FOSTERING ENTREPRENEURIAL THINKING AND ENTREPRENEURSHIP LEARNING IN THE TORONTO DISTRICT SCHOOL BOARD: ASSESSING TEACHERS' AND ADMINISTRATORS' ATTITUDES, PERCEPTIONS, KNOWLEDGE, SKILLS AND PRACTICES AND STUDENTS' MINDSET AND SELF-EFFICACY

Toronto District School Board

tdsb.on.ca

TITLE: Fostering Entrepreneurial Thinking and Entrepreneurship Learning in the Toronto District School Board: Assessing Teachers' and Administrators' Attitudes, Perceptions, Knowledge, Skills and Practices and Students' Mindset and Self-Efficacy
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ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

In recent years, entrepreneurship has come to occupy a prominent place in the 21st Century learning frameworks. As described by the Council of Ontario Directors of Education in their 2014 vision statement for the province,

> [s]tudent engagement and curiosity could be addressed through stronger development of 21st century learning skills and well-being. We could call this the 'new entrepreneurial spirit'—a spirit characterized by innovation, risk-taking, commitment, and skilled problem solving in the service of a better future. (Government of Ontario, 2014, p.4)

The World Economic Forum (WEF), an organization that supports entrepreneurship for the global community, asserts that "innovation and entrepreneurship provide a way forward for solving the global challenges of the 21st Century, [by] building sustainable development, creating jobs, generating renewed economic growth and advancing human welfare" (WEF, 2009, p. 12).

The research described in this report explores a joint initiative by the Toronto District School Board (TDSB) and the MaRS Discovery District (henceforth referred to as MaRS) to develop and scale up entrepreneurial education and Entrepreneurial Thinking (ET) within Toronto public schools. This initiative is called *The Entrepreneurial Thinking and Youth Entrepreneurship Learning Partnership*.

The program was started in the 2014-15 school year and was co-developed with representatives from MaRS and TDSB educators and students. The goal of the partnership is to "[embed] the competency of entrepreneurial thinking into the professional development of teachers and into the curriculum for students in Kindergarten-Grade 12 through co-creating professional development content, tools, and delivery which engages teachers, and therefore motivating and inspiring student success" (MaRS, 2015a, p. 4). Both MaRS and the TDSB share a common understanding of the concept of entrepreneurship that encompasses the cultivation of new attitudes, mindsets, and competencies.

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As MaRS describes it, "[e]ntrepreneurial thinking is a mindset and learning style propelled by the desire to solve problems and create" (MaRS, 2015b, para. 1). MaRS (2014a) emphasizes that ET builds skills including[1]: "design thinking, communication, teamwork, perseverance, creativity, critical thinking, resilience, and goal-setting" (pp. 1-2).

The Entrepreneurial Thinking and Youth Entrepreneurship Learning Partnership provides one way to build capacity around ET within existing and complementary initiatives at the TDSB, such as the EDuTECH Strategy for Global Learners and the TDSB's Global Learning and Education (GLE) Framework (Sinay, 2014).

Research Objectives and Guiding Questions

This study focuses on evaluation of the first phase of this program through the analysis of surveys designed to elicit feedback on participants' perceptions, attitudes, knowledge, and practices regarding ET teaching and learning, as well as the quality and effectiveness of the professional learning activities and resources offered in the program. The research describes the first stage of a developmental evaluation and performance metrics approach created to improve the program design and delivery, measure uptake and applications, and to assess impact on student achievement and teacher professional learning.

The major research questions this paper addresses include the following:

- What are the teachers' and administrators' perceptions, attitudes, and knowledge on Entrepreneurial Thinking (ET) and Entrepreneurship Education (EE)?
- What skills and practices do teachers use in their current teaching towards promoting ET skills?
- What is the rate of attendance by teachers and administrators in ET professional learning sessions and how does this impact their overall teaching/work?

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[1] These skills were shared in several internal documents. For further information on MaRS ET skills, please visit *Entrepreneurial Thinking Toolkit for K-12 Educators* at: http://www.marsdd.com/systems-change/entrepreneurial-thinking/entrepreneurial-thinking-tools/

Survey Design

As a method of program evaluation, a comprehensive survey was designed to address the perceived competencies (attitudes, knowledge, and skills) of the participating teachers and administrators. A detailed literature search was completed to identify research examining the assessment and monitoring of the attitudes, skills, and knowledge regarding ET required by individuals in educational settings. The surveys that were developed reflect the best practices in the area and were designed considering the approach taken by MaRS in delivering the modules to the professional learning participants. The approach to design the measures took into consideration the working definitions as described in the section of this paper called *Entrepreneurial Thinking and Entrepreneurship Education*.

Students need to possess certain competencies and have an entrepreneurial mindset. Teachers need to be knowledgeable about ET, possess the right attitudes, and be able to cultivate students' ET skills (creativity and innovation, design thinking, critical thinking, self-direction, resilience, collaboration, communication, and goal-setting). In addition, they have to practice the ET skills in their classrooms. The attitudes, opinions, and beliefs of teachers and administrators towards Entrepreneurial Thinking and Youth Entrepreneurship Learning were addressed in the survey questions.

It has been suggested that the attitude towards ET and entrepreneurship education can be influenced by exposure to training sessions (Johansen, Schanke & Clausen, 2012; Packham, Jones, Miller, Pickernell, & Thomas, 2010). It has also been suggested that teachers' attitude and self-efficacy could influence students' entrepreneurial motivation and competencies (Pihie & Bagheri, 2011) and for this reason, these topics were also included in the current surveys. Furthermore, there are several attempts in the literature to measure entrepreneurship education and skills (e.g., Moberg, 2014; Ruskovaara, n.d.), and the effectiveness of professional learning. With this in mind, we have designed the Educator/Administrator Survey to elicit the perceptions, knowledge, and practices relating to Entrepreneurial Thinking and Youth Entrepreneurship Learning, and to identify the effectiveness of professional learning.

Key Findings

Following, the key findings of the study are presented under the three major headings corresponding to the main survey sections:

A. Entrepreneurial Thinking and Entrepreneurship Education Attitudes, Perceptions, and Knowledge;
B. Teacher Attitudes on Entrepreneurial Education and their ET Teaching Practices; and
C. Professional Learning and Organizational Support.

An overview of the main findings is provided at the onset of each section before elaborating on the survey results.

Entrepreneurial Thinking and Entrepreneurship Attitudes, Perceptions and Knowledge

With regards to perceptions and attitudes around entrepreneurial education, participants shared similar perceptions and attitudes around ET. For instance, virtually every participant indicated that they believed that ET went far beyond business development, but rather

> Comments on Entrepreneurial Thinking:
> - *The 'why' behind projects. Problem-solving in an authentic, real-life way.*
> - *Touching almost any career. Aspects of entrepreneurship can be found pretty much everywhere.*

encompassed "a wide range of attitudes, knowledge, and skills[2]." The vast majority of participants also believed that entrepreneurship and education ought to be integrated in a wide range of subjects, with administrators more prone to see ET relevant to subjects beyond STEM compared to educators.

The first section of the survey also asked participants to evaluate how knowledgeable they believed themselves to be on the strategies introduced in the MaRS toolkit after participation in the ET modules. Overall, participants saw themselves as knowledgeable on the majority of ET strategies. Differences were found between administrators and teachers in only a few areas, including the use of digital strategies for ET, use of Entrepreneurial Ecosystems, and in the application of Problem-Based Learning (PBL) strategies to the teaching of ET. More teachers saw themselves as knowledgeable with

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[2] This definition was used in the development of the survey and was taken from MaRS, 2014a; MaRS, 2014b; MaRS, 2014c.

regards to applying digital strategies and PBL tactics compared to administrators, whereas more administrators were aware of the Entrepreneurial Ecosystems tool than teachers who said they used them[3].

These findings suggest that improving the ET program for the next iteration could include enhancing the digital strategy component, especially for administrators who are interested in developing capacity in ET strategies, and spending more time using and discussing the importance of Entrepreneurial Ecosystems with teachers. It would also be beneficial to elicit information from participants about their own practice prior to engaging in the ET modules, in order to explore whether the ET program served to introduce them to approaches such as PBL, or helped to improve their existing practice in these areas.

> These findings also suggest that there might be benefit in developing different strands of the program that can focus on the many shared needs, but also address the unique responsibilities of both teachers and administrators (building capacity for ET within a classroom and within a school).

Also, while more administrators indicated that they were aware of the Entrepreneurial Ecosystems tool and they found it useful than teachers who stated they used it and they found it useful, this could likely be a correlation between low knowledge rankings and tool/concept use/awareness. For example, 43% of administrators noted that they were aware of Entrepreneurial Ecosystems, while 90% of teachers reported that they did not use it in their practice. Thus, it is logical that teachers who did not attempt to use this tool would also rate themselves as less knowledgeable on this item. This could also be related to the extent of covering this concept in professional learning sessions.

> It could be beneficial then to dedicate more program time to using and discussing the importance of Entrepreneurial Ecosystems with teachers.

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[3] Teachers were asked if they used the ET tools/concepts/practices. School Administrators and/or Superintendents were asked if they were aware of the tools/concepts/practices.

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With regards to significant differences on these measures, 69% of teachers ranked themselves as more or highly knowledgeable on 'using digital strategies,' as opposed to only 44% of administrators (p = .044).

Similar differences were observed on Problem-Based Learning (PBL) strategies (p = .022). For instance, 72% of administrators rated themselves as 'more' or 'highly' knowledgeable on this item, compared to 88% of teachers.

> *I currently teach Spec ED HSP, so though I have taught more open ended strategies and activities in the past [(with no HSP) students] the "Entrepreneurial Thinking" sessions have inspired me to re-engage that aspect of my teaching practice more with my spec. ed students.*
>
> *…the degree to which they [the tools/concepts/practices] are integrated into daily lessons varies greatly with subject matter.*

As indicated by the open-ended comments that participants provided, there were rich connections between their own practice and the new strategies and tools they learned. This provided more information about what tools or concepts participants tended to use in their practice, and which they found to be most useful for engaging students with important concepts and ideas. This information could be used to inform the design of more subject-specific professional learning within the context of ET, which, as

> Participants suggested that the ET tools and concepts introduced in the modules had to be adapted in different ways for different contexts.

will be described a little later in this section, is something that participants indicated they would like to have available.

In summary, the major findings for this category are listed in Figure 1.

Figure 1: Entrepreneurial Thinking and Entrepreneurship Education Attitudes, Perceptions, and Knowledge

> **Entrepreneurial Thinking and Entrepreneurship Education Attitudes, Perceptions, and Knowledge**
>
> - Virtually all participants believed ET engaged a variety of 21st Century competencies such as innovation and creativity.
> - The majority of participants agreed that entrepreneurship should be integrated into a wide range of school subjects, with more administrators seeing ET as relevant to a wider variety of subjects beyond STEM disciplines than teachers.
> - Teachers made rich connections between their own practice, current TDSB initiatives, and the new tools and strategies introduced in the ET program.
> - Teachers felt more confident than administrators when it came to using PBL or digital strategies for ET, while administrators were more likely to be aware of Entrepreneurial Ecosystems than teachers who used them.

Teaching Entrepreneurial Thinking Skills and Practices

Results on the section of the survey that questioned participants about their perceptions of teaching ET showed that participants reported generally high levels of self-efficacy. In general, the great majority of teachers indicated that they tried to develop students' ET skills in their practice (76%). Similarly, two-thirds of teacher participants (66%) indicated that students had learned ET while in their class.

Importantly, this suggests that the teachers' sense of self-efficacy for teaching ET is relatively high.

> Given that most teacher participants reported that they were not exposed to ET strategies before the MaRS modules, the fact that they rated themselves positively on this competency is very promising.

As noted earlier, teachers' perceptions and attitudes about their own abilities for teaching entrepreneurship can influence students' entrepreneurial competencies (Pihie & Bagheri, 2011). Thus, this finding is important to note, as it suggests that the teachers who took part in this program felt a relatively high sense of self-efficacy for teaching ET.

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In future survey studies, comparisons between teachers' perceptions of self-efficacy and

students' ideas about their own abilities could shed more light on the possible relationships between the two and the role a teacher's sense of efficacy plays in helping students develop ET skills and competencies.

> Participant observations on assessment and ET:
>
> • *Since most or all of the "entrepreneurial thinking" skills are transferable skills related to inquiry, problem solving and communication, assessing these skills is easily incorporated into existing curriculum.*
>
> • *It is difficult to assess my own skills in this area. With more time/experience my skills with further develop as well as my ability to assess my skills."*

Also, exploring what may have helped empower teachers and boost their self-perceptions and self-confidence (e.g., a particular workshop, post-workshop meetings at their school, one-on-one conversations with MaRS representatives, etc.) could help pinpoint leverage points and provide valuable information that could inform future refinements to the content, delivery, or development of the program.

