enhanced learning (revised based on Hattie and Timperley, 2007)

Through their conceptual analysis, Hattie and Timperly (2007) deduced that while self and task level feedback were most common in schools, self-regulation level feedback followed by process level feedback were most effective in supporting learners' progress. They also noted that self-regulation feedback and process level feedback were "powerful in terms of deep processing and mastery of tasks" (pp. 90–91).

Within the context of contemporary formative assessment, as indicated in Figure 6, feedback is viewed as an essential driving force and maps onto core AfL strategies. Integrating AfL strategies throughout the learning period creates

a classroom rich with feedback. This feedback enables positive feedback loops: recursive opportunities for students to revisit their learning based on feedback and enhance their work. Positive feedback loops promote productive spirals of learning leading to growth and development, whereas negative feedback loops inhibit or stall learning. To promote positive feedback loops in classrooms, feedback should be:

- anchored to explicit learning goals,
- provide opportunities to revise work and integrate feedback into learning, and
- activate self-regulatory behaviours in students (e.g., via self- and peer-assessment).

Research has also shown that the integration of daily AfL practices into teaching and learning yields productive gains to teachers' pedagogical practices as feedback is also provided to teachers on the effectiveness of teaching strategies (James & McCormick, 2009). In essence, formative assessment enhances both learning and teaching.

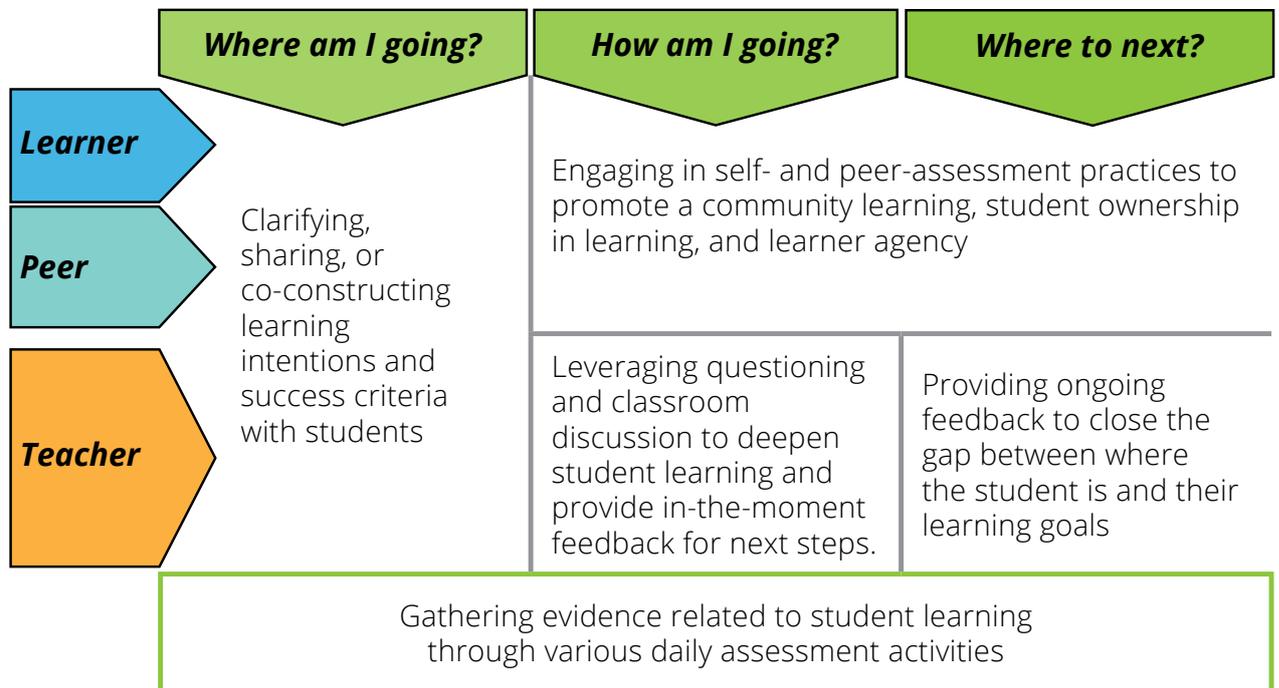


Figure 6. Integrated Model of AfL Strategies and Use of Feedback (Adapted version of Wiliam, 2018 drawing on Lysgaht, O'Leary, & Ludlow, 2017, 2019 AfL principles and instrument for classroom assessment)

