

Educational Technology: Bridging the Gap Between Policy and Practice

Dr. Sana Jamil

Abstract: No empirical investigations have attempted to explore the integration of educational technology along with policy in K-12 schools, despite continuous investments by the Newfoundland and Labrador Government (Education and Early Childhood Development, 2020). This study explores how educational technology policies shape teachers' use of technology. Specifically, the study seeks to understand the mechanisms through which policy decisions impact elementary teachers' instructional practices in Newfoundland and Labrador Schools. The study is guided by the following research questions: (1) How do provincial policies shape teachers' use of educational technology in classrooms? (2) What are the existing policy frameworks that support or hinder the implementation of educational technology? and (3) How do teachers perceive the relevance and effectiveness of these policies in their instructional practices? Guided by Feenberg's (1991) critical theory of technology and a qualitative single case study approach, data were gathered through documents, a questionnaire, interviews, and classroom observations. Findings emphasize the need for administrative support and planning, ongoing professional development, and teacher involvement in policy design. A new implementation model called the Educational Technology Action Cycle is proposed, thereby integrating elements from Deliverology and



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the Alberta Teachers' Association professional development planning cycle. The study offers recommendations to align policy, investment, and professional learning for more effective technology integration in education.

Keywords: educational technology, policy implementation, teacher professional development, K-12 schools

Technologies éducatives : combler l'écart entre les politiques et les pratiques

Résumé : Aucune étude empirique n'a jusqu'à présent cherché à examiner l'intégration des technologies éducatives en lien avec les politiques publiques dans les écoles primaires et secondaires, malgré les investissements continus du gouvernement de Terre-Neuve-et-Labrador (Education and Early Childhood Development, 2020). Cette étude analyse la manière dont les politiques relatives aux technologies éducatives influencent l'usage que les enseignants font des technologies. Plus précisément, elle vise à comprendre les mécanismes par lesquels les décisions politiques affectent les pratiques pédagogiques des enseignants du primaire dans les écoles de Terre-Neuve-et-Labrador.

L'étude est guidée par les questions de recherche suivantes : (1) De quelle manière les politiques provinciales influencent-elles l'utilisation des technologies éducatives par les enseignants en classe ? (2) Quels sont les cadres politiques existants qui soutiennent ou entravent la mise en œuvre des technologies éducatives ? et (3) Comment les enseignants perçoivent-ils la pertinence et l'efficacité de ces politiques dans leurs pratiques pédagogiques ?

S'appuyant sur la théorie critique de la technologie de Feenberg (1991) et sur une approche qualitative fondée sur une étude de cas unique, les données ont été recueillies à l'aide de documents, d'un questionnaire, d'entretiens et d'observations en classe. Les résultats soulignent l'importance du soutien administratif et de la planification, du développement professionnel continu ainsi que de la participation des enseignants à l'élaboration des politiques. Un nouveau modèle de mise en œuvre, appelé Cycle d'action des technologies éducatives (Educational Technology Action Cycle), est proposé. Ce modèle intègre des éléments issus de la Deliverology et du cycle de planification du développement professionnel de l'Association des enseignants de l'Alberta. L'étude formule enfin des recommandations visant à mieux harmoniser les politiques, les investissements et le développement

professionnel afin de favoriser une intégration plus efficace des technologies en éducation.

Mots-clés : technologies éducatives, mise en œuvre des politiques, développement professionnel des enseignants, écoles primaires et secondaires.

Introduction

Policies exist in the form of written documents that are produced after a series of processes to address a specific issue. A policy “usually proposes a vision to achieve, sets goals to meet, and may even spell out the means to reach them” (OECD, 2017, p. 21). A typical policy may therefore include specific components such as a vision, analysis, planning, implementation, and evaluation. In the field of education, policies address issues related to equity, curriculum and learning outcomes, evaluation and assessment mechanisms, school and learning environments, and funding, among others (OECD, 2015). It is well known that the implementation of new education policies is “incredibly hard” particularly across institutions (McLaughlin, 1987, p. 172).

In Canada, some provincial education policy and regulations require schools to develop plans based on provincial priorities (Alberta Teachers' Association, 2005). The Newfoundland and Labrador Government recently provided \$20 million in support of digital learning in the K-12 education system (Education and Early Childhood Development, 2020). Newfoundland and Labrador Schools (NLSchools), formerly the Newfoundland and Labrador English School District, is the province’s only English-language school district and is responsible for equipping teachers with the skills needed to support digital learning in K–12 classrooms. The purpose of this research is to investigate how education policies influence integration of educational technology in K-12 classrooms. Specifically, the study seeks to understand the mechanisms through

which policy decisions impact teachers' instructional practices and professional development in NLSchools. The research is guided by the following questions:

- 1. How do provincial policies shape teachers' use of educational technology in classrooms?*
- 2. What are the existing policy frameworks that support or hinder the implementation of educational technology?*
- 3. How do teachers perceive the relevance and effectiveness of these policies in their instructional practices?*

Research Methodology

Within the qualitative methodology research approach, a single case study design was applied. Feenberg's (1991) critical theory of technology served as the guiding philosophical lens for this research. This framework enabled an exploration of teachers' perspectives on technology in general and educational technology in particular. Feenberg (1991) argues that the critical theory of technology offers both critical and empirical insights that help make sense of the technological changes shaping society.