In regards to whether participants felt they were knowledgeable on assessment and evaluation, 48% of teachers felt they could not adequately assess their students, while 52% felt that they could. Exploring ways to improve the assessment component of the modules in order to increase participant knowledge and confidence in this area would be beneficial to the evolution of the program. Development could include both the

introduction of ready-made assessment tools and strategies constructed in collaboration with the core curriculum leaders, informed by the creations of participants in previous years.

> Assessment, then, could potentially become an area of emergence and innovation, where participant contributions could play an integral role in the evolution of the program and the tools and strategies that are explored and shared within it.

The majority of ET tools/concepts/practices were implemented and deemed to be useful by participants. Particularly popular amongst both groups were Rapid Prototyping and Pivoting. Among the lower rated items were using Entrepreneurial Ecosystems and taking a field trip to a business or social/community enterprise, both of which were judged more useful by administrators than teachers. However, it should be noted that

taking a field trip requires more than a teacher's willingness or desire to enact, but also relies upon resources and logistics. Thus, the lower teacher ranking on this item might be partially attributed to the latter, although this was not covered in the survey.

When looking at the relationships between teachers' attitudes on entrepreneurial education and their assessment of their own teaching on ET, a general trend seemed to emerge. Those teachers that believed that ET should be a part of most curriculum subjects throughout Grades 7-12 also identified that they frequently encouraged their students to engage with a variety of ET skills and competencies either 'often' or 'all the time' in their classrooms. This suggests that those teachers who perceive ET to encompass a broader set of competencies and skills, beyond those deemed relevant to solely business studies also tended to connect ET strategies to their own classroom practice to a greater extent than those who do not.

It is important to know whether teachers held these perceptions before the module took place, and to what extent teachers were already engaging with some of the ET practices (e.g., 'enabling students to generate their own ideas about how to confront a problem or question') before their participation in the project. These surveys were designed to collect participants' pre-and post-module responses; however, with no pre-test survey, it is impossible to distinguish the extent to which participants' attitudes, perceptions, and practices around ET changed as a result of engagement with the ET program. Future evaluations will include a participant survey taken at the onset of the modules so that this type of assessment can be made.

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The key outcomes that emerged from this component of the research are outlined in Figure 2.

Figure 2: Teaching Entrepreneurial Thinking Skills and Practices

Teaching Entrepreneurial Thinking Skills and Practices
- The majority of teachers indicated high levels of self-efficacy with regard to teaching ET.
- Approximately half of all participants felt they were able to use effective assessment strategies, while the other half did not.
- Teachers who perceive ET to encompass a wider range of competencies and skills tended to connect ET strategies to their own classroom practice to a greater extent than those who do not.
- Each of the ET tools/concepts/practices was deemed to be useful to some degree by participants.
- Among teachers, Rapid Prototyping and Pivoting were the most popular tools, while Entrepreneurial Ecosystems were judged to be less useful by teachers than administrators.

Professional Learning and Organizational Support

Overall, the ET modules were very well received by participants, and were overwhelmingly perceived as being informative, of high quality, useful to participants' daily practice, and able to help deepen participant knowledge and skills around ET.

Results from the survey also suggest that partnership programs, such as this one between the TDSB and MaRS, fill a professional learning void, and can help teachers and administrators develop their skills and knowledge in the area of ET.

Requests from participants for future ET professional learning:
- "*Experts from MaRS, with respect to E-Thinking, coming to planning sessions at our schools to assist cross curricular collaboration*".
- "*We would benefit from having a consistent relationship with a dependable entrepreneur*".
- "*Opportunity to continue to meet and share lessons and approaches and outcomes*"
- "*Maybe a presentation in the school to all staff!*"

As indicated by participants' survey comments, there was clear demand for more sustained collaboration with colleagues and subject-specific workshops. As noted earlier, in a second iteration of the survey, it would be beneficial to ask teachers to identify which tools or concepts they found to be most useful for engaging students in their particular domain and grade level. This could provide valuable information on teacher practice and could inform professional learning aspects of the program. There was also great interest in developing more consistent relationships between schools and MaRS representatives or 'expert entrepreneurs'.

Overall, with respect to the professional learning portion of the survey, the majority of responses were positive, as indicated in the key findings presented in Figure 3.

Figure 3: Professional Learning and Organizational Support

Professional Learning and Organizational Support

- ET modules were overwhelmingly perceived as informative, useful, and impactful.
- Most teachers felt that they had sufficient time and support in their schools to plan and prepare ET teaching.
- Approximately half of all participants believed that other teachers in their school were open to change, while the other half of participants did not.
- There is clear demand for continuing Entrepreneurship Education in schools. The most frequent participant demands included:
  - more time for professional learning and peer collaboration;
  - subject-specific workshops with a focus on technical support; and
  - stronger and more consistent community-school partnerships.

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Policy Implications and Recommendations

Figure 4 proposes two key policy recommendations based on the research findings.

Figure 4: Policy Recommendations

- Policies are needed to support sustained professional learning to enable effective spread and scale of ET throughout the school board.
- Strong school-community partnerships are a marker of countries demonstrating effective school-to-work transitions (The Learning Partnership, 2014).
- Policy makers should enable and support such connections. The Entrepreneurial Thinking and Youth Entrepreneurship Partnership is a unique platform for promoting such connections in an effective, in-demand and pedagogically powerful context.

The growing prominence of entrepreneurship in 21st Century learning frameworks suggest that the benefits of entrepreneurial education for engaging students in critical competencies such as the ability to collaborate, problem-solve, take risks and innovate, are being increasingly recognized. As with any effort to make transformative change, there are many challenges to integrating entrepreneurial education successfully into pedagogical practice. As the Organization of Economic Cooperation and Development OECD (2014) identifies:

> Lack of time, learning materials and financial resources; teachers and parents' fear of "commercialism"; rigid institutional frameworks; and difficulties in assessing learning outcomes of entrepreneurial education are some of the challenges practitioners have encountered when trying to infuse entrepreneurship into education. (para. 1)

Furthermore, the results of the EY G20 Entrepreneurship Barometer 2013 saw Canada score below the average among the G20 countries in the category of entrepreneurial education, with the author stating that, "too few education and training-related efforts focus specifically on the needs of entrepreneurs" (EY, 2013, p. 9).

Acknowledging both of these very real challenges, and the relative lack of entrepreneurship opportunities for Canadian students up to recent years, the success of the Entrepreneurial Thinking and Youth Entrepreneurship program marks a significant achievement on behalf of the TDSB and MaRS. The integration of the professional learning modules and the co-development of ET curriculum resources with students, teachers, and MaRS representatives helped to make the program robust, accessible, and engaging. Policy makers should take notice of the "bottom-up" demand coming from practitioners in the field and help to facilitate existing and new opportunities for continued professional learning and increased integration of entrepreneurial education within Ontario schools.

The benefits of entrepreneurial education may not only impact student learning with regards to 21st Century learning skills, but can also help to facilitate the transition from school to the workplace. Indeed, students today will be entering a workplace that is and will continue to be characterized by complexity and unpredictability, competition, global interconnectivity, and new technologies. Similarly, career education and workplace training for students is also undergoing rapid change (Connelly, Blair, & Ko, 2013).

In Canada, "approximately 35% of … students may immediately enter the workforce after leaving public education" (Connelly et al., 2013, p. 13). Supporting entrepreneurial education in schools could potentially directly benefit this large segment of Canadian students. Fostering youth entrepreneurship can also be beneficial to those students who are disengaged and dropping out of school, or to youth who remain unemployed or underemployed, issues that are prevalent on a global scale (WEF, 2009).

> An important consideration for the stakeholders in the project to discuss would be the extent to which the TDSB-MaRS partnership can play a role in sustaining an architecture of support needed to help spread capacity building for ET throughout the school board through continued entrepreneur/community connections and relationship-building.

Community connections have been shown to be a marker of successful school-to-work transitions. As noted in *The Report on the Partnership Summit 2014* by the Learning

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Partnership, effectively all countries that are strong in this area have found ways to create strong partnerships between schools and community organizations and employers, and to support educational opportunities that leverage these linkages (The Learning Partnership, 2014). This same report includes the recommendation that this is one area where "Canada can learn something from the European countries doing well [in] that [area]" (The Learning Partnership, 2014, p. 15).

The partnership between the TDSB and MaRS has demonstrated itself to be a very valuable connection that holds a great deal of promise for scaling up entrepreneurial education in schools and for helping students achieve success both in the classroom and as they transition out into the workplace.

As indicated by the survey results and commentary, many program participants want to be able to engage in a sustained relationship with representatives from MaRS or other community leaders, with more opportunities to connect and communicate. Policy makers could review the literature and data about the impacts on student success that strong school-community partnerships can have, and support opportunities to strengthen these connections where they can make the most difference in a provincial context. The Entrepreneurial Thinking and Youth Entrepreneurship program offers opportunities for these kinds of connections in an effective, in-demand, and pedagogically powerful context.

Effective entrepreneurial education can be beneficial to both students and to society at large. Numerous recent studies show that entrepreneurship is a critical element driving economic and social progress (Cotis, 2007; Naudé, 2013; Independent Evaluation Group [IEG] World Bank, 2013).

In Canada, recent data show that in regards to the contemporary workplace, there is a significant lack of workers with 21st Century competencies needed for many jobs that are in demand (see Connelly et al., 2013). For instance, a 2012 CIBC World Markets report found that nearly 30% of Canadian employers are confronted with a workplace deficit (Tal, 2012), especially those in STEM fields, which also represent the high growth

employment sectors. At the same time, many young Canadians are either without jobs or underemployed. Currently, the youth unemployment rate is sitting at approximately 14.5%, which is twice the normative unemployment rate and growing (CBC News, 2013).

Policies that help to strengthen, support, and engender opportunities for entrepreneurial education, which include school-community connections and facilitate classroom-to-work transitions, can help to address these problems and support students in achieving success in the Canadian workplace.

Overview of Recommendations for Future Project Implementation and Research

Research into this first year of the Entrepreneurial Thinking and Youth Entrepreneurship Learning Partnership has revealed some important findings that can help inform and improve development of the project as it continues and that also shed light on directions for future research. Following is a summary of the key recommendations for each area:

Recommendations for future iterations of the program:

- *Focus on assessment* - this can include the development of ready-made assessment tools in collaboration with core leaders, but also the creation of new assessments with teachers involved in the program to engage them as valued contributors as their experience and expertise develops.

- *Enhance the digital component* - especially for administrators interested in developing capacity for ET in their school.

- *Build on participant engagement and expertise* - draw out participants' insights, discoveries and innovations to feed into development of ET workshops and other professional learning opportunities for ET.

- *Maximize partnerships (TDSB-MaRS)* - examine the extent to which the TDSB-MaRS partnership can play a role in building and sustaining classroom-community partnerships.

- *Leverage existing PL networks* - to support capacity building and scaling up ET in the TDSB, identify areas and mechanisms in existing professional learning networks that can be leveraged for building an architecture of support for ET throughout the Board.

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Recommendations for future research:

- Compare teachers' self-confidence and students' ideas about their own abilities to shed light on the role a teacher's sense of self-efficacy plays in helping students develop ET skills and competencies.

- Use of pre-module surveys or interviews to elicit more feedback on teachers' prior practices as well as experience with Problem Based Learning (PBL) strategies in order to better understand how engagement with the ET program helps to develop, enhance, or change past practice.

BACKGROUND AND RATIONALE

Life in the 21st Century is characterized by complex social and political problems, exponential technological growth, and continual demographic change. More and more, the ability to be productively engaged and active in our current "knowledge age" (Drucker, 1994) demands a citizenry with a capacity for innovation, creative problem-solving, and the ability to work in technologically-rich and networked environments (Autor, Levy & Murnane, 2003).

Public education is critical for equipping students with the skills and competencies they will need to be productive global citizens in this rapidly changing world. The effort to transform education to meet the needs of the new millennium is reflected in a number of contemporary educational initiatives that target so-called "21st Century skills" such as the Partnership for 21st Century Learning [P21], Canadians for 21st Century Learning and Innovation [C21 Canada], and Assessment and Teaching of 21st Century Skills [ATC21S]. The skill sets advocated by these initiatives commonly include the "6 Cs," namely: collaboration, communication, creativity and innovation, citizenship, and character education (see Fullan, 2012, p. 8).

Recently, the element of entrepreneurship has taken a more prominent place alongside these components as a major point of focus in 21st Century learning. As described by the Council of Ontario Directors of Education in its 2014 vision statement for the province,

> [s]tudent engagement and curiosity could be addressed through stronger development of 21st century learning skills and well-being. We could call this the 'new entrepreneurial spirit'—a spirit characterized by innovation, risk-taking, commitment, and skilled problem solving in the service of a

better future. (Government of Ontario, 2014, p. 4)

According to the World Economic Forum (WEF), an organization that supports entrepreneurship for the global community, "innovation and entrepreneurship provide a way forward for solving the global challenges of the 21st Century, building sustainable development, creating jobs, generating renewed economic growth and advancing human welfare" (WEF, 2009, p. 12). Supporting opportunities for entrepreneurial thinking in classrooms can play a key role in developing students' 21st Century competencies and for increasing Canada's capacity for innovation.