Evidence-Informed Formative Assessment Strategies

Various research studies across educational contexts have investigated the impact of different formative assessment strategies on students' learning, motivation, and performance. While the research evidence is not necessarily unified or comprehensive (Kingston & Nash, 2011), some trends have emerged.

1. While feedback is essential to propel learning forward, not all feedback is of equal value in supporting student learning.

As noted above, substantive feedback that is focused on process and self-regulation levels has higher value than feedback focused solely on task activities (Hattie & Timperly, 2007; Wisniewski et al., 2020). In addition, self-level feedback (often in the form of praise or punishment) can have a counter effect on learning. From students' perspectives, a study of 1079 Canadian elementary students found that they valued teacher feedback processes more so than peer feedback and that assessments that clarified learning intentions and success criteria were highly valued in supporting their learning (DeLuca et al., 2018).

2. For feedback and AfL processes to positively impact learning, teachers need to engage in ongoing professional learning about formative assessment and have multi-levels of support.

Heitink et al. (2016) noted the multiple contextual factors necessary to support implementation and uptake of formative assessment in classrooms. At the school level, these factors include, leadership and school assessment culture, and professional development supports. At the classroom level, factors include teachers' and students' knowledge, skills, attitudes, and beliefs as well as the assessment context (i.e., alignment and integration of AfL with content and pedagogy). Research on the adoption of AfL in schools suggests that several of these factors can be effectively supported via professional development initiatives, which aim to build learning communities around AfL concepts and practices (Brooks et al., 2021). These communities should extend to students as explicit instruction of AfL concepts, terminology, and processes has been shown to increase uptake and perceived value of these processes by students (DeLuca et al., 2018).

3. All AfL strategies are based on gathering evidence of student learning through ongoing assessments. These assessments should be varied and triangulated.

Central to AfL practices is the gathering of evidence related to student learning through various daily assessment strategies. A common framework for AfL strategies includes a triangulated approach to collecting evidence and providing students with multiple feedback opportunities. Triangulated

evidence enhances the reliability (i.e., consistency) and validity (i.e., accuracy) of feedback by ensuring that students receive more than one piece of feedback and typically from multiple sources (i.e., teacher, peer, and self). Practically, through a triangulation approach, students are encouraged to think more critically and deeply about their learning and work. Evidence of student learning and feedback on student work can be generated through a variety of assessment activities.

Implementing AfL in the Classroom

Meaningful implementation of contemporary formative assessment in classrooms often requires significant shifts in teacher practices to adopt a spirit of AfL. The goal is to let formative assessment strategies drive teaching and learning in classrooms; assessment is pedagogy. Specifically, continuous experimentation and implementation of the following strategies – with feedback from students on their effectiveness – will promote an AfL approach to teaching and learning. Importantly, while initial implementation may involve procedural adoption of specific practices (i.e., implementing the letter of AfL), through continuous teacher reflection, professional learning, and explicit engagement with students about developing an AfL culture within the classroom, AfL strategies should become increasingly embedded into teaching and learning processes. For each strategy, select practices are presented as an initial characterization of the strategy-in-action. These practices have been explicitly drawn from Lysgaht, O’Leary, and Ludlow’s instrument for AfL in the classroom (2017, 2019) (see also Box 5). While they provide initial insights into what each strategy might look like in classrooms, teachers can extend the practices within each strategy to their own context and consider new practices that support the strategy.