Building on this perspective, Rowe (2011) emphasizes that technology is inherently embedded within social practices. He explains that "it is how technology is used and administered within complex realms that determine its potential" (Rowe, 2011, p. 15). Furthermore, this potential is realized through the dynamic interplay of human and non-human factors within specific contexts influenced by social, economic, and political interests and values (Rowe, 2011).

This interplay can be clearly observed in K–12 educational settings, where multiple stakeholders shape the implementation and use of educational technology. School leaders, teachers, students, and policy frameworks all contribute to how technology is adopted and integrated into classroom practice. As such, educational technology is not neutral but is shaped by the broader institutional and societal context in which it operates. From this perspective, the critical theory of technology underscores the importance of critically evaluating technological tools before adopting them in educational environments. It also supports the democratization of technology by advocating for more inclusive and participatory decision-making processes (Feenberg, 1991).

Data for this study were collected from documentation, a questionnaire, interviews, and classroom observations. Policy documents pertaining to educational technology and teacher's professional development were reviewed from different provinces in Canada. The review included most recently published government reports, school district policies, teacher associations' research documents, reports from international organizations and other relevant materials. These documents further helped to uncover meaning, develop understanding, and discover insights relevant to the research. Questionnaire responses acted as preliminary findings and supplemented the interview and observation data. The questionnaire assessed teachers' skills for integrating technology into classroom teaching and their awareness around educational technology policies. A purposeful sampling strategy was applied to develop an in-depth understanding of the case (Patton, 2015). The initial recruitment letter, that included the

questionnaire link, was sent to all K-6 school principals, who then forwarded the information to all grade 6 teachers in their school. Next, based on their responses, teachers were invited to participate in the interview and observation portion of the study. A total of 10 teachers were interviewed from across the province. Classrooms of two teachers who were interviewed were also sites of observations. Sufficient data were collected until there was no new information shared, and the study reached the saturation point. The next section provides a detailed literature review of education policy and frameworks.

Literature Review

Education policies are often formed following a top-down approach, where policymakers from the head of a governing body make decisions that ripple down and are forwarded to schools for implementation in classrooms. As a result, experts have become particularly invested in developing the capacity to implement policies with school leaders and teachers (Hopfenbeck et al., 2015; OECD, 2017; Wurzburg, 2010) because they act as policy implementers at the ground level (Dede et al., 2005; Fullan, 2016). School leaders and teachers need to have a skill set to implement and be fluent in adopting a policy within a given context. Moreover, the school principal is believed to be empowered to ensure the effective use of educational technology in instructional practices (Machado & Chung, 2015; Sergiovanni, 2009).

It is important to note that even after investing in policy implementers at the ground level, policies can fail to produce their desired outcome due to various reasons. According to Darling-Hammond (1990), failure to understand

local policy context; lack of dialogue and education; and not considering the process of teaching, which includes teachers' prior learning, beliefs, and attitudes are factors that can result in an unsuccessful education policy implementation. A study conducted in Norway by Hopfenbeck et al. (2015) obtained the same results, even after 25 years, signifying the importance of these factors. Hopfenbeck et al. (2015) investigated a government-initiated four-phase policy implementation program on Assessment for Learning. Data collected from 145 primary schools and 80 secondary schools included semi-structured interviews with stakeholders, comparison of test scores, and textual analysis of relevant documents. The results indicated the need for trust, dialogue, and higher levels of teacher involvement in the policy implementation process.

Conversely, a proactive approach was adopted by the school districts in Maine in the United States that resulted in better outcomes for both teachers and students. Murphy et al.'s (2020) study addresses the "increasingly common and important policy contexts—the one-to-one technology initiative" (Murphy et al., 2020, p. 1). The authors noted that, as per the statewide policy for addressing equitable access in Maine, every student in middle school was provided with a laptop to take home. Murphy et al. (2020) conducted a randomized controlled trial study to assess a web-based platform known as ASSISTments™ that was used as an intervention for two years to help grade 7 students solve mathematics homework problems and assist teachers by providing data to track student progress. Data collected from 43 public schools,

87 teachers, and 2,769 grade 7 students included interviews, observations, surveys, and instructional logs. Ongoing professional development was provided to teachers by a coach who offered both introductory and advanced level training and technical assistance throughout the school year.

The online mathematics homework intervention mentioned above produced not only a positive impact on students' mathematics achievement but also prepared teachers to use the feedback in an instructionally meaningful manner (Murphy et al., 2020). It is apparent from this study that the policy of providing 1:1 devices to students needs to be supplemented with software that meet the needs of both the teachers and students. Therefore, understanding the local policy context—in this case, access to personal laptops for students, homework policy, and support for teacher preparation—resulted in successful policy implementation.

While policy implementation can be influenced by internal factors directly involved in its development and execution, there can also be external factors that support opposing policies or enforce policy implementation. This includes the department or ministry of education, faculties of education, unions, and other agencies that may have a role in the implementation process.

An Overview of Education Policy Implementation

Education policies have the potential to be formulated and implemented at a national, provincial, or school district level, depending on the nature of the policy (OECD, 2017). Hence, policies can be formulated “at a number of different

levels” (Bell & Stevenson, 2006, p. 18). This article speaks about the potential of implementation at a provincial, district, school, and classroom level for educational technology and teacher professional development. Furthermore, it highlights the inter-relationships among the different levels. OECD (2017) provides an example in its report stating, “if a new curriculum requires the use of high technology equipment which schools cannot afford, the policy may fail to be implemented unless some budget is available at the national or local level” (p. 6). Similarly, if the budget is in place and educational technology is made available, but teachers are not provided with professional development opportunities, the desired outcome will not be achieved.