The WEF (2009) views the development of entrepreneurship in young people as an investment that supports economic growth and innovation, and considers it essential to nurture the talents and skills of young people. It perceives youth as being innately entrepreneurial in terms of their "independence of mind" and "desire for innovation" (WEF, 2009, p. 26). To encourage innovative thinking, the WEF deems it critical to start education from an early age in order to have the greatest impact on students' attitudes, knowledge, and skills: "The earlier and more widespread the exposure to entrepreneurship and innovation, the more likely students will become entrepreneurial, in one form or another, at some stage in their lives" (WEF, 2009, p. 10). Entrepreneurial education can be promoted starting as early as primary education and continue life-long (WEF, 2009).

The research described in this paper explores a joint initiative by the Toronto District School Board (TDSB) and the MaRS Discovery District (MaRS) to develop and scale up entrepreneurial education within Toronto public schools. The Entrepreneurial Thinking and Youth Entrepreneurship Learning partnership between MaRS Discovery District (MaRS) and TDSB educators and students was started in the 2014-15 school year.

The goal of the partnership is to "[embed] the competency of entrepreneurial thinking into the professional development of teachers and into the curriculum for students in Kindergarten to Grade 12 through co-creating professional development content, tools, and delivery which engages teachers, and therefore motivating and inspiring student

success" (MaRS, 2015a, p. 4).

The project is embedded within the TDSB's existing ICT Standards and the Global Learning and Education (GLE) Framework.

This study focuses on evaluation of the first phase of this program by means of surveys designed to elicit feedback on participants' perceptions, attitudes, knowledge, and practices regarding ET teaching and learning, and to identify the quality and effectiveness of the professional learning activities and resources offered in the program. Two surveys were developed: the first targeted participating teachers and administrators (see Appendix A), and the second targeted students (see Appendix B). This study is solely concerned with the first survey, which targeted teachers and administrators. This survey represents a first step in evaluating participants' own ideas about ET, opportunities, and challenges for integrating ET in practice, and for targeting areas for program improvement.

Entrepreneurship for Economic, Social, and Cultural Innovation

The knowledge and creativity of young people is critical to the growth of a sustainable knowledge economy, both in Canada and around the world. Although there are a myriad of different ways to define ET, it can be commonly understood as a mindset that involves the development of attitudes, knowledge, and skills related to entrepreneurship, with an emphasis on innovation, creativity, and problem solving (WEF, 2009). This point deserves emphasis here because in the initial stages of entrepreneurial pedagogy, the business approach, methods, and terminology were used, and posed a significant problem in the evolution of entrepreneurship education. Initiatives for entrepreneurial education that focused too narrowly on a business model framework were subject to criticism (Komulainen, Naskali, Korhonen, & Keskitalo-Foley, 2011), and more recent models that continue to do so still garner disapproval from those working in educational contexts (Woods & Woods, 2011). In 2013, for example, the European Trade Union Committee for Education (ETUCE) issued a strongly worded statement in response to the conception of entrepreneurship described in the European Commission's Entrepreneurship 2020 Action Plan. In this statement, the ETUCE declared

that they "disagre[e] with the very narrow perception of entrepreneurship conceived as a business development model" (ETUCE, 2013, p. 1) and instead emphasize the idea that "Entrepreneurship education should prepare the students to obtain democratic skills and educate people for life promoting initiative, taking responsibility and analyzing situations" (ETUCE, 2013, p. 1). They also stress that "developing skills and competences like creativity, initiative, tenacity, and teamwork are essential for...all students and not only for future entrepreneurs to develop businesses" (ETUCE, 2013, p. 2). It is important to emphasize that it is this broader understanding of ET, which stresses the social and cultural aspects of entrepreneurship, and not just the business development element, that informs the curriculum.

Entrepreneurial Thinking and Entrepreneurship Education

For the purpose of this research, the following working definitions of the key concepts of entrepreneurship, and entrepreneurship education are adopted, taking into consideration the educational setting they are applied to:

- *"Entrepreneurship* [emphasis added] is concerned with establishing new activities and about being able to perceive new opportunities and making them work in a number of social areas" (Norwegian Ministry of Education, 2009, p. 7).

- *"Entrepreneurial thinking* is a mindset and learning style propelled by the desire to solve problems and create" (MaRS, 2015b, para. 1).

- *Entrepreneurship Education* comprises those curriculum areas that are integrated to encourage ET by independent thinking and creative problem-solving. It fosters creativity and innovation, design thinking, critical thinking, self-direction, resilience, collaboration, communication, and goal-setting (Goodin, 2003; MaRS, 2014a; MaRS, 2014b).

Entrepreneurial Education Initiatives around the World

Educational researchers, practitioners, governments as well as educational systems all around the world, including Canada, already recognize entrepreneurship education as an essential element of contemporary schooling (C21 Canada, 2012; EACEA/EURYDICE, 2012; EduGAINS, n.d.; Government of Alberta, 2011). There has been an expansion of initiatives in the field of entrepreneurship education in post-secondary, secondary and primary education in recent years. For example, many countries in Europe have already

developed entrepreneurship education strategies (EACEA/EURYDICE, 2012):

> The 2003 Lithuanian national education strategy already explicitly mentioned entrepreneurship education. The United Kingdom (Wales) and Norway followed closely behind, launching strategies in 2004. These countries, as well as the Netherlands and Finland, are now in their second wave of measures. Many more countries launched strategies from 2007 and particularly in 2009, and several strategies have only been launched very recently; the Flemish Community of Belgium embarking on this path towards the end of 2011. In some countries, like Hungary, Portugal and Romania, entrepreneurship strategies are currently under discussion and could be launched soon. (p. 7)

In Canada, the Government of Alberta's vision for education states that students will be "engaged thinkers and ethical citizens with an entrepreneurial spirit" (Government of Alberta, 2011, p.2), which would be nurtured through the development of various competencies. According to this vision, an entrepreneurial spirit in youth is characterized by qualities such as hard work, perseverance, exploration of ideas, creation of opportunities, adaptability, resilience, confidence, and risk-taking (Government of Alberta, 2011).

This vision statement composed by the Government of Alberta was adopted by the Canadians for 21st Century Learning and Innovation initiative (C21 Canada), and was used to inform the model they outline in their *Shifting Minds* document, designed to provide a "national vision and framework for 21st century models of learning in Canada" (C21 Canada, 2012, p. 6). The framework includes competencies and skills that global leaders in education, government, and business identify as critical for success in the knowledge and digital era and integrates them into one coherent model that aims to "serv[e] as a guide for integrating these key competencies and skills into Canada's learning systems" (C21 Canada, n.d., para. 1). In this framework, entrepreneurship is incorporated as a major competency under 21st Century Competencies as an essential capacity in the spirit of creativity and innovation (C21 Canada, 2012).

As reflected in this model from C21 Canada, ET has become deeply embedded in the idea of a 21st Century education throughout Canada, including in provincial curricula. In

2010, for example, the Premier's Technology Council in British Columbia issued a report, *Vision of Education for the 21st Century*, that advocated for the province to acknowledge the "global shift and strive to become a knowledge-based society" which requires its citizens "to drive the innovation, entrepreneurship and dynamism of that society's economy" (Organization of American States [OAS], 2010, as cited in Premier's Technology Council, 2010, p. 7).

More recently, in April 2014, the Nova Scotia School Boards Association (NSSBA) released a review of the province's education system in a discussion paper entitled *Shaping a New Vision for Public Education in Nova Scotia* (NSSBA, 2014). In this review, the NSSBA calls for a transformation of the system in alignment with the framework for 21st Century learning outlined in the C21 Canada's *Shifting Minds* document. Also, in this same year, the Government of Ontario released its *Achieving Excellence: A Renewed Vision for Education in Ontario* document, which describes its main goal as raising achievement and expectations "for valuable, higher-order skills like critical thinking, communication, innovation, creativity, collaboration and entrepreneurship" (Government of Ontario, 2014, p. 3). Opportunities to foster entrepreneurial education can offer a promising and exciting avenue to expand and improve our understanding of entrepreneurship, and build capacity for innovation in our students and our schools.

Pedagogical Approaches for Entrepreneurial Thinking

As its role in 21st Century learning paradigms suggests, entrepreneurial education should not be seen as a disparate initiative to be pursued in addition to existing educational programs. Rather, it is better understood as a unique collision of many existing educational objectives that can be engaged using pedagogically sound approaches, and that can play a key role in advancing 21st Century learning goals. Entrepreneurial education and 21st Century frameworks can be said to "juggle with similar conceptual balls" (Diego, 2014, para. 5). Both have developed with advances in the learning sciences that support a shift away from a "transmission" approach, towards an inquiry-based vision for education in the new millennium (Bransford, Brown & Cocking, 2000; Davis, Sumara & Luce-Kapler, 2008; Sawyer, 2006; Western and Northern Canadian

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Protocol [WNCP], 2011).

From an inquiry-based perspective, it is crucial that a modern education provides students with the opportunity to engage in authentic intellectual challenges that foster deep conceptual understanding, to tackle "real life" challenges in collaboration with others, and to participate in genuine knowledge creation from the earliest levels (Barron & Darling-Hammond, 2008; Jardine, Clifford & Friesen, 2008; Perkins, 2009; Sawyer, 2006). Inquiry-based pedagogies also prioritize skills and competencies that help nurture entrepreneurial thinking in young people, such as helping students to develop "the ability to be creative, propose innovative solutions, gather data to make informed decisions, evaluate options from different perspectives, work in collaborative teams, and take risks" (Gates, Romero, Alonso, Klett, Naveda & Requena, 2011, p. 48).

Over the past two decades, a number of pedagogical approaches grounded in an inquiry-based framework have evolved, including: authentic intellectual work (Newmann, Bryk, & Nagaoka, 2001), discipline-based inquiry (Galileo Educational Network Association, 2008), project-based learning (Thomas, Mergendoller, & Michaelson, 1999), problem-based learning (Barrows, 1996); design-based learning (Hmelo, Holton, & Kolodner, 2000), and challenge-based learning (Johnson & Adams, 2011).

While these models vary in certain aspects from one another (see Friesen & Scott, 2013 for a comparison of these approaches), they share an emphasis on collaboration, creativity, citizenship, self-regulation, technological literacy, and fostering deep understanding. Other pedagogical approaches, such as learning that is co-constructed with those beyond the school, have also been suggested (EU, 2011). "Knowledge building" (Scardamalia & Bereiter, 2003) offers yet another complementary approach that shares an emphasis on creative work with ideas. Knowledge building is suited to entrepreneurial education because of its focus on innovation, giving students collective responsibility for advancing knowledge, and on immersing students in authentic knowledge creation.

Entrepreneurial Education within the Toronto District School Board

The TDSB is engaged in a number of initiatives and strategies to help grow 21st Century teaching and learning within its schools. Currently, one of the most stimulating trends in the TDSB is the innovative pedagogical approaches introduced through the TDSB's *Years of Action 2013-2017* by the Director of Education, Donna Quan, and her leadership team. The TDSB's *Years of Action* plan is "an ambitious, inclusive and actionable vision" (TDSB, 2013a, para. 6)[4] promoting student achievement and well-being by "lead[ing] internationalization and Global Education, implement[ing] Science, Technology, Engineering and Mathematics (STEM) Programming and Foster[ing] Student Creativity, Leadership and Ethical Citizenship" (TDSB, 2013b, Student Achievement & Well-being, para. 6-8) across the board.[4] Towards this direction, the TDSB recently introduced the EDuTECH Strategy for Global Learners (Sinay, 2014):

- To Promote High Quality, Effective Professional Learning to Improve Teachers Technological Pedagogical Content Knowledge;
- To Transform Teaching and Learning with Meaningful Technology Integration
- To Improve Students' Higher Order Cognitive Skills; and
- To Promote Students as Global Learners with necessary Foundational, Meta and Citizenship Knowledge and Competencies. (p. 27)

At the TDSB, we define Global Learners as "literate, connected, interconnected and interdependent. They care, are self-regulated and know their impact; they identify and solve problems using imagination, creativity, and innovation to promote a civic, democratic society" (TDSB, 2013c, as cited in Sinay 2014, p. 17). In this era of a globalized, knowledge-based and information-driven society, it is essential for our students as Global Learners to have ET skills.