Strategy 1: Clarifying, sharing, or co-constructing learning intentions and success criteria with students

- Learning intentions are stated using words that emphasise knowledge, skills, concepts and/or attitudes i.e., what the students are learning NOT what they are doing.
- Students are reminded about the links between what they are learning and the big learning picture (e.g., “We are learning to count money so that when we go shopping, we can check our change”).
- Child-friendly language is used to share learning intentions with students (e.g., “We are learning to make a good guess (prediction) about what is likely to happen next in the story”).
- Success criteria related to learning intentions are differentiated and shared with students.
- Students demonstrate that they are using learning intentions and/or success criteria while they are working (e.g., checking their

progress against the learning intentions and success criteria for the lesson displayed on the blackboard or flipchart, for example).

Strategy 2: Leveraging questioning and classroom discussion to deepen student learning and provide in-the-moment feedback for next steps.

- Assessment techniques are used to facilitate class discussion (e.g., brainstorming).
- Questions are used to elicit students' prior knowledge on a topic.
- Students are encouraged to share the questioning role with the teacher during lessons (e.g., the teacher routinely invites students to question their peers' contributions to discussions).
- Students' incorrect responses are used to guide teaching and learning (e.g., students are asked to explain why they gave a particular answer).
- Students can explain to others what they are learning (e.g., if a visitor came to the classroom, students could articulate what they are learning in terms that identify the knowledge, skills, concepts and/or attitudes being developed).

Strategy 3: Engaging in self- and peer-assessment practices to promote a community learning, student ownership in learning, and learner agency

- Students are given an opportunity to indicate how challenging they anticipate the learning will be at the beginning of a lesson or activity (e.g., by using traffic lights).
- Students are encouraged to record their progress using, for example, learning logs.
- Students are encouraged to use a range of assessment techniques to review their own work (e.g., a rubric; traffic lights: red light – what is not working and needs to stop?, yellow light - what does the student need clarified? green light - what is working well and should continue?; thumbs up/down; two stars and a wish (i.e., two pieces of learning that the student has mastered and one wish/need they have for their continued learning) .
- A visual record of students' progress is maintained to celebrate students' learning and show areas of/for development (e.g., a bulletin board displaying progression in story writing over a term).
- Time is set aside during parent/guardian-teacher meetings for students to be involved in reporting on some aspects of their learning (e.g., students select an example of their best work for discussion at the meeting).

Strategy 4: Providing ongoing feedback to close the gap between where the student is and their learning goals

- Feedback to students is focused on the original learning intention(s) and success criteria (e.g., “Today we are learning to use punctuation correctly in our writing and you used capital letters and full stop correctly in your story, well done”).
- Assessment techniques are used during lessons to help the teacher determine how well students understand what is being taught (e.g., thumbs up-thumbs-down and/or two stars and a wish).
- Diagnostic information from standardised tests is used to identify strengths and needs in teaching and learning.
- Students are involved formally in providing information about their learning to their parents/guardians (e.g., portfolios or learning logs are taken home), other students in their class, or other visitors to the classroom.
- In preparing to provide students with feedback on their learning, the teacher consults their records of achievement against key learning intentions from previous lessons (e.g., the teacher reviews a checklist, rating scale, or anecdotal record that they have compiled).

Gathering Evidence of Student Learning

All AfL strategies are predicated on gathering evidence of student learning and engaging in assessment activities on that evidence. The typology in Figure 7 is useful in organizing the types of evidence teachers can gather related to student learning. Each type of evidence is the basis for meaningful assessment. Combining these various forms of evidence contribute to a triangulated approach to student assessment in classrooms.