Education policies shape the environment in which school leaders and teachers work. While Cerna (2013) considers policy implementation as “a multidimensional process” (p. 22), O’Toole (2004) describes implementation as a “puzzle” (p. 265). In simpler terms, implementing an education policy can be understood as putting an idea into practice while following a rigorous and iterative process. Also, implementation is considered a complex, evolving process involving many stakeholders (Darling-Hammond, 1990; OECD, 2017). Many comprehensive definitions of education policy implementation are present in the literature. For instance, Bell and Stevenson (2015) consider education policy implementation a complex process involving a thorough understanding that translates into a restructuring of the policy. They also highlight the importance of stakeholder participation and include analyzing similar practices in place as an integrated component of developing a policy. Haddad and Demsky

(1995), however, note that education policy implementation involves concrete planning with a clear outline focusing on details of what, when, and how. It can be understood that, though policy implementation is a complex process, concrete planning leads to robust implementation of education policy. Consequently, there exists an inherent agreement that educational policy implementation is a complex process, requiring time and planning.

A concise definition of education policy implementation is offered by Honig (2006), who defines the term “as the product of the interaction among particular policies, people, and places” (p. 4). Considering Honig’s definition in the context of K-12 schools, education policy implementation can be observed as a guide for the day-to-day functioning of schools. Several education policy implementation frameworks are proposed in the literature (Bell & Stevenson, 2015; Nakamura & Smallwood, 1980; Suggett, 2011). The next section considers three different types of frameworks to identify and understand the policy implementation framework (if any) adopted by NLSchools for educational technology and professional development.

Types of Frameworks

The framework acts as a roadmap, provides policy direction, and ensures alignment across different systems (Government of Alberta, 2013). Furthermore, the framework guides policy processes towards achieving the vision. For this study, one analytical, one normative, and one action-oriented policy implementation framework are explored, including their relationship to one another.

Analytical frameworks are structured in a systematic manner which helps in logical thinking. An analytical framework, “From policy development to enactment,” proposed by Bell and Stevenson (2015) explains the multidirectional interactions between the development and enactment stages.

Normative frameworks prescribe a path forward by educating policymakers in the conditions that would lead to success (OECD, 2017). Suggett (2011) provides a four-part matrix, classifying implementation challenges, to consider conditions for designing implementation strategy.

Action-oriented framework offers steps to consider and highlights the prescribed path forward on what needs to be done (OECD, 2017). As the contextual factors vary greatly, an action-oriented framework can provide effective implementation practices for policymakers. OECD (2017) identifies the need for coherent, action-oriented approaches to policy implementation. The literature highlights Deliverology (Barber et al., 2011) as a prominent results-focused framework designed to support the effective delivery of reform initiatives. Deliverology incorporates three main components: the formation of the delivery unit, data collection for setting targets and trajectories, and the establishment of routines.

Comparing Education Policy Frameworks

In this section, the three frameworks are compared:

- An analytical framework (Bell and Stevenson)
- A normative framework (Suggett); and

- An action-oriented framework called Deliverology (Barber et al.).

Table 1 highlights how these frameworks relate based on their characteristics, uniqueness, and relationship to one another. The purpose, structure, stages, environments, and key actors of the relationships are elaborated. For example, the relationship between the action-oriented framework (Deliverology) and the analytical framework (Bell & Stevenson) is discussed as the difference in structure; the Deliverology framework is cyclic, and the analytical framework (Bell & Stevenson) is linear.

Table 1: Comparison of Education Policy Frameworks

Primary Framework	Compared With	Comparison
Bell & Stevenson (BF), 2015	Suggett (SF) (2011)	Bell & Stevenson is an analytical framework, whereas Suggett's is normative. The environmental interactions seem to be linear in BF but are clearly distinguished as two stages. SF does not involve stages of policy development nor implementation but addresses issues that influence them by studying the uncertainty and goal conflict.
Bell & Stevenson (BF), 2015	Deliverology Framework (DF) (Barber et al.)	Deliverology is cyclical, whereas Bell & Stevenson follows a linear policy structure. Deliverology overlaps more with the second stage of policy enactment presented by BF. The focus is on the implementation aspects; the need had already been identified and analyzed to further implementation.

Primary Framework	Compared With	Comparison
Suggett (SF), 2011	Deliverology Framework	Suggett provides a basis to identify the need, its magnitude and the level of goal conflict associated with it. The outcome can be considered the foundation for utilizing DF, including where it can be analyzed and the necessary steps that can be taken towards implementation.

As stated by Cerna (2013), the type of framework to be adopted depends on the need, as well as the potential influence of multiple factors such as cultural, social, economic, political, geographic, and demographic. Furthermore, it is important to have an in-depth understanding of the context as “the right approach might depend upon the issue” (Hill & Hupe, 2002, p. 56). Hence, understanding the resolution of need which includes a crucial component of policy implementation is fundamental, and selection of the appropriate framework is critical. This section interprets findings in relation to the research questions posed earlier.

Data Analysis

Interview transcripts, observation field notes, questionnaire responses, and relevant documents were systematically organized to support analysis. An interpretive framework guided this process, with key segments highlighted and annotated using keywords and symbols.

Coding proceeded in two stages. First, in vivo coding was used to preserve participants’ language and perspectives. This was followed by

inductive coding of interview transcripts and open-ended questionnaire responses to identify patterns and themes. The questionnaire responses acted as preliminary findings and supplemented the interview and observation data. Emerging themes were then connected to existing theory, evidence, and practice (Sargeant, 2012), and interpreted through the lens of the critical theory of technology (Marshall & Rossman, 2014).