The Entrepreneurial Thinking and Youth Entrepreneurship Learning Partnership provides one way to build capacity around ET within the framework of the EDuTECH Strategy for Global Learners. Both MaRS and the TDSB share a common understanding of the concept of entrepreneurship that encompasses the cultivation of new attitudes, mindsets, and competencies. As MaRS (2015b) describes it, "[e]ntrepreneurial thinking

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[4] For further information on the TDSB's *Years of Action 2013-2017*, please visit: www.tdsb.on.ca/everystudent

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is a mindset and learning style propelled by the desire to solve problems and create"
(para. 1). MaRS (2014a) stresses that ET builds skills including: "design thinking,
communication, teamwork, perseverance, creativity, critical thinking, resilience, and
goal-setting" (pp. 1-2). These skills appear to be similar with the ones that are presently
common in progressive educational settings and thus provide an approach for engaging
students in these transversal competencies that are required in technology-rich
teaching and learning environments.

The TDSB's Triadic Model of Fostering Entrepreneurial Thinking and Pedagogy with High-Quality, Effective Professional Learning in the TDSB

The same competencies required in technology-rich teaching and learning environments
are reiterated in TDSB ICT Standards (n.d.) (see Figure 5). Guided by the Standards, the
TDSB students locate, retrieve, organize, manipulate, synthesize, and evaluate and
communicate information in collaborative and creative environments using a wide
range of tools commonly used for research, inquiry, problem-solving, decision-making,
and creativity.

Figure 5: Toronto District School Board's ICT Standards

	Technology Operations & Concepts Students demonstrate a sound understanding of technology concepts, systems, and operations.	**Communication & Collaboration** Students work collaboratively, using digital media and environments, to support individual learning and to contribute to the learning of others.	
	Research & Information Fluency Students use appropriate technology to gather, evaluate, and use data and/or information in order to plan and conduct research or inquiry.	**Digital Citizenship** Students understand human, cultural, and societal issues related to technology and practice legal, ethical, and safe behaviour.	
	Critical Thinking & Problem Solving Students think critically to manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.	**Creativity & Innovation** Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.	

Source: TDSB's ICT Standards (n.d., p.4.), adapted from the ISTE Standards for Students (ISTE, 2007); as cited in Sinay, 2014

The TDSB aspires to enable its students to access technology-rich environments which incorporate elements of 21st Century learning, and provide opportunities for students to take advantage of the available knowledge existing on computers and on the Internet by using global learning competencies, some of which include: "effective collaboration and communication, critical and creative thinking, powerful reasoning, essential capacities of self to learn" (Sinay, 2014, pp. 14-15). Moreover, the same ET transversal skills proposed by MaRS are also adopted, in part or in their entirety, by the recently proposed TDSB Global Learning and Education (GLE) Framework.

The Framework incorporates the elements of 21st Century learning, internationalization and global competencies into three domains of knowledge and their associated skills and competencies (Binkley, Erstad, Herman, Raizen, Ripley & Rumble, 2010; Kereluik, Mishra, Fahnoe, & Terry, 2013; Saavedra & Opfer, 2012; as cited in Sinay, 2014):

- Foundational Knowledge - it is comprised of three key subcategories: content knowledge and multiple literacies; digital competency; and inter-systems of knowledge.

- Meta-Knowledge - the domain has three subcategories: problem assessment and designing solution; build capacity of self to learn; and locally and globally.

- Citizenship Knowledge - it has three subcategories: personal and emotional; cultural and ethical; and navigating and engaging in and with the world. (p. 18)

Figure 6 shows a concept map of the three frameworks in relation to each other. This triadic model is an attempt to initially synthesize the three frameworks in which we have identified commonalities: TDSB ICT standards, the Global Learning Framework, and the Entrepreneurial Thinking and Youth Entrepreneurship Learning program.

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Figure 6: Entrepreneurial Thinking Skills in Relation to the TDSB's ICT Standards and Global Learning and Education Framework
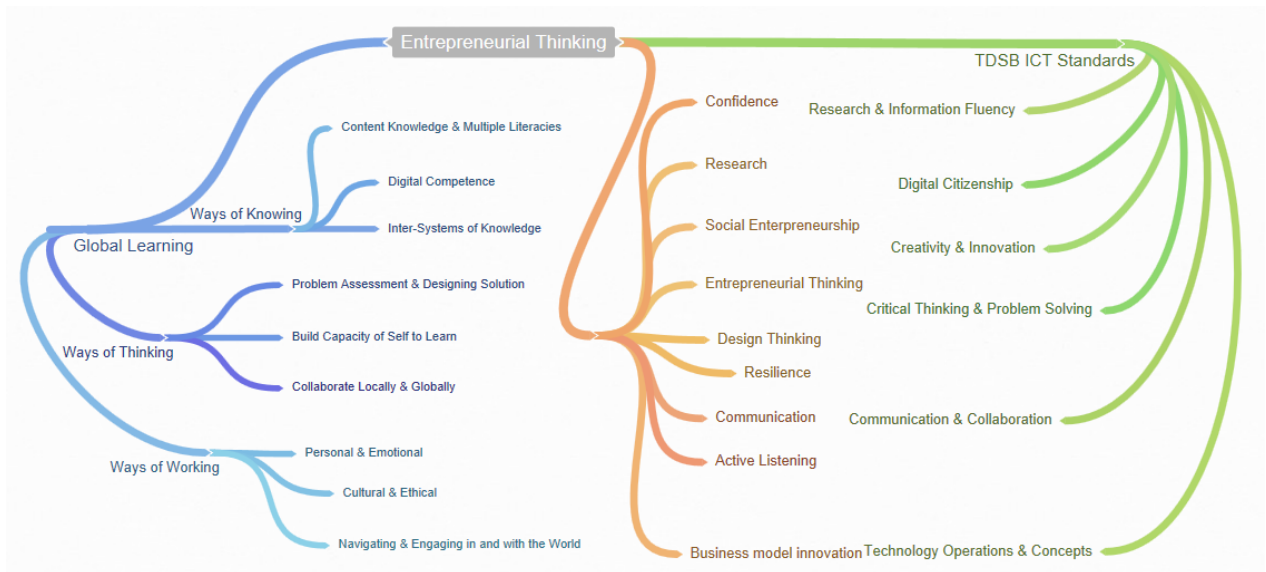
Sources: TDSB's ICT Standards (n.d., p. 4.), adapted from the ISTE Standards for Students (ISTE, 2007); Sinay, 2014; MaRS, 2014a; Binkley et al., 2010; Kereluik et al., 2013; Saavedra, & Opfer, 2012.

PROJECT GOALS

The Memorandum of Understanding between the Toronto District School Board (TDSB) and MaRS Discovery District (MaRS) describes the project goals as (MaRS, 2015a):

1. To co-create, co-construct and co-design professional development curriculum in Entrepreneurial Thinking and classroom curriculum applications that can be utilized within a variety of themes and subject areas and scaled across TDSB schools;

2. To collaboratively develop and apply methods for measurement of impact and progress, providing feedback to adjust ideas and prototypes, and develop strategies to scale successful prototypes across the Board;

3. To provide opportunities for MaRS and TDSB schools to learn and build capacity for change, as well as building the receptor capacity in the education sector regionally, provincially, nationally to embed entrepreneurial thinking into their curriculum; and

4. To enhance technological infrastructure as a tool to learn, work and document the collaboration by educators and students. Online learning resources, toolkits, learning platforms to enable collaboration, a repository of artefacts, and other tools may be developed and delivered

to build the culture of entrepreneurial thinking in schools and classrooms, and to support new pedagogies based on this partnership. (p. 4)

Research Objectives and Guiding Questions

The research documented in this report focuses on the second goal in particular. It describes the first stage of a developmental evaluation and performance metrics approach created to improve the program design and delivery, measure uptake and applications, and assess impact on student achievement[5] and teacher and administrator professional learning. The tools and procedures used in this study are designed to collect the educators' and administrators' current perceptions, self-efficacy, attitudes, behaviors, knowledge and practices regarding ET teaching and learning environments, and to identify the quality and effectiveness of professional learning sessions conducted by MaRS. The major research questions this paper addresses include the following:

- What are the teachers' and administrators' perceptions, attitudes, and knowledge on ET and entrepreneurship education?
- What skills and practices do teachers use in their current teaching towards promoting ET skills?
- What is the rate of attendance by teachers and administrators in entrepreneurial thinking professional learning sessions and how did this impact their overall teaching/work?

Study Design: Measuring the Effectiveness of Entrepreneurship Education and Professional Learning

In this study, we apply a use-inspired research framework that enables us to contribute to the partnership initiative and to the area of entrepreneurship education as a whole. A use-inspired research framework attempts to understand ET as well as considers use of the research findings for the benefits of the students to improve their achievement and well-being (see Figure 7).

Figure 7: The Stokes Research Matrix
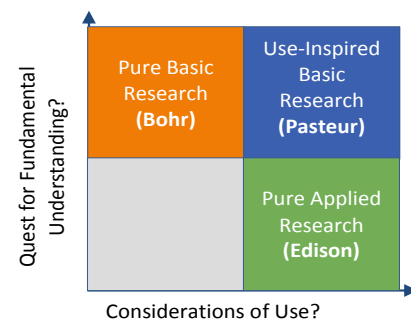
Source: Stokes, 1997, p. 73; as cited in Sinay, 2014, p. 28

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[5] The student survey was not implemented and was not included within the scope of the study in the first year of the project.

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Figure 8 displays the proposed research frameworks including the phases and research activities from longitudinal and multi-dimensional perspectives. As part of measuring the effectiveness of the initiative, we developed surveys based on best research practices in the literature examining the educators', administrators' and students' beliefs, attitudes, knowledge, and experiences in ET and Entrepreneurial teaching and learning. The framework involves the attempt to identify the baseline stages of concerns, beliefs, attitudes, and experiences of the key stakeholders, and their level of use through the TDSB's Education Configuration Map (see Figure 8).

Figure 8: Conceptual Framework for the Evaluation of the Entrepreneurial Thinking and Youth Entrepreneurship Learning Initiative and Professional Learning
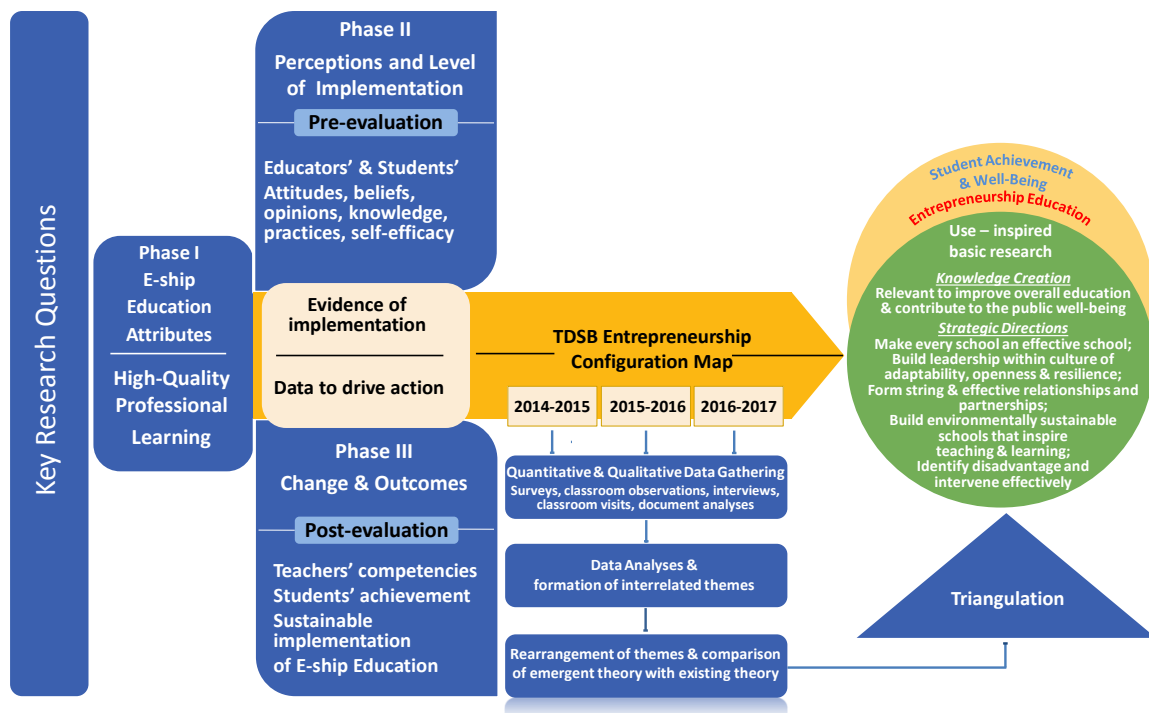
Participants

In total, the participant pool for this study was 69, comprising of teachers (*n*=50) and administrators (*n*=19) who engaged in the first half of the first year of the Entrepreneurial Thinking and Youth Entrepreneurship Learning program, 2014-15. The participants attended four professional learning modules.