Figure 7. Gathering Evidence of Student Learning

- **Observations** include teacher or peer observations of student performance and can be recorded digitally or via more traditional anecdotal records. Guiding observational assessment may be the use of a rubric or assessment guide (e.g., checklist) or, in some instances, may be more ad hoc. Collecting observational evidence can be useful as reflections back to students about their learning and behaviours in relation to success criteria and learning goals, or as a collection of student growth and development over time. Observations allow for the assessment of curriculum-based learning goals as well as student learning skills, behaviours, and attitudes. Examples of formative assessment observation practices include:
 - Informal observations of individual or collaborative work or play;
 - Formal observations using a standardized protocol or running record template;
 - Documenting observations using an iPad or recording device, or via a photo;
 - Observation checklists (for behaviours).
- **Conversations** provide opportunities for in-the-moment, responsive feedback. Through dialogue, teachers and peers can assess students' understandings and support next steps. Again, conversations can be guided through standardised protocols or, as is the case most often, occur spontaneously throughout learning activities. Conversations can be between teacher and student, involve small groups, or whole class, all of which can comprise assessment evidence of student learning. Examples of formative assessment conversation practices include:
 - In-the-moment questioning of individual student work or groupwork (e.g., Why did you do that? What do you plan to do next? How does this link to our learning goals?);
 - Think-pair-share activities: individual time to think about responses to questions, then share responses to questions with peer then share responses with larger group;
 - Four quadrants: ask a question that provokes perspective-based responses, then ask students to move to one of the four corners of the room based on their perspective; students can discuss their perspectives with their peers and the whole group;
 - Small group or 1:1 conferencing: either with pre-set questions or without, engage students in discussion on their work-in-progress;
 - Exit cards: after a lesson or day of learning, ask students to reflect on what worked and what didn't work (i.e., feedback for teacher and student to support next steps).
- **Products** have traditionally been the subject of the majority of assessment activities in classrooms. Products refers to any artifact of student work from a quiz/test to essay to performance/presentation or

other constructed assignment. Products provide natural opportunities for formative feedback (via self-, peer-, or teacher-assessments) of work-in-progress as well as feedback at summative submission points. Examples of formative assessment practices related to products include:

- 1:1 peer or teacher feedback on work-in-progress: using rubric, provide direct feedback on work-in-progress in relation to learning goals and evaluation criteria;
- Show and tell: student shares work-in-progress and invites written feedback from teacher or peer;
- Bump-it-up wall: students self-assess their work-in-progress by using the evaluation criteria (as outlined on the blackboard or bulletin board) to evaluate where their work currently is at and what they need to do to 'bump it up' to the next level.

Additional resources to help teachers implement AfL in their classrooms can be found on the webpages in Table 2.

Table 2. AfL resources for teachers

Assessment for Learning Strategies	Source
<i>AfL in Practice</i>	Cambridge Assessment
<i>Strategies For Assessment For Learning</i>	Structural Learning
<i>Formative Assessment Strategies: A Teacher's Guide</i>	Structural Learning
<i>Planning Assessment with Instruction Video Library</i>	EduGAINS
<i>Pedagogical Documentation: K-2</i>	Ontario Ministry of Education
<i>Pedagogical Documentation Revisited: K-12</i>	Ontario Ministry of Education
<i>Assessment for Learning Resources</i>	Canadian Assessment for Learning Network
<i>Assessment for Learning Strategies to Improve Learning for ALL Students</i>	Damien Cooper
<i>7 Smart, Fast Ways to do Formative Assessment</i>	Edutopia
<i>20 Simple Assessment Strategies You Can Use Every Day</i>	TeachThought
<i>10 Assessments You Can Perform in 90 Seconds</i>	TeachThought

Technology-Enabled Formative Assessment and Feedback

Just as formative assessment seeks to support and advance student learning, so too does the integration of technology in schools and classrooms (Hammond, 2013). When paired, technology has the potential to enhance formative assessment processes to make them more efficient and effective for students and teachers (Pellegrino & Quellmalz, 2011; Shute & Rahimi, 2017). In addition, digital technologies are an ever-increasing part of school curricula and associated with school, work, and life success (OECD, 2018).

Within the realm of assessment, common digital technologies have been adopted for assessment processes (e.g., laptops, tablets, software) in classrooms in addition to purposefully created tools for assessment tasks (e.g., automated feedback software) (Blundell, 2021; Harris et al., 2010). Current uses of technology in classrooms for assessment purposes have proliferated at a rapid rate resulting in a range of digital tools and options for teachers. Adaptive assessments, e-portfolios, collaborative feedback and grading software, digital self- and peer-assessment tools, and assessment analytic packages are among the current platforms that shape the digital assessment reality in some classrooms today. Depending on local context and availability, there are technologies to support teachers' classroom practices.