Ensuring Rigour and Trustworthiness

To ensure rigour, reliability, and validity—core principles of qualitative research (Bashir et al., 2008)—multiple strategies were employed:

- **Triangulation:** Data were collected from interviews, questionnaires, observations, and documents to support a constructivist approach (Merriam & Tisdell, 2016). Observation data were used to cross-validate teachers' reported experiences with technology integration.
- **Member Checking:** Preliminary findings were shared with participants to confirm accuracy and enhance credibility.
- **Audit Trail:** A detailed record of analytic decisions and procedures was maintained to ensure transparency.
- **Peer Examination and Documentation:** Reliability was strengthened through peer review, data summary charts, and analytic memos.
- **Reflexivity and Bias Mitigation:** Researcher bias was addressed through systematic documentation and the use of rich, thick descriptions.

Together, these strategies support the study's credibility, reliability, and transferability (Miles et al., 2014; Devault, 2018).

Unfolding the Data

This study provides a foundation for understanding the role of policy in educational technology contexts. Analysis of the data revealed two key themes related to administrative dimensions: administrative support and administrative planning. To ensure participant confidentiality while maintaining narrative coherence, pseudonyms were employed—an approach widely recognized in qualitative research (Creswell & Poth, 2018; Tisdell et al., 2025).

Administrative Support

Many teachers alluded to the fact that they had supportive administrative teams at their schools. Participant names have been replaced by pseudonyms. For instance, while referring to the curriculum implementation, Ms. Dora said, "I'm a big believer in teacher autonomy so while I am responsible for the curriculum outcomes, I have a lot of discretion on how I achieve those curriculum outcomes and I'm lucky I have a very supportive administration."

Similarly, Mr. Smith said, "I'm fortunate right now I'm in a school that has a very responsive administration and one that values technology very highly." While highlighting the role of principals, Mr. Smith mentioned that in Newfoundland and Labrador, principals have control over the direction of a school and it is up to them to set priorities and use the budget accordingly. He used his daughter's school as an example:

urban school in St. John's, large population, incredibly diverse, young families . . . and they have 30 Chromebooks for 690 children, they don't have blanket wi-fi access for the school and the fundraisers are going to buy replacement basketball jerseys for the third basketball team.

Whereas in Ms. Bella's previous school, the fundraising efforts resulted in the purchase of a full classroom set of iPads and Chromebooks for both primary and elementary classes. Likewise, Ms. Honey also appreciated the fundraising efforts of her school community. She explained that:

we are very fortunate that we've spent a lot of time and funds over the last few years, so any fundraising money that we've gotten into technology in our building because we see the importance of providing students access to technology and also learning how to use it appropriately and responsibly.

Mr. Smith alluded that "there needs to be some kind of very fundamental evidence-based cycle of feedback from classrooms and students, what do students need and want, and from the private sector and just about anything else." He further provided an example from his school. Previously, he had another school principal and during that time "there was almost no technology implementation at all, there was no physical acquisition of things, there was no pressure or support to engage in anything new and innovative whatsoever so nothing happened . . . it was very sort of chalk and talk." Then, a new principal was hired who had different priorities:

and very quickly tens of thousands of dollars that had been going in other directions were all going into training, acquiring

physical things to be in the building and even just the language around it and the sense of what was important changed entirely.

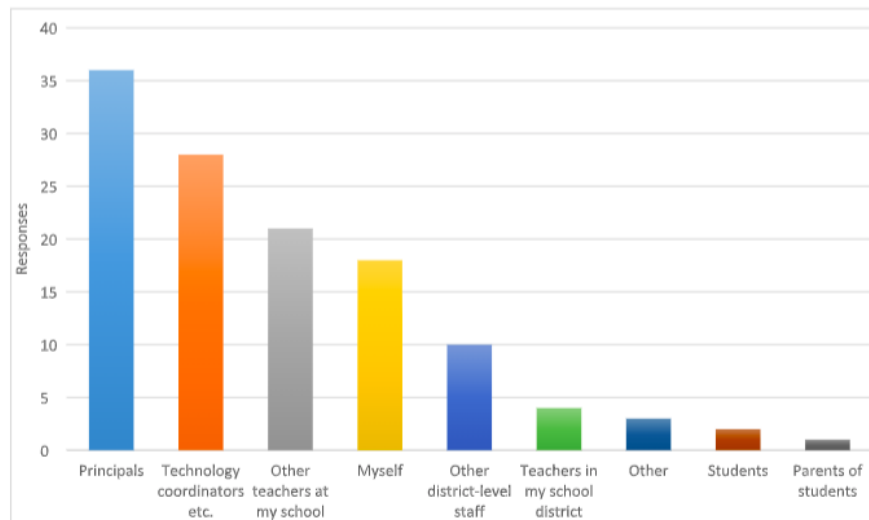


Figure 1: Personnel Responsible for Purchasing Educational Technologies

Figure 1 image description available

The questionnaire data also confirmed the role of principals in educational technology use in classrooms as most teachers indicated their principal made decisions about the purchase of educational technologies at their school (see Figure 1).