Research Tools for Studying the Effectiveness of the ET, Youth Entrepreneurship Learning, and the Quality of Professional Learning

There are several attempts in the literature to measure entrepreneurship education and skills (e.g., Moberg, 2014; Ruskovaara, n.d.), and the effectiveness of professional learning. With this in mind, we have designed the Educator/Administrator survey to elicit their perceptions, knowledge, and practices relating to Entrepreneurial Thinking and Youth Entrepreneurship Learning and to identify the effectiveness of Professional Learning. As a method of program evaluation, a comprehensive survey was designed to address the perceived competencies (attitudes, knowledge, and skills) of the participating teachers and administrators. A detailed literature search was completed to identify research examining the assessment and monitoring of the attitudes, skills, and knowledge regarding ET required by individuals in educational settings. The surveys that were developed reflect the best practices in the area and were designed considering the approach taken by MaRS in delivering the modules to the professional learning participants.

The approach to design the measures took into consideration the working definitions as described in the section of this study called *Entrepreneurial Thinking and Entrepreneurship Education*. Students need to possess the competencies and have an entrepreneurship mindset. Teachers need to be knowledgeable about ET, possess the right attitudes, and be able to cultivate students' ET skills (creativity and innovation, design thinking, critical thinking, self-direction, resilience, collaboration, communication, and goal-setting). In addition, they have to practice the ET skills in their classrooms. The framework depicted in Figure 9 was used to assess the ET of TDSB educators, administrators, and students[6].

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[6] The student survey was not implemented in the 2014-15 school year.

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Figure 9: The Framework used to Assess the Components of the Attitudes, Knowledge and Skills toward Entrepreneurial Thinking, and Youth Entrepreneurship Learning
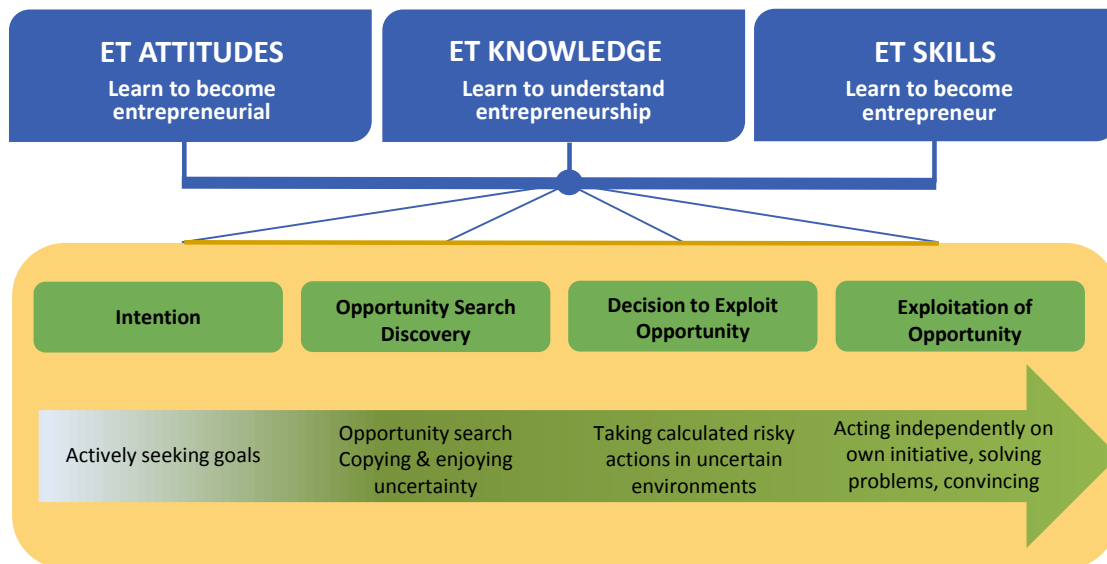
Source: ASTEE, n.d.

The attitudes, opinions, and beliefs towards Entrepreneurial Thinking and Youth Entrepreneurship Learning were addressed in the survey questions. It has been suggested that the attitude towards ET and entrepreneurship education can be influenced by exposure to training sessions (Johansen et al., 2012; Packham et al., 2010).

It has also been suggested that teachers' attitude and self-efficacy could influence students' entrepreneurial motivation and competencies (Pihie & Bagheri, 2011) and for this reason they were also included in the current surveys. Finding evidence of increases in students' perceptions of self-efficacy could help counter existing literature that holds that Ontario students demonstrate lower self-confidence and agency with regards to increasing school success than in other high-achieving nations, such as Finland or Singapore (The Learning Partnership, 2014).

ET Knowledge

In the Educator/Administrator survey, we included items that address their perceived knowledge about ET and entrepreneurship education as they relate to their own perception of skills and attitudes. We included questions addressing knowledge about

ET pedagogy and questions about the integration of entrepreneurship education into the curriculum. In addition, we addressed the teachers' perceptions of their practices and the integration of specific tools and concepts in their ET teaching.

ET Skills

Driessen (2005) reported that ET skills can be developed by having participants attend relevant programs and there is the possibility that these skills can even change during the training period. In the framework proposed by MaRS, skills are the product of ET training. Activities generated during the MaRS module presentations are geared towards developing the teachers' ET skills. Although in the literature different skills are emphasized by different researchers in entrepreneurship education, most of the skills suggested by MaRS are easily identified as the main skills necessary for teachers' ability to engage in ET activities in their classroom. The following are the skills proposed by MaRS and emphasized in the Educator/Administrator survey.

Creativity and innovation skills: "refer to students being able to generate and refine solutions to complex problems or tasks based on synthesis, analysis and then combining or presenting what they have learned in new and original ways" (Ravitz, 2014, p. 7).

Design thinking skills: a mindset and a methodology used to better understand problems and implement solutions (MaRS, 2014a; MaRS, 2014b; MaRS, 2014c).

Critical thinking skills: **"**refer to students being able to analyze complex problems, investigate questions for which there are no clear-cut answers, evaluate different points of view or sources of information, and draw appropriate conclusions based on evidence and reasoning" (Ravitz, 2014, p. 5).

Self-direction skills: "refer to students being able to take responsibility for their learning by identifying topics to pursue and processes for their own learning, and being able to review their own work and respond to feedback" (Ravitz, 2014, p. 7).

Resilience skills: "is about understanding the difference between criticism of an idea and of a person" (MaRS, 2014a, p.1; MaRS, 2014b).

Collaboration skills: "refer to students being able to work together to solve problems or answer questions, work effectively and respectfully in teams to accomplish a common goal, and assume shared responsibility for completing a task" (Ravitz, 2014, p. 6).

Communication skills: "refer to students being able to organize their thoughts, data and findings and share these effectively through a variety of media, as well as orally and in writing" (Ravitz, 2014, p. 6).

STUDY FINDINGS

Results from all three portions of the Educator/Administrator survey (A, B, and C) are summarized in the following sections. Total percentages were calculated on each item and were used to chart the frequency of responses corresponding to each survey question. Statistical significance tests are used to compare the responses of the two groups (administrators and teachers) on items in sections A and C to determine any possible significant differences between them. Statistically significant differences were reported where the probability (*p*) level was less than .05. Because section B deals with classroom practice, administrators were not expected to fill out this part of the survey and, therefore, no cross-group comparisons were made on this section. Overall results for each group (teachers and administrators) are presented in the appendices (see Appendix E and Appendix F).

Part A: Perceptions, Attitudes, and Opinions on Entrepreneurial Thinking.

Survey results indicate that both teachers and administrators held similar perceptions and attitudes around ET (see Appendix E and Appendix F). For instance, virtually every participant indicated that they believed that ET went far beyond business development but rather encompassed "a wide range of attitudes, knowledge, and skills." In addition, an optional comment field asking participants to elaborate on their ideas about what ET means elicited three main types of responses (*n*=65). The first and most common theme, representing 79% of all responses (both teacher and administrator), corresponds closely to the definition quoted above, reflecting broader skills and competencies with no mention of the following business or commercial concepts:

- Real world, authentic, not just business/economics.

- The "why" behind projects. Problem-solving in an authentic, real-life way.

- Touching almost any career. Aspects of entrepreneurship can be found pretty much everywhere.

- 21st Century Thinking, Hands on learner, design thinking, literate.

The second category of responses represents a mix of broad skills and competencies but includes business-specific elements, and was traced in approximately 15% of comments. A few of these comments included the following:

- Problem-solving, innovation, business.

- Money, business, ingenuity, marketing, creativity, collaboration, flexibility, goal oriented.

- Business, Creativity, Innovation.

- Risk taking, grit, problem-solving, pivoting, money, business.

The third category of responses reflects a strictly business-related conception and was reflected in only 6% of comments. These included responses such as:

- How to develop and run a successful business.

- How to convince people that they need something.

- Selling, Promoting, Marketing.

When it came to the question of whether entrepreneurship and education should be integrated, the majority of participants indicated that they agreed. More importantly, 84% of participants believed that ET should be required for all students in Grades 9-12, while 90% of participants believed that ET should be blended into most subjects across Grades 7-12 (see Figure 10).

Figure 10: **Rate of Participant Agreement on the Question of Whether Education and ET should be Integrated across all Subjects Gr. 9-12, only in Business Studies Gr. 9-12, or across all subjects Gr. 7-12**
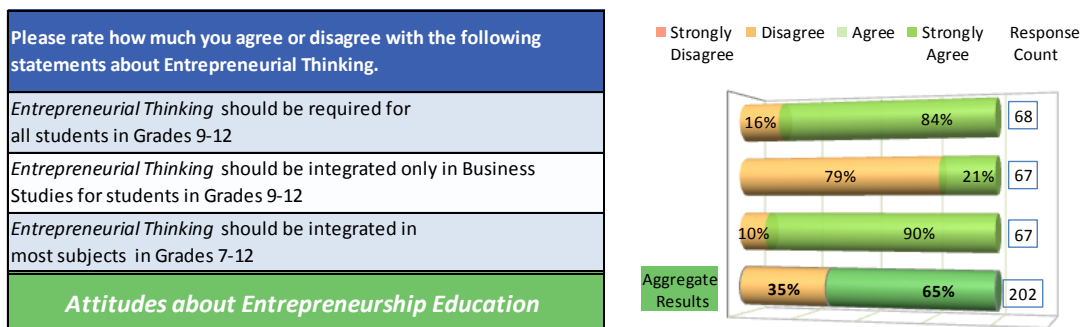
In general, participants perceived STEM-related subjects as well as Language Arts and Social Sciences to be most appropriate for integration with ET (see Table 1). However, administrators seemed to consider a more diverse range of subjects compatible with ET as compared to teachers, with significant differences of opinion occurring in relation to Geography (p = .010), the Arts (p = .036), and the Social Sciences (p = .049) in particular.

Overall, however, the majority of participants saw ET as an umbrella term that encompassed many 21st Century competencies such as innovation and creativity, and that could be applied in many and varied subject areas across both intermediate and secondary curricula (see Table 1).

Table 1: Subjects Likely to Integrate ET

Please tell us the school subject or subjects in which you consider it likely to integrate *Entrepreneurial Thinking*					
The Arts	69% (47)	History	47% (32)	Science	79% (54)
Computer Studies	78% (53)	Language Arts	74% (50)	Social Sciences	71% (48)
Environmental Studies	69% (47)	Mathematics	68% (46)	Technological Education	85% (58)
Foreign Languages	34% (23)	Music	49% (33)	Other (please specify):	21% (14)
Geography	57% (39)	Physical Education/Health	41% (28)		

Part A: Perceived Knowledge about EE, Social Entrepreneurship, and the MaRS ET Toolkit K-12

Part A of the survey also asked participants to evaluate how knowledgeable they believed themselves to be on the strategies introduced in the MaRS toolkit after participation in the ET modules. Figure 11 lists the ratings on each item for all participants.

With regards to significant differences on these measures, 69% of teachers ranked themselves as more or highly knowledgeable on 'using digital strategies,' as opposed to only 44% of administrators (p = .044). Age could potentially have a bearing on this finding. The age range of administrator participants was 40-60+ years of age. Within the teacher group, just under half of the participants were between 20 and 39 years of age. Any in depth exploration of how age-related discrepancies might play into these differences in perceived ability is beyond the scope of this paper. However, considering the importance of digital literacy both to ET strategies and to 21st Century learning goals

generally, this finding suggests that engaging participants in professional learning around digital strategies for promoting ET could be furthered developed, especially for administrators wishing to build capacity around entrepreneurial education within their schools. For instance, what tools and strategies can be implemented into the program to increase professional knowledge and confidence in using digital strategies? Are there existing models of successful approaches from an entrepreneurial education perspective that can help inform improvements to the program?