Recognising that formative e-assessment involves using technology for the social process of formative assessment, Pachler et al. (2009, p. 4) offer a useful definition of digital classroom assessment:

Digital assessment is the use of ICT to support the iterative process of gathering and analysing information about student learning by teachers as well as learners and of evaluating it in relation to prior achievement and attainment of intended, as well as unintended learning outcomes, in a way that allows the teacher or student to adjust the learning trajectory.

In one of the most recent reviews of digital technologies for school-based assessments, Blundel (2021) examined research from 2009 to 2019 and found that digital tools are used for a variety of assessment functions:

- automated marking,
- immediate feedback to students and teachers,
- reduction in workload,
- tracking and monitoring of student progress and better match assessments to students' learning abilities,
- promote a student-orientated view of assessment,
- collection and curation of diverse forms of learning evidence, including supporting enhanced storage, speed, and scalability of assessments (Pachler et al., 2009)
- and peer-feedback and self-reflection/assessment.

Blundel (2021) noted that advanced digital technologies enable game environments and virtual/augmented realities for assessment and feedback related to a variety of tasks, video recording to support deeper feedback and reflection, and e-portfolio that enable students to collect diverse products of learning. Blundel (p. 295) argued that through such e-assessments, “pedagogy is supported by the efficiencies and diversifications made possible by school-based assessment uses of digital technologies. These uses further enable teacher agency in selection and application of approaches at the nexus of teaching, learning and assessment.”

The extent to which technology can be used to support formative assessment strategies will depend on a number of factors including:

- availability of technology,
- teacher and student technology knowledge and skill, and
- students’ bandwidth (i.e., degree of digital poverty; Doucet et al., 2020).

What is evident from the emerging literature is that there is technology available to support all dimensions of contemporary formative assessment from clarifying learning goals and intentions to gathering diverse forms of evidence to supporting self-, peer-, and teacher-feedback processes.

Nevertheless, importantly, effective formative assessment is not dependent on teachers’ use of digital technology nor do teachers need advanced forms of technology to engage in digital formative assessment. *The key message is that there is a spectrum of contemporary formative assessment practice that range from no-technology to advanced-technology.*

Conclusions

The Teacher-led Learning Circles project involves facilitated professional development opportunities to support teachers' leadership of educational change processes in their schools, and teachers' understanding and use of formative assessment and feedback practices in their classrooms to support students' learning and progression. The Teacher-led Learning Circles project also involves a research dimension with teams of national researchers collaborating with the Learning Circles, including teachers, facilitators, and teacher unions representatives in each county to assist with developing, using, and assessing the benefits and outcomes of formative assessment practices for teachers' teaching and students' learning. We – the international research team are providing guidance on research relevant to the project and the overarching research design, plus working in collaboration with all partners to identify, describe and report effective formative assessment practices and the conditions that support these practices. This report is the first report from the international research team and provides a review of research relevant to informing the Teacher-led Learning Circles project and, especially, the teachers' approaches to their leadership and practice of formative assessment and feedback.

We began by situating the Teacher-led Learning Circles project in the larger global discussion and research concerning the development of high-quality education systems, which support both improved student learning and achievement, and more equitable student outcomes. Drawing on and updating the adage, "the quality of an education system cannot exceed the quality of its teachers" (Barber & Mourshed, 2007, p.13), we discussed four further features of high-quality education systems:

- Developing teacher quality and teaching quality is essential for high-quality education systems;
- Teaching quality is influenced by the teachers' working context and conditions within their education system, school, and classroom;
- "The quality of an education system cannot exceed the extent to which it supports, sustains, and invests in the status of its teachers" (Thompson, 2021, p. 114); and
- Valuing teacher leadership for educational change and improvement is vital for creating and sustaining high-quality education systems.