On the other hand, Ms. Cindy highlighted the role of her school's Library Learning Resource Commons teacher who looked after all the technological devices. She explained that:

if schools don't have the organization system for it then it makes educational technology integration ridiculously difficult . . . I could see a lot of schools that have all these things and they're not really thinking about what's the best way to use it, organize it, and store it; like it could be a logistical issue too that would slow down your ability to get the maximum impact out of it.

The data from the open-ended questionnaire also highlighted the role of top-level stakeholders in supporting educational technology use. For example, a respondent noted that:

many opportunities exist for 'deep-learning' projects where educational technology can be implemented, but a curriculum that is still based on course objectives/outcomes can sometimes act as a deterrent. Flexibility is very important, and teachers need to be encouraged from a department or board level to engage in such activities to ensure it is an acceptable practice.

Administrative Planning

Although there were several teachers who addressed the role of administrators in educational technology planning, Mr. Smith, particularly, expressed his views more openly. He explained that:

there needs to be a fundamental understanding of what students' needs are, not just now but in the future, and there has to be really a decision made about what that district's priority is going to be and how they're going to make those decisions.

While referring to the COVID-19 pandemic, Mr. Smith said he was helping by providing professional development sessions to teachers on certain educational technologies, but he found it extremely frustrating because:

there wasn't actually anyone in the department or the board who could tell what to do or who would instruct on what needed to be taught. So, there were these moments where I was kind of having these ethical dilemmas of like, I'm telling people they should be doing this or I'm suggesting this is the best way to use

this tool and I'm not a researcher. I don't have a PhD; I don't work in policy. I'm a teacher.

Mr. Smith added:

I'm hoping for that view of people who've gotten really good information from a bunch of different perspectives and are able to say concretely, look this is a really good way to do this or in this place this is how it worked out . . . that's my dream.

A similar perspective was echoed in the questionnaire data. A respondent noted that, "I would like to see more research on effectiveness, and more side-by-side comparisons, before choosing one technology to embrace."

On the other hand, Ms. Honey explained the professional development situation related to administrative planning during the pandemic. Ms. Honey, along with some other teachers, were asked by the school district to provide professional development sessions on Google Classroom and Google Meet for six weeks. She added:

I think it's great to amplify teacher's voices and that if you're a leader in your school or in your community then to provide the platform to help others, because that's something that we're probably doing on our own time anyway. But, at the same time, there should be people at the district who can do that without having to pull teachers from the classroom.

Ms. Honey also noted that since the school district is a Google district, then there should be refresher sessions or sessions on new updates. She said, "you need that constant support which is not there all the time."

Policy Planning

It was believed that constant support needed concrete policies. According to Mr. Smith, "it doesn't feel like there's much policy at all on educational technology; honestly, feels like it's a moving target . . . it's more reactionary, it feels like there's a very small cluster of people making very huge decisions." While referring to the district, Mr. Smith provided an example of Google Workspace stating that:

it's sort of a bit of an in for a penny in for a pound mentality . . . so hey, look we want Google Suite [Workspace] so we're going to ignore whether or not this is the best tool for the job because this is what we've decided.

He said some of his colleagues feel "we're just being kind of talked down to" and they feel their advice or input isn't solicited until educational technologies get implemented. For him:

the root of that however is in the fact that there isn't firm policy because if there was then there would be a much more grassroots approach to it . . . it's a problem with government acquisitions and private sector and all kinds of things but it's also hard because I think the kicker in all of this is that we have to sit in rooms every day, full of students who know this technology better than us.

Ms. Cindy discussed at length the involvement of her colleagues at the district or government level. She explained that:

I wonder what they do to the door in the [district or government] building because it's like when they walk through that door

they're zapped and all the concepts and everything they know about teaching they just forget and so then they make these policies that are like, what were you thinking, you were here just last year, you know that's not gonna work.

Ms. Cindy added that the best way to develop a policy is through consultation from all stakeholders. She believed that people who work on policies remain disconnected from the realities of the classroom and “they're thinking oh we should do this, I think they're forgetting what it's like to be in the streets and down where everything is happening . . . because if you're not in the everyday mode, there are angles that you're just not going to see.” In a similar vein, Ms. Honey believed that:

I think it really needs to be like a joint effort from many different areas in order to create those policies. I don't think it should be top down because teachers are on the front line they're the people that are using ed tech daily so obviously their opinion should be there regardless.

Ms. Precious related the process of policy planning to her classroom. She said, at the beginning of the school year, we develop a draft of class rules and take some time to implement them, and then we review and finalize them. Similarly, she explained that educational technology policies need constant review and renewal by a team, which should include people with different areas of expertise, “a team that comes together to develop a draft and then that draft will be reviewed and then once the policy is developed it still goes under review, a couple of years' time, it's under review again.”

Mr. Joshua, who was also a school principal, supported and practised the idea of cyclic policy making at the school level. He provided some insight:

teachers map out their needs at the beginning through a survey that we use to inform ourselves in terms of what we can offer. We reach out again to check if this is something that they want, so it's always a give and take. It is indeed a cyclical and responsive process.

Similarly, although Ms. Sarah wanted teachers to be a part of the consultation process, she also wanted to highlight that the teachers need to take the responsibility when the time comes as:

it's one thing to say like oh teachers need to be consulted, through whatever the chosen method of consultation is, if you don't actively take part then you don't have a place to say like well we should be consulted.