Figure 11: Breakdown of Participant Results on the Perceived Level of Knowledge on ET, Social Entrepreneurship, and the MaRS ET Toolkit

Please rate your level of knowledge in the following areas:	1: No Knowledge	2	3	4: Highly Knowledgeable	Response Count
Developing *Entrepreneurial Thinking* lesson plans	3%	31%	52%	13%	67
Helping students to structure brainstorms using Design Thinking	3%	24%	54%	19%	68
Enabling students to assess their ideas using a Strengths, Weaknesses, Opportunities and Threats (SWOT) Diagram	7%	28%	48%	16%	67
Teaching students to understand the value of their work by measuring Social Return on Investment (SROI)	18%	49%	26%	7%	68
Helping students to conduct better research by learning to Pivot		24%	53%	24%	68
Teaching students to refine their ideas using an Idea Canvas	7%	22%	52%	18%	67
Helping students to address research bias through Customer Discovery	9%	24%	54%	13%	67
Enabling students to test their hypotheses through Rapid Prototyping	8%	16%	64%	13%	64
Helping students to refine their arguments by Crafting Pitches	3%	26%	51%	19%	68
Facilitating students to form complementary groups by communicating their Personal Brand	3%	34%	47%	16%	68
Helping students to engage their audience with a Creative Slide Deck	13%	28%	46%	12%	67
Helping students to identify career paths by exploring Entrepreneurial Ecosystems	18%	50%	29%	3%	68
Using digital learning strategies in teaching *Entrepreneurial Thinking*	4%	33%	40%	22%	67
Using inquiry-based strategies in teaching *Entrepreneurial Thinking*	3%	13%	53%	31%	68
Using problem-based strategies in teaching *Entrepreneurial Thinking*	4%	12%	51%	33%	67
Preparing entrepreneurship-related exercises, presentations, and essays	7%	26%	53%	13%	68
Using financial literacy in your assignments (e.g., how to read and interpret financial statements, how to estimate a budget, how to control costs for projects)	10%	38%	34%	18%	68
Perceived knowledge about Entrepreneurship Education, Social Entrepreneurship and MaRS Entrepreneurial Thinking Toolkit for K-12 Educators (17 items) — Aggregate Results	7%	28%	48%	17%	1145

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A second significant difference was found in relation to using Problem-Based Learning (PBL) strategies (p = .022). For instance, 72% of administrators rated themselves 'more' or 'highly' knowledgeable on this item, compared to 88% of teachers. These results suggest that members of both participant groups, but particularly teachers, felt confident using pedagogical strategies they might already be familiar with to facilitate and activate ET strategies. However, since it is not known how many participants were already using these approaches in their practice, or to what extent, the results could also suggest that to those less familiar with PBL, the ET strategies themselves were considered to be tools to enact these approaches, and thus, participants perceived that their knowledge developed in these areas. However, this is only conjecture, as more information on the background knowledge and experience of each participant would have to be known to make any conclusions on this point.

The last significant difference found on this section of the survey relates to Entrepreneurial Ecosystems. Teachers ranked their knowledge of Entrepreneurial Ecosystems lower in comparison to administrators (p = 0.038). However, there could likely be a correlation between low knowledge rankings and tool/concept awareness/use. For example, 44% of administrators noted that they were 'more' or 'highly knowledgeable' about Entrepreneurial Ecosystems, as compared to 28% of teachers. In fact, on all ET tools/concepts/practices surveyed, teacher use of Entrepreneurial Ecosystems was the lowest. Thus, it is logical that teachers would also rate themselves as less knowledgeable on this item.

Commentary on this survey item was infrequent, with only 10% of participants opting to fill out this section. Of the few comments that were written, half appear to be a response more to the framing of the survey questions themselves than as a reflection prompted by them. For instance, one participant indicated that a lower level of knowledge on some concepts/tools might be unavoidable: *"If you do one "all the time" you can't do all of the others".* Another participant also gave pedagogical reasons for being selective in this area: *"The variety of strategies used will depend to a certain extent and the "audience" that I am "pitching" the curriculum too!"* This sentiment is

also reflected in the following comment focusing on disciplinary selectivity: *"…the degree to which [they] are integrated into daily lessons varies greatly with subject matter"*.

As for the remaining few comments, they included brief connections noted between ET teaching strategies and the participant's own existing practice, such as the following example: "*I currently teach spec ED HSP, so though I have taught more open ended strategies and activities in the past [(with no HSP) students] the "Entrepreneurial Thinking" sessions have inspired me to re-engage that aspect of my teaching practice more with my spec. ed students".* As indicated by the comments in this section, participants were making rich connections between their own practice and the new strategies and tools they were learning. They were also suggesting that the ET tools and concepts introduced in the modules might have to be adapted in different ways for different contexts.

Drawing out more information about what tools or concepts participants tended to use in their practice, and which they found to be most useful for engaging students with important concepts and ideas in their particular domain would be beneficial. This information could be used to inform the design of more subject-specific professional learning within the context of ET, which, as will be described a little later in this section, is something participants indicated they would like to have available.

Part A: Overall Perceptions about ET Teaching

As shown in Figure 12, the great majority of teachers indicated that they tried to develop students' ET skills in their practice (76%). In the optional comment section on this item, which was filled out by 26% of participants, most stated that they had tried ET strategies in their class but needed more time to develop their practice: "*I would like more time to implement, modify, try these strategies again. That might move my knowledge level up!*" Similarly, two-thirds of teachers (66%) indicated that students had learned ET while in their class. This finding is important to note, as it suggests that the teachers' sense of self-efficacy for teaching ET was relatively high. As noted earlier, teachers' perceptions and attitudes about their own abilities for teaching

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entrepreneurship can influence students' entrepreneurial competencies (Pihie & Bagheri, 2011). Given that most teacher participants reported that they were not exposed to ET strategies before the MaRS modules, yet still rated themselves positively on this item, is very promising and is an indicator of the success of the program.

Figure 12: Breakdown of Teacher Responses on Perceptions of ET Teaching
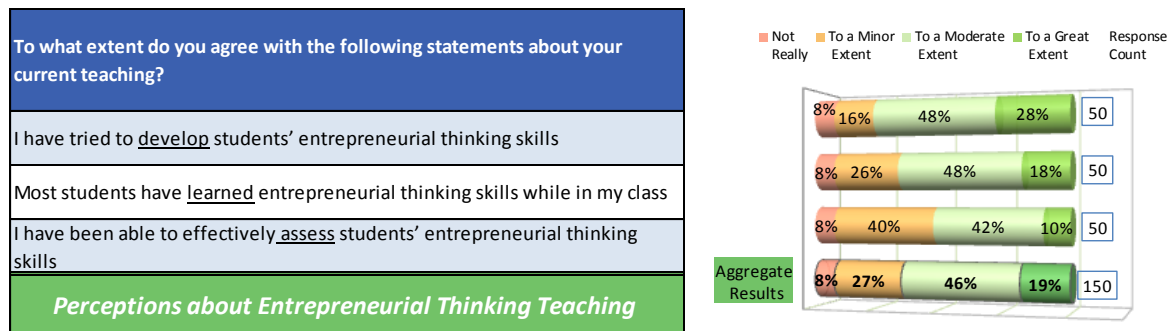
In future survey studies, comparisons between teachers' perceptions of self-efficacy and students' ideas about their own abilities could shed more light on the possible relationships between the two and the role a teacher's sense of efficacy plays in helping students develop ET skills and competencies. Also, exploring what may have helped empower teachers and boost their self-perceptions and self-confidence (e.g., a particular workshop, post-workshop meetings at their school, one-on-one conversations with MaRS reps, etc.) could help pinpoint leverage points and provide valuable information that could inform future refinements to the content, delivery, or development of the program.

Interestingly, the results on the question of whether teachers felt they had effectively assessed their students' ET skills, 48% of teachers felt they had not adequately assessed their students, while 52% felt that they could. This discrepancy was also reflected in the survey comments. For example, a participant wrote: "*Since most or all of the "entrepreneurial thinking" skills are transferable skills related to inquiry, problem solving and communication, assessing these skills is easily incorporated into existing curriculum".* Another participant suggested that assessment proved more of a challenge: "*It is difficult to assess my own skills in this area. With more time/experience*

my skills [will] further develop as well as my ability to assess my skills." Others indicated that they simply needed more time and experience to work on assessment for ET: *"In early stages of implementation as I would like to use pilot of one class and roll into all of my classes. In process of developing effective rubrics to assess work"*.

While the comments reflect a diversity of opinion on the matter, the variability on this measure suggests that it represents a program area that needs further attention. Exploring ways to improve the assessment component of the modules in order to increase participant knowledge and confidence in this area would be beneficial to the evolution of the program. Development could include both the introduction of ready-made assessment tools and strategies made in collaboration with the core curriculum leaders, but could also build on the creations of participants in previous years. Assessment, then, could potentially become an area of emergence and innovation, where participant contributions could play an integral role in the evolution of the program and the tools and strategies that are explored and shared within it.

Part B: Teacher Attitudes on Entrepreneurial Education and Their ET Teaching Practices

Part B of the survey was only for teachers since it asks participants to reflect on classroom practice. Cross-tab comparisons were performed between responses on the survey sections probing teachers' attitudes towards ET and the extent to which they believed they engaged with various ET thinking skills and practices.

Figure 13 shows a breakdown of responses on this section. Results showed a number of significant differences between teachers' attitude towards entrepreneurial education and their teaching practices around ET. For instance, the teachers who disagreed with the notion that entrepreneurial education should be restricted to secondary Business Studies identified that they enabled their students to 'generate ideas about how to confront a problem or solution' either 'often' or 'all the time.' Teachers who agreed that entrepreneurial education should be restricted to Business Studies indicated they felt they enabled their students to do so only 'often' or 'sometimes'.

The same general trend was found for the following practices, including allowing

students to 'creatively synthesize information'; 'develop different iterations of a solution to a problem or challenge'; 'create joint products using contributions from each student,' and, finally, 'give feedback to peers or assess other students' work. Similarly, teachers who agreed with the idea that entrepreneurial education should be integrated into most subjects from Grades 7-12 differed from those who disagreed with this item on the frequency with which they felt they enabled students 'to analyze or organize ideas from multiple perspectives using empathy' in their practice.

A greater proportion of these teachers selected the options 'often' or 'all the time' on this item, while the teachers that chose to disagree selected 'sometimes' or 'never' more often. The same pattern as previously mentioned applies to the last example, wherein teachers who agreed that entrepreneurial education should be integrated into *all* subjects from Grades 9-12, identified to a significantly different degree from teachers who disagreed on this item. More particularly, teachers in agreement felt that they more often gave their students opportunities to "creatively synthesize information" and build onto each other's ideas as well as 'to plan next steps to accomplish a complex task.'

Figure 13: Teacher Perceptions on Teaching ET Skills

In your current teaching, how often do you enable students to do the following?

Generate their own ideas about how to confront a problem or question	14% · 56% · 30% — 50
Test out different ideas and work to improve them	2% · 18% · 50% · 30% — 50
Invent a solution to a complex, open-ended question or problem	2% · 30% · 42% · 26% — 50
Create an original product or performance to express their ideas	4% · 14% · 50% · 32% — 50
Aggregate Results	2% · 19% · 50% · 30% — 200

a) Creativity and Innovation Skills

Legend: Never or Rarely · Sometimes · Often · All the Time · Response Count

In your current teaching, how often do you enable students to do the following?

Generate ideas using different strategies (e.g., brainstorming, sticky notes, mind-mapping)	16% · 40% · 44% — 50
Analyze and organize ideas from multiple perspectives using empathy	8% · 38% · 38% · 17% — 48
Creatively synthesize information (e.g., students build on each other's ideas or students try multiple headings or themes when organizing ideas)	4% · 28% · 48% · 20% — 50
Use rapid prototyping by having them create a rough sketch or diagram of one way that their ideas could be executed	6% · 42% · 42% · 10% — 50
Aggregate Results	5% · 31% · 42% · 23% — 198

b) Design Thinking Skills

Legend: Never or Rarely · Sometimes · Often · All the Time · Response Count

In your current teaching, how often do you enable students to do the following?

Ask many questions before they try to find a possible solution	2% · 22% · 50% · 26% — 50
Analyze competing arguments, perspectives or solutions to a problem	2% · 32% · 48% · 18% — 50
Provide graphs and/or diagrams to support their solutions to a problem	6% · 29% · 43% · 22% — 49
Develop a persuasive argument based on supporting evidence or reasoning	6% · 29% · 39% · 27% — 49
Aggregate Results	4% · 28% · 45% · 23% — 198

c) Critical Thinking Skills

Legend: Never or Rarely · Sometimes · Often · All the Time · Response Count

In your current teaching, how often do you enable students to do the following?