Supporting and enabling teacher leadership and ensuring access to and engagement in effective continuing professional development and ongoing professional learning throughout a teacher's career is central to achieving high quality teachers, teaching, and education systems. The concept that all teachers have – or can develop – leadership influence and (co)lead educational changes

and improvements in and beyond their classrooms and schools is at the heart of this project. We also identify six key features of effective continuing professional development. Specifically, effective continuing professional development:

- is linked to teachers' identified priorities for their work to support students' needs, improve student learning, and enhance related student outcomes;
- is differentiated for teachers' professional values, experiences, and work in their school and classroom contexts;
- provides useful, research- and practice- informed, quality content relevant to identified professional development needs;
- supports evidence-informed active professional learning, inquiry processes, critical reflection, and collaborative professional learning to value and develop teachers' leadership and professional agency;
- requires adequate provision of funding, time, and expert resources; and
- involves system, school, and teacher leadership supporting the importance of professional development.

Within a school, teachers and teaching have the most influence on student learning and student outcomes. Teachers' work matters. In particular, the use of formative assessment is one of the most powerful strategies to support student learning and progress. We explain that formative assessment involves the purposeful integration of feedback throughout teaching to support and accelerate student learning through a variety of daily assessment activities that:

- Clarify learning goals and success criteria;
- Engage students in meaning questioning and classroom discussions;
- Involves peer- and self-assessment activities; and
- Monitor progress towards learning goals through diverse forms of feedback about next steps for development.

We trace the development, definitions, and features of formative assessment over time, and the contemporary shift to an emphasis on Assessment for Learning (AfL). The Assessment Reform Group (2002) defined AfL as: "the process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they need to go and how best to get there." Lysghat, O'Learly, and Ludlow (2017, 2019) outlined four key AfL strategies:

- 1.** Clarifying, sharing, or co-constructing learning intentions and success criteria with students;
- 2.** Leveraging questioning and classroom discussion to deepen student learning and provide in-the-moment feedback for next steps;
- 3.** Engaging in self- and peer-assessment practices to promote a community learning, student ownership in learning, and learner agency;

4. Providing ongoing feedback to close the gap between where the student is and their learning goals.

These strategies can be regularly applied in teachers' work with their students. Drawing on Hattie and Timperley (2007), we consider how feedback from teachers, peers, or student themselves can respond to three broad questions:

1. **Where am I going?** Which serves to clarify the learning goals and is known as 'feed up';
2. **How am I going?** Which serves to reflect on the students' current performance level and is known as 'feed back'; and
3. **Where to next?** Which serves to support students' next steps and learning actions, and is known as 'feed forward'.

Practical strategies for developing, adapting, and applying AfL in classrooms are identified, including approaches with and without the use of technology, and the importance of gathering and considering evidence from observations, conversations, and products to inform feedback to support students' learning.

There is long-standing evidence about the powerful effect of formative assessment for students' learning, and there is also long-standing evidence about the importance of the work of teachers as central to improving student learning and student outcomes. These understandings and related policy and practice implications have become even more urgent and needed in the context of global and local challenges and changes. A global pandemic has had a profound effect on student learning, equity, and well-being, and on the work and professional lives of teachers. Further changes and challenges from social, economic, climate, technological, geo-political, migration, and demographic shifts are also affecting the work of schools. Education must be at the heart of navigating these changes and supporting each student to learn how to be successful in present times and in actively contributing to the future they aspire to. Crucially, supporting all students to achieve their fullest potential involves equipping teachers to support the diversity of students and their range of needs. In this vital and complex work, teachers, their leadership, and work matter; but teachers cannot be asked to do this alone. High-quality education systems require government leaders, working in collaboration with teacher unions and the education profession, who prioritise the importance of education, including investing in, respecting, trusting, and developing teachers and teaching, in order to support student learning, equity, and well-being.

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Developing Teacher Leadership
and Teaching Practice for the
Use of Formative Assessment
to Improve Students' Learning

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