In the open-ended section of the questionnaire, teachers were asked if they would do anything different with the policy related to educational technology. Although some teachers answered no or not sure, others explicitly shared their thoughts. For example, a teacher stated that, "there should be a dedicated person/group at all organizational levels, who is in charge of proactively finding problems and solutions related to tech policy . . . this person or department would identify and research the best options, and coordinate training and implementation." On the other hand, when asked about the importance of teachers' role in policy development for educational technology

use in classrooms, all respondents unanimously wanted teachers to be involved in the process. For instance, a teacher explained:

Often those out of the classroom may miss the bigger picture of the how and why technology should be implemented to achieve learning goals. Involving teachers in policy development is always important to have a firm, practical understanding of its impact on teaching and learning.

Another respondent added, “teachers are important in helping decide what may work best for the students that they teach. Teachers are familiar with the curriculum, the learning outcomes, students' needs and the challenges with technology implementation in the classroom.” As evident from the data, there was a strong sense of advocacy among teachers for being more involved in the decision-making process for educational technology. Also, the need for a dedicated person to address technological issues was apparent during the classroom observations. For example, a few Chromebooks in Mr. William’s classroom were not working, so he sent a request to the gym teacher who also dealt with technical issues.

Discussion

Provincial policy on educational technology was non-existent and hence did not influence teachers’ integration of educational technology in their classrooms. Teachers support the development of policy on educational technology and involvement of stakeholders, particularly teachers, in the process. Therefore, context, resources, communication and coordination,

stakeholders, and accountability and evaluation were identified as the key determinants of policy implementation. Also, to keep track of policy, a framework must be adopted and an action-oriented framework was perceived as a better fit for the context of Newfoundland and Labrador.

A policy “usually proposes a vision to achieve, sets goals to meet, and may even spell out the means to reach them” (OECD, 2017, p. 21). There was no policy related to educational technology that proposed a roadmap to achieve a goal. It is astounding to learn this as the Newfoundland and Labrador Government has invested a huge amount in educational technology without establishing a policy for the same. This shows a gap in how investments are being made. Conversely, the only two policies mentioned in the data were the Social Media Use policy and the Acceptable Use of Technology policy. Both policies are targeted towards students and hence are very basic and operational in nature. Interestingly, the school district’s Safe and Caring Schools policy (Department of Education, 2013) was not addressed in the data, even though it includes a section on Teaching Digital Citizenship. MediaSmart, an established Canadian organization, mapped educational technology policy documents across Canada, but only referred to the Technology Education curriculum in its report while addressing policies in Newfoundland and Labrador, and overlooked the Teaching Digital Citizenship policy from the school district (MediaSmart, 2015). However, the district’s Safe and Caring Schools policy mentions MediaSmart in its document while referring to the online resources that support digital citizenship. This is concerning because none of the teachers acknowledged the

presence of this policy, indicating that better communication is needed from the district to bring awareness of these existing policies. This was evident in the data, for example, Ms. Bella said, "I'm aware there are policies out there but I feel like . . . you need to take the responsibility to go and investigate yourself." Furthermore, the Safe and Caring Schools policy document includes superficial information on Teaching Digital Citizenship, as though it were a tick mark that needed to be met. Moreover, the Safe and Caring Schools policy is a decade old and requires an immediate review to include teachers' role in using educational technology for instructional purposes.

It was found in the review that educational technology policies across Canada tended to be dated and superficial. It was apparent that most provinces in Canada do not have a guiding document on educational technology. Predominantly, Alberta and Saskatchewan were the leading provinces that showcased pinnacle examples of policies related to educational technology. The Alberta Education's (2013) *Learning and Technology Policy Framework* is a comprehensive document that lays out the foundations for establishing educational technology and professional development implementation routines. The Saskatchewan Ministry of Education (2015) *Digital Citizenship Education in Saskatchewan Schools*, developed to address bullying and cyber-bullying, offers a policy planning guide for K-12 schools to implement digital citizenship education. Although these documents are more than a decade old, they serve as an inspiring model for other provinces. Therefore, there is a large policy niche

within the Canadian landscape, and a great amount of development can be done on educational technology policies.

The findings of this study suggest that a well-designed professional development plan, along with the availability of devices and technical support, can lead to productive instructional use. The data show overwhelming support for consultation from all stakeholders, confirming Fullan's (2016) assertion that successful implementation of policy is possible when teachers, school administrators, and other stakeholders in education understand the policy. Overall, participants strongly felt that educational technology policy should have a direct connection to the classroom. Furthermore, in the future, if purchases are planned for educational technology, it is necessary that consultation begins from the classroom. There were repeated mentions of teachers being the frontline implementers (Lipsky, 2010) and they therefore need to be part of the policy early in the process. For instance, Ms. Sarah said:

I think it's important to involve the people who are going to be using it . . . we've all probably have policies and stuff handed down on us that comes from somebody who probably has not been in the classroom recently, if ever.

Additionally, teachers highlighted the need for relevant professional development that prepared them to use educational technology in their instructions. This is a clear indicator that professional development had to be designed in a manner that matched the level of teachers' technological capabilities. Several teachers noted that the professional development for educational technology was mostly offered at the basic level with no possibility

for advanced level learning. This finding coincided with Murphy et al.'s (2020) study that analyzed a web-based platform, ASSISTments, for two years to help grade 7 students solve mathematics homework problems and assist teachers by providing data to track student progress. Each student was given a laptop and teachers were provided with introductory and advanced level training and technical assistance. The policy of providing 1:1 laptops was supplemented with content-specific software, well-designed teacher professional development, and continuous technical support. Teachers in this study also lobbied for the same. They wanted relevant educational technology, well-designed professional development, and timely technical support. Moreover, similar to Murphy et al.'s (2020) study, teachers requested differentiated professional development. For example, Ms. Dora noted that educational technology professional development is offered at an "intro level":

it's very much okay how to use it, but there's not often [any] kind of differentiated sessions. So now that I've been using it for a little while, how can I take it to the next level or how can I incorporate it more effectively.