Take initiative when confronted with a difficult problem or question	2% · 12% · 57% · 29% — 49
Choose their own topics of learning or questions to pursue	4% · 30% · 42% · 24% — 50
Plan the steps they will take to accomplish a complex task	18% · 50% · 32% — 50
Monitor their own progress towards completion of a complex task and modify their work accordingly	16% · 60% · 24% — 50
Aggregate Results	2% · 19% · 52% · 27% — 199

d) Self-Direction Skills

Legend: Never or Rarely · Sometimes · Often · All the Time · Response Count

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Figure 13 continued

In your current teaching, how often do you enable students to do the following?
Learn from different cases of problems
Follow through on a solution until the end
Develop different iterations of a solution to a challenge/problem
Accept failure as part of the learning process
e) Resiliency Skills

Legend: Never or Rarely, Sometimes, Often, All the Time, Response Count

- Learn from different cases of problems: 6%, 30%, 44%, 20% — 50
- Follow through on a solution until the end: 20%, 40%, 40% — 50
- Develop different iterations of a solution to a challenge/problem: 6%, 18%, 59%, 16% — 49
- Accept failure as part of the learning process: 16%, 41%, 43% — 49
- Aggregate Results: 3%, 21%, 46%, 30% — 198

In your current teaching, how often do you enable students to do the following?
Assign students to groups which contain members who have a wide range of skills and interests
Create joint products using contributions from each student
Work as a team to incorporate feedback on group tasks or products
Give feedback to peers or assess other students' work
f) Collaboration Skills

Legend: Never or Rarely, Sometimes, Often, All the Time, Response Count

- Assign students to groups...: 4%, 24%, 38%, 34% — 50
- Create joint products...: 10%, 14%, 52%, 24% — 50
- Work as a team...: 4%, 24%, 42%, 30% — 50
- Give feedback to peers...: 4%, 26%, 46%, 24% — 50
- Aggregate Results: 6%, 22%, 45%, 28% — 200

In your current teaching, how often do you enable students to do the following?
Convey their ideas using media other than a written paper (e.g., posters, video, blogs, etc.)
Prepare and deliver an oral presentation to the teacher or others
Engage in activities where they learn to communicate in a language that the target audience will understand
Understand the responsible use of social technology (e.g., use social media to gather market data or draft a value proposition that explains to the target audience the value of a product)
g) Communication Skills

Legend: Never or Rarely, Sometimes, Often, All the Time, Response Count

- Convey their ideas using media...: 2%, 18%, 36%, 44% — 50
- Prepare and deliver an oral presentation...: 4%, 20%, 47%, 29% — 49
- Engage in activities...: 4%, 30%, 46%, 20% — 50
- Understand the responsible use of social technology...: 12%, 38%, 40%, 10% — 50
- Aggregate Results: 6%, 27%, 42%, 26% — 199
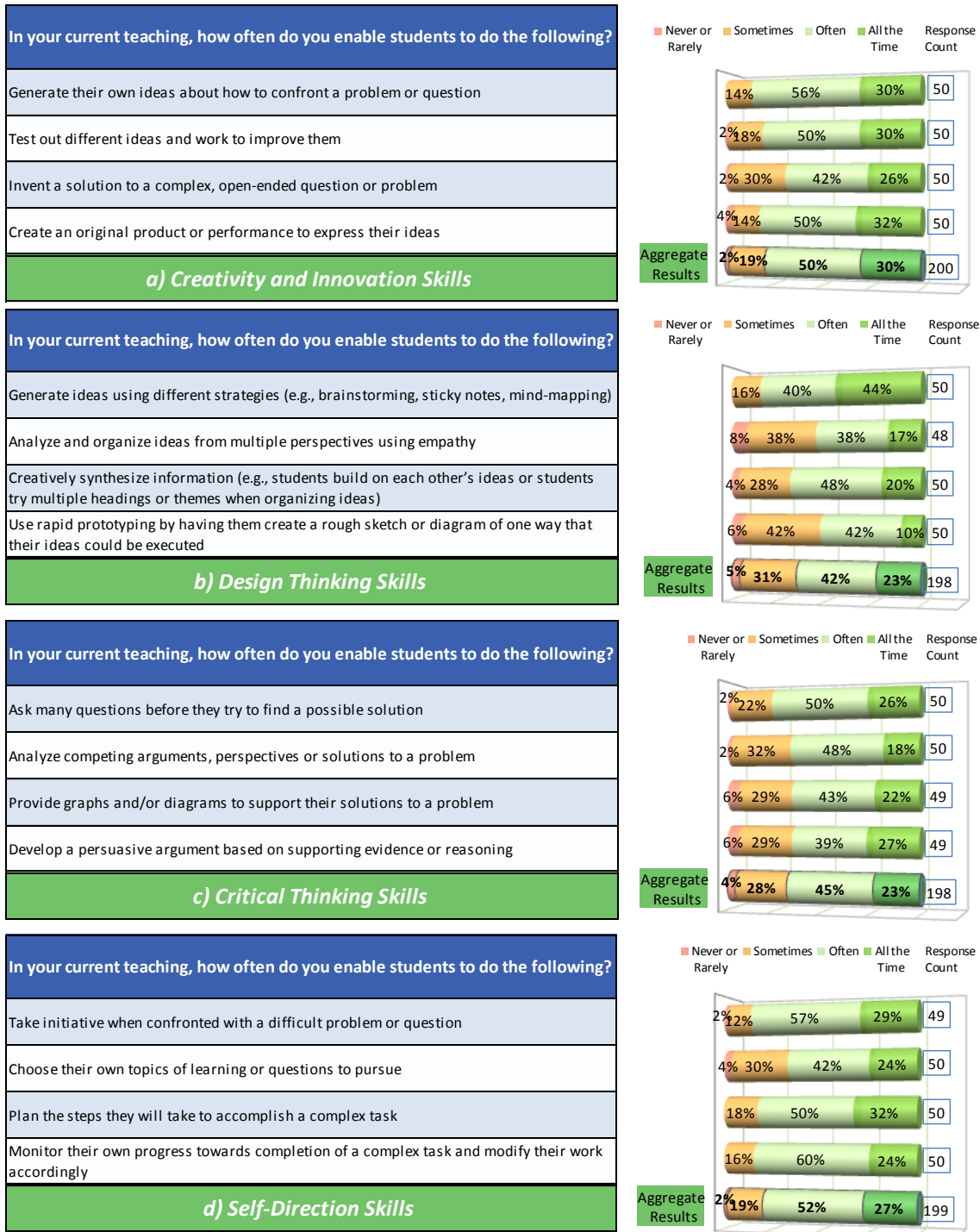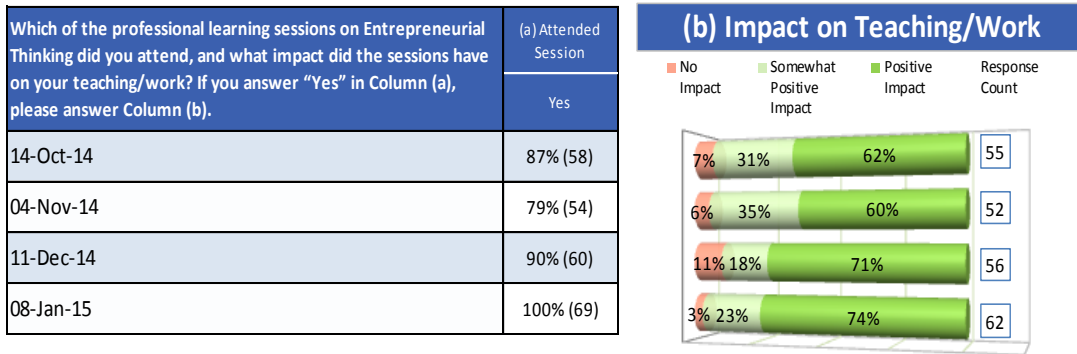
Part C: Professional Learning and Organizational Support

When asked to rate the impact of the various MaRS modules, virtually all participants said that the January 2015 session had some positive impact, followed very closely by the two Fall sessions. In general, as seen in Figure 14, all of the modules can be considered very successful with respect to their perceived impact on participant learning and knowledge.

Figure 14: Participant Feedback on Impact of Professional Learning Sessions

Which of the professional learning sessions on Entrepreneurial Thinking did you attend, and what impact did the sessions have on your teaching/work? If you answer "Yes" in Column (a), please answer Column (b).	(a) Attended Session Yes
14-Oct-14	87% (58)
04-Nov-14	79% (54)
11-Dec-14	90% (60)
08-Jan-15	100% (69)

(b) Impact on Teaching/Work

■ No Impact   ■ Somewhat Positive Impact   ■ Positive Impact   Response Count

	No Impact	Somewhat Positive Impact	Positive Impact	Response Count
	7%	31%	62%	55
	6%	35%	60%	52
	11%	18%	71%	56
	3%	23%	74%	62

With regards to the degree of participant knowledge around ET before attending the MaRS modules, nearly three quarters (74%) indicated that they had never had exposure to ET before these modules, with only 1% having been exposed during initial teacher training (see Table 2). Likewise, only 3% had taken entrepreneurship courses in tertiary education, and 6% through self-study. Nineteen per cent (19%) said they learned of entrepreneurship studies from some other means. Twenty-three per cent (23%) of participants elaborated on their choices in the comments section. Approximately five participants said they had been entrepreneurs in the past, another eight referenced summer programs at MaRS or the University of Toronto Rotman School of Management, and one participant mentioned an Engineering degree that had served as an introduction to ET. Overall, the survey results suggest that partnership programs such as this one between the TDSB and MaRS fills a professional learning void, and can help teachers and administrators develop their skills and knowledge in the very important area of ET.

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Table 2: Participants' First Exposure to ET

Were these modules your first exposure to *Entrepreneurial Thinking*?	Unchecked	Checked
Yes	26% (18)	74% (51)
No, I learned about E-Thinking during my initial teacher training	99% (68)	1% (1)
No, I took a workshop or course on E-Thinking in university or college	97% (67)	3% (2)
No, I learned about E-Thinking through self-study (e.g., Internet)	94% (65)	6% (4)
Other (please specify):	81% (56)	19% (13)

Part C: Application and Usefulness of ET Tools/Concepts/Practices

The last portion of Part C of the survey asked whether teachers had used any of the ET tools/concepts/practices introduced in the modules in their practice. As seen in Figure 15, the most frequently used tools by the teachers included the following, in descending order: Pivoting (used by 88% of teachers), Personal Branding (74%), Customer Discovery (74%), Rapid Prototyping (68%), inviting entrepreneurs to class (62%), Crafting a Compelling Argument/pitch (61%), using an Idea Canvas (57%), SWOT Diagram (42%) and lastly, taking a field trip to a business or social/community enterprise (40%).

In terms of usefulness, Pivoting was ranked highest (92% 'useful' or 'very useful'), with all participants finding it useful to some degree. Idea Canvas, Rapid Prototyping, Crafting a Compelling Argument/Pitch, and Strengths, Weaknesses, Opportunities and Threats (SWOT) Diagram all followed, with 89% of those surveyed ranking these tools as 'useful' or 'very useful.' Eighty one percent (81%) of the participants found Customer Discovery 'useful' or 'very useful' followed by taking a field trip (80%), Personal Branding (80%), Creative Slide Deck (80%), inviting an entrepreneur to class (74%), Social Return on Investment (SROI) (68%) and Entrepreneurial Ecosystem (61%).

With respect to considerable differences on the use of ET tools/concepts/practices, the two participant groups differed in their answers regarding the use of taking field trips and Entrepreneurial Ecosystems. For instance, while 71% of administrators said they were aware of the notion of taking a field trip to a business or social/community enterprise as an ET Tool, only 40% of teachers indicated that they had enacted this practice. Likewise, 43% of administrators said they were aware of Entrepreneurial

Ecosystems, while only 10% of teachers indicated they actually used this tool. On this same item, 93% of administrators found the tool itself 'somewhat' to 'very useful', as did 84% of the teachers who employed it.

Generally, all the ET tools/concepts/practices were deemed to be useful by participants. Of all the participants in both groups, only a very few teachers chose the 'not useful' rank for each tool, with the exception of Rapid Prototyping which received no responses in this rank. Of the administrators surveyed, only the item 'inviting an entrepreneur to class' received a 'not useful' score, with 6% of participants in this group making this judgment.