Teachers with advanced skills were eager to learn more about the different possibilities of integrating educational technology with the curriculum. Therefore, results of this study provide useful insights that can be considered when planning policies, designing professional development activities, and adopting educational technologies. The next section proposes and discusses an action-oriented framework.

Educational Technology Action Cycle

This study proposes an action-oriented framework called Educational Technology Action Cycle (see Figure 2). The framework incorporates components of both Deliverology and the Alberta Teachers' Association (2005) *Professional Development Planning Framework* based on research and analysis of teachers' needs and students' learning. Deliverology provides a cyclic approach for "managing and monitoring the implementation of activities" through relationship building (Barber et al., 2011, p. 33). On the other hand, the Alberta Teachers' Association (2005) planning cycle combines the art and science of professional development:

The art is the creativity and imagination necessary to produce an innovative and effective PD program; the science is necessary to systematically develop a program that meets participant, school and jurisdiction needs, achieves its goals and can be evaluated using data (p. 4).

Both Deliverology and the Alberta Teachers' Association planning cycle are action focused. With educational technology implementation in Newfoundland and Labrador, a framework is needed that not only acts as a roadmap but also embeds a culture of open communication, support, and action based on research and best practices. Table 2 lists the main characteristics of Deliverology and the Alberta Teacher's Association (2005) professional development planning cycle. It can be observed that Deliverology has much more to offer than the Alberta Teacher's Association professional development planning cycle. Deliverology considers elements of rigour like accountability,

budgeting, and relationship building, which align well with the findings of this study.

Table 2: *Key Characteristics of Deliverology and Alberta Teachers' Association Professional Development Planning Cycle*

Characteristics	Alberta Teachers' Association	
	Professional Development Planning Cycle	Deliverology
Knowledge building	✓	✓
Best practices	✓	✓
Strategic design	✓	✓
Flexibility	✓	✓
Follow-up	✓	✓
Revisions	✓	✓
Coordination	✓	✓
Regular evaluation	✓	✓
Accountability	–	✓
Budgeting	–	✓
Relationship building	–	✓
Consequences visibility	–	✓

Key components of both Deliverology and the Alberta Teachers' Association professional development planning cycle are elaborated in Table 3. The potential elements listed in the table are derived from both approaches and lay the foundation for the proposed framework. The potential elements identified for consolidation are critical as they emphasize the clarity of the expected outcome which is to set appropriate goals, build effective strategies, and set a clear action plan with efficient communication mechanisms and periodic follow-ups.

Table 3: Key Components of Deliverology and Alberta Teachers' Association Professional Development Planning Cycle

Deliverology	Alberta Teachers' Association Professional Development Planning Cycle	Potential Elements for Consolidation
• Set direction and context • Establish clear accountabilities and metrics • Create realistic budgets, plans, and targets • Track performance effectively • Hold robust performance dialogues • Ensure actions, rewards, and consequences	• Conduct environmental scan and participant needs assessment • Develop professional development program goals • Identify possible professional development strategies • Finalize action plan and measures • Implement action plan • Revise action plan as required • Undertake summative evaluation	• Baseline Analysis • Goals Setting • Strategies Development • Action • Communication • Follow-up • Evaluation

For successful implementation of educational technologies, research needs to be paired with training. The proposed Educational Technology Action Cycle is an attempt to ensure that the major elements of a high-level professional development strategy are covered comprehensively. The delivery unit remains the central part of the process and will not only be responsible for conducting needs assessments and consultation but also setting goals with regular follow-ups to make necessary adjustments.

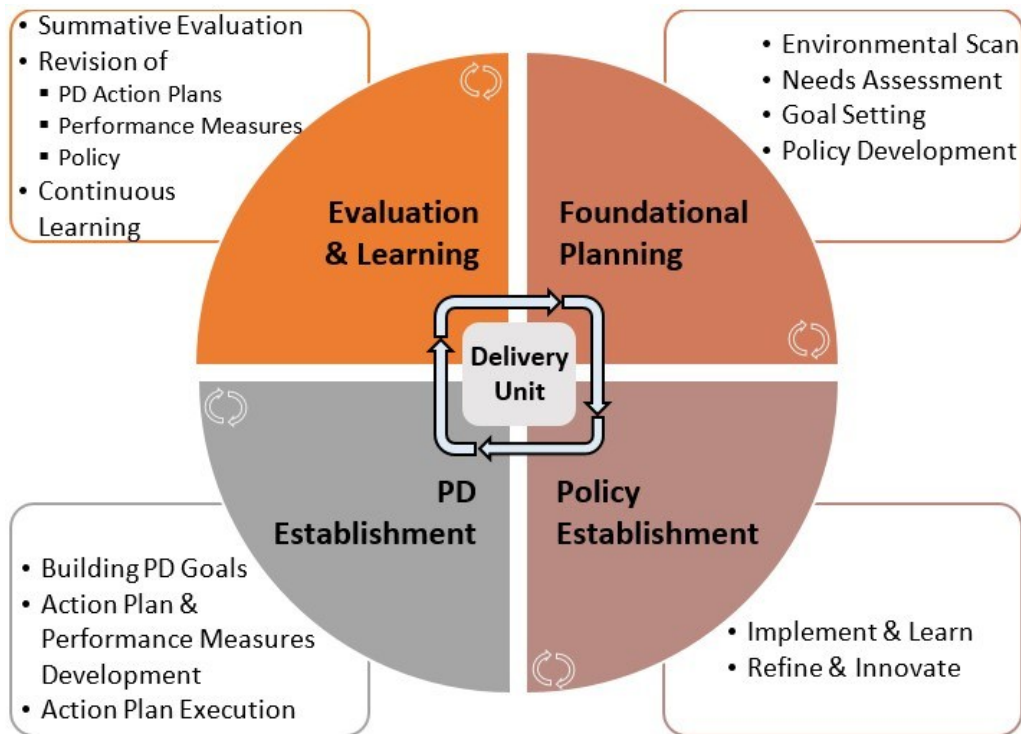


Figure 2: Educational Technology Action Cycle

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Figure 2 image description available

The proposed Educational Technology Action Cycle comprises four major stages. Each stage is characterized by a set of activities as described below:

1. Foundational Planning

- Environmental Scan:** The starting point of a strong foundation is a thorough scan of best practices and supporting research related to educational technology use, along with professional development activities. The findings of the environmental scan will highlight the best practices undertaken at different schools in different regions.
- Needs Assessment:** An assessment highlighting the findings from the scan should be circulated for input and to understand the needs.

- c. *Setting Goals:* Appropriate goals are then built based on the identified needs.
- d. *Developing Policy:* Based on the environmental scan, needs assessment, and goals, experts then devise a policy with subsequent guidelines.

2. Policy Establishment

- a. *Implementation:* The developed policies should be implemented at different levels according to the hierarchy of the education district.
- b. *Refining:* Based on the challenges faced while implementing the policy, necessary refinements can be made to achieve anticipated outcomes.
- c. *Innovation:* Refining policy can be driven through innovation, either due to technological developments or the emergence of unknown parameters influencing policy implementation.

3. Professional Development Establishment

- a. *Building Professional Development Goals:* Depending on the needs of teachers/classrooms, appropriate professional development goals should be developed in consultation with teachers and by involving related stakeholders.
- b. *Developing Action Plans and Performance Measures:* Once the goals are defined as appropriate, action plans and performance measures have to be developed. While action plans are necessary to assure timely achievement of goals, performance measures help assure the minimum level of professional development desired for teachers.
- c. *Executing Action Plans:* The developed action plans will now have to be executed to achieve desired goals for professional development.

4. Evaluation and Learning

- a. *Summative Evaluation*: A thorough evaluation of every stage starting from foundational planning, policy establishment, and professional development establishment is necessary to gauge the success.
- b. *Revising Professional Development Action Plans, Performance Measures, and Policy*: Based on the evaluation, appropriate revisions should be made for professional development action plans, performance measures, and policy for the next cycle.
- c. *Continuous Learning*: Continuous learning is now a global phenomenon in every field; insights from past and current cycles of professional development and policy will drive the success of the following cycles.

Periodic evaluation of each stage within the proposed framework is important. Each step under each stage needs to be revisited and evaluated periodically.

Implications and Future Direction

This study emphasizes the need for a policy framework and targeted professional development to support effective educational technology integration. It provides practical guidance for government departments, policymakers, school districts, and communities by promoting evidence-based planning and stakeholder collaboration. Future research could explore administrators' roles in policy implementation and compare frequent and infrequent users of educational technology through cross-case analysis. These insights could help refine the proposed framework and address emerging needs in classroom practice.

Conclusion

The study highlights the critical role of provincial policies in the integration of educational technology in K-12 classrooms within Newfoundland and Labrador. Despite significant investments in educational technology, the study reveals gaps in policy implementation and the need for continuous professional development for teachers. The proposed Educational Technology Action Cycle framework emphasizes the importance of administrative support, stakeholder involvement, and ongoing evaluation to ensure effective use of technology in education. The research underscores the necessity of aligning investments with comprehensive policies and professional development to achieve desired educational outcomes, providing valuable insights for policymakers, administrators, and educators.

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Author

Dr. Sana Jamil is an educational technologist, researcher, and faculty developer specializing in the intersection of pedagogy, technology, and innovation in higher education. She holds a PhD in Education from Memorial University of Newfoundland and brings over a decade of experience spanning K–12, ESL, and post-secondary teaching. Dr. Sana collaborates with faculty to design high-impact, research-informed learning experiences in online and blended environments. Her work is particularly focused on advancing artificial intelligence in education, digital pedagogy, and curriculum transformation. She leads faculty development initiatives, contributes to program redesign, and engages in international collaborations exploring the future of higher education. Recognized for her ability to translate research into practice, Dr. Sana is committed to fostering inclusive, innovative, and learner-centred educational environments that respond to the evolving demands of contemporary education systems.

Image Descriptions

Figure 1 image description: The bar chart shows response counts by role:

- Principals: 36
- Technology coordinators, etc.: 28
- Other teachers at my school: 21
- Myself: 18
- Other district-level staff: 10
- Teachers in my school district: 4
- Other: 3
- Students: 2
- Parents of students: 1

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Figure 2 image description: Circular diagram showing a continuous improvement cycle with four stages:

- Foundational Planning
- Policy Establishment
- PD Establishment
- Evaluation and Learning

The stages are connected around a central Delivery Unit. Each stage includes related actions such as needs assessment, implementation, and evaluation.

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