Figure 15: Breakdown of Teacher Responses on the Question of Application and Perceived Usefulness of ET Tools/Concepts/Strategies

Have you applied any of the following entrepreneurship tools/concepts/practices in your classes, and how useful did you find them?	Tools/ Concepts/ Practices	
	(a) Used	
	Yes	No
Inviting entrepreneurs or representatives from social/community enterprises to take part in classroom learning activities	62% (31)	38% (19)
Taking a field trip to a business enterprise and/or to a social/community enterprise	40% (19)	60% (29)
Pivoting (focusing on the most valuable elements of an idea through a process of hypothesizing, researching, and modification)	88% (44)	12% (6)
Customer discovery (a process by which entrepreneurs come to understand people's reaction to their ideas)	74% (37)	26% (13)
Idea canvas (a diagram used to visualize the strategy needed to execute an idea)	57% (28)	43% (21)
Rapid prototyping (a process of giving an idea a physical form so that it can be tested and improved)	68% (34)	32% (16)
Crafting a compelling argument/pitch (a creative argument that encourages a particular audience to do something)	61% (30)	39% (19)
Social Return on Investment (SROI) (a measurement of the social value generated by a project or organization)	27% (13)	73% (36)
Personal Branding (a concise and highly creative way of expressing an identity)	74% (37)	26% (13)
Strengths, Weaknesses, Opportunities and Threats (SWOT) Diagram	42% (20)	58% (28)
Creative Slide Deck to support your points and increase audience engagement	31% (15)	69% (33)
Entrepreneurial Ecosystems (networks of programs and organizations that supports entrepreneurs)	10% (5)	90% (43)
Practices of Entrepreneurship Education		

(b) Usefulness
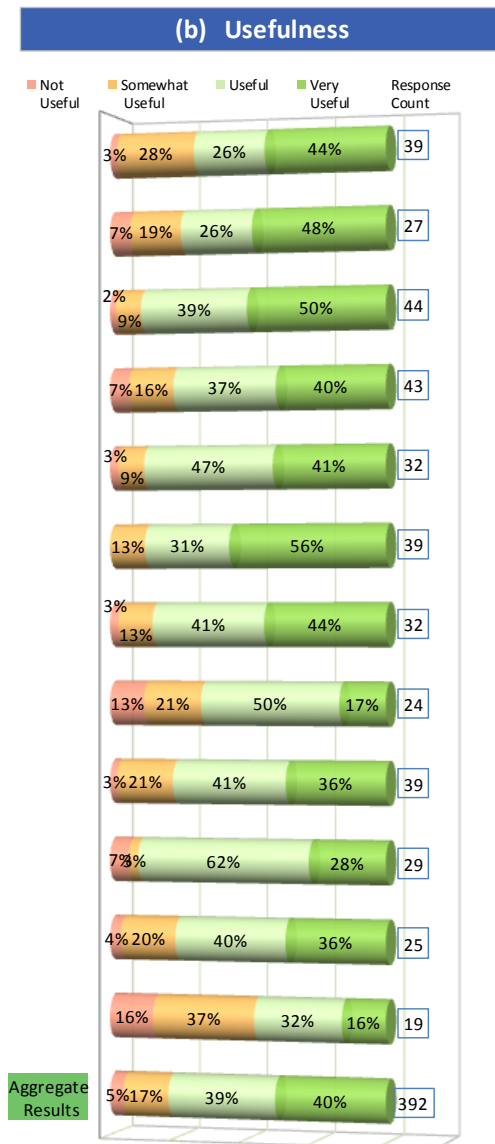
Part C: Quality of the PL Sessions

Overall, the majority (86%) of the participants found the quality of the PL session 'Good' or 'Excellent' (see Figure 16). With respect to scores on the modules themselves, there were no significant differences on ratings, although slightly more administrators rated them as 'Excellent' or 'Good' (56% and 44%, respectively) than did teachers (39% and 43%, respectively). Also, no administrator participant rated the modules 'poor' or even 'fair,' whereas 2% and 16% of teachers did, respectively. Also, the vast majority of

participants from both groups (90%) indicated that they would like ET education to continue at their school (see Figure 16).

Figure 16: Quality of PL Session and Willingness to Continue Entrepreneurship Education
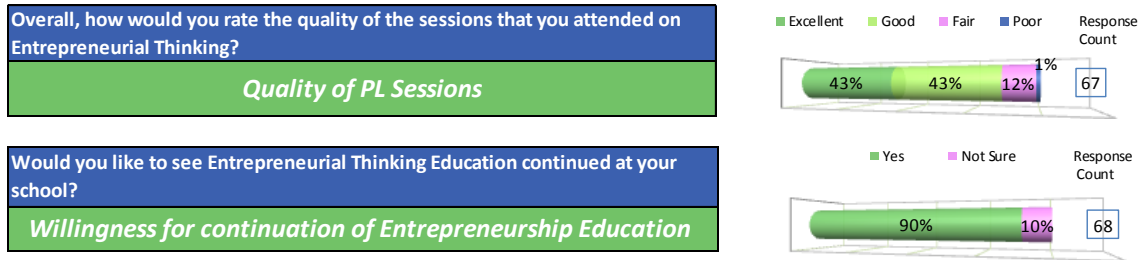

Figure 17 depicts the remaining results for this section of the survey, which shows that both modules were rated highly by both groups on relevant content, knowledgeable presenters, appropriate teaching materials, new information and perceived ability to apply their learnings to their practice/work.

Figure 17: Breakdown of Participant Response on Quality of the ET Modules
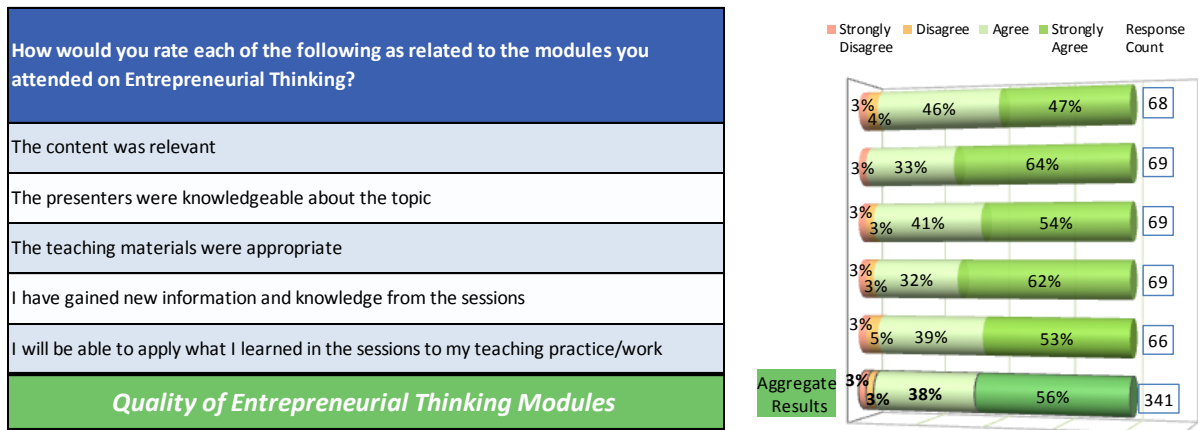
As the results show, all of the participants agreed that the professional learning sessions emphasized entrepreneurial education and ET (see Table 3). Furthermore, 93% of participants agreed that the module materials were relevant, and 96% indicated that the modules helped facilitate their understanding of ET strategies. The highest discrepancy in this section of the survey was in the question asking participants whether they agreed that the program emphasized engagement with school community and stakeholders, with 15% choosing to disagree.

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Table 3: Content of the PL Sessions

Did the sessions you attend on Entrepreneurial Thinking	Yes	No
Emphasize Entrepreneurship Education and *Entrepreneurial Thinking* ?	100% (68)	0% (0)
Provide adequate Entrepreneurial toolkits?	96% (64)	4% (3)
Facilitate your understanding of strategies used for *Entrepreneurial Thinking* ?	96% (64)	4% (3)
Emphasize working with the school community and stakeholders?	85% (56)	15% (10)

Of all the survey questions where participants had the option to make comments, the question of the quality of the PL sessions was the most popular, with 67% of participants choosing to add their thoughts. Just under one third of those who filled out the comments section made remarks related to the continued relationship between either representatives from MaRS or from entrepreneurs in the community, as evident in these sample comments: "*We would benefit from having a consistent relationship with a dependable entrepreneur*" or "*Experts from MaRS, with respect to E-Thinking, coming to planning sessions at our schools to assist cross curricular collaboration*". The quantitative results previously reported, coupled with these comments, show that strengthening the MaRS partnership and/or creating branch off community connections could support the growth of ET in TDSB schools.

In addition to these comments, just under one quarter of participants (24%) wrote that they would like to see more professional learning going on in their school, with either more time to collaborate with department colleagues (e.g., *"Opportunity to continue to meet and share lessons and approaches and outcomes*"), more release time for workshops (e.g., "*Workshops for teachers- department. Seminars/lectures/online resources for teachers")*, and/or initiation of efforts to conduct whole-school professional around ET ("*Maybe a presentation in the school to all staff!").* So, in response to such requests, one consideration for the evolution of the program could be offering on-site school workshops led by, for instance, teachers, administrators, and/or even students who were involved in the core curriculum development group in the summer. Another option is to have others that have become experienced with ET strategies lead such professional learning workshops to help meet the demand.

Furthermore such workshops could include targeted instruction, which about 20% of participants indicated that they would like. For instance, one participant suggested that, *"The tools for teaching are excellent. We need to focus on these tools to give examples of how they can be integrated into different subject area"*. Another commented that *"More one on one support to help generate and create lessons for the classroom."* These comments appear to be logical extensions of the module content, which begin with introducing teachers to ET tools without an explicit disciplinary context. More subject-specific exploration could also be incorporated into possibly teacher-led ET workshops, such as those previously suggested.

Finally, there was a handful of participants (9%) who made general comments in praise of the program in this section of the survey. For instance, one participant wrote that they appreciated the research-based PL: "*Really good. Your content was really current and on point. Thank you for being to the point, organized and for bringing knowledge and research. So many PD sessions are about the teachers brainstorming, but getting current expert content was more valuable*". Another listed the elements that they liked best: "*Great speakers about E-thinking. Effective use of PowerPoint. SWOT development".* Other comments provided critical feedback, such as the following examples: "*Having an overview/sense of exactly where the project is headed from the beginning would have helped*". However, rather than critiquing module content or delivery, this comment seems to speak to lack of clarity on the expectations placed on the participants going into the project. It could be beneficial, therefore, to ensure that administrators who are recruiting participants make expectations and commitments clear for their particular contexts from the outset. The remaining comments (9%) were explicit appeals for more technical support, like this one: "*Technology support [i.e., how to use Twitter to communicate with parents/guardians*]). These appeals strengthen the recommendation previously made to focus on the area of digital support in the program modules for future iterations.

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Overall, these comments offered in this section of the survey indicate directions for possible extensions of the ET program: More time for professional learning and peer collaboration; subject-specific workshops with a focus on technical support; and stronger and more consistent community-school partnerships.

Part C: Organizational Support and Opportunities for Professional Learning

The survey also asked participants to rate their feelings on the level of organizational support within their own schools as shown in Figure 18. Of all participants, 78% agreed that they felt teachers had sufficient time within their schools to plan and prepare ET teaching and activities, while 16% 'disagreed', and 6% 'strongly disagreed'. When asked whether they thought teachers were open to changing their practice, administrators and teachers differed only marginally in their responses, with just under half of participants in each group disagreeing with the idea that teachers in their schools were 'open to changes in teaching' (47% and 45%, respectively). The proportion of participants who chose to either 'disagree' or 'strongly disagree' with the next three items were as follows: 'The teachers in my school really work as an innovative team' (34%); 'Our school creates opportunities for partnerships beyond school' (20%); 'Our school leaders and teachers provide high quality professional learning needed to foster entrepreneurial teaching and learning in my school' (24%); and 'Our school/district leaders are willing to listen attentively to teachers' thoughts' (13%). Overall, most participants appeared to feel properly supported in their school and also feel as if they worked in knowledge-creating teams with others. While the bulk of results here are positive, there are some findings that merit some further exploration, namely, the perception that teachers were not perceived to be open to change (which received the greatest proportion of negative responses in this section of the survey), and the potential challenges that these beliefs posed to spread and promote capacity building for ET.

Figure 18: Organizational Support and Opportunities for Professional Learning

How would you rate each of the following as related to the organizational support you receive in your school environment?
Our school provides enough time for teachers to plan and implement Entrepreneurial teaching activities
Most teachers in our school are open to changes in teaching
The teachers in my school really work as an innovative team
Our school creates opportunities for partnerships beyond school   (e.g., involvement with business, sports, and arts communities)
Our school leaders and teachers provide high quality professional learning needed to foster Entrepreneurship teaching and learning in my school
Our school/district leaders are willing to listen attentively to teachers` thoughts
Support received by School Environment

Legend: Strongly Disagree | Disagree | Agree | Strongly Agree | Response Count

	Strongly Disagree	Disagree	Agree	Strongly Agree	Response Count
	6%	16%	55%	23%	64
	8%	37%	50%	5%	62
	3%	31%	52%	13%	61
	3%	17%	52%	28%	65
	3%	21%	54%	22%	63
		13%	56%	31%	64
Aggregate Results	4%	22%	53%	21%	379

Participants were also keen to comment on this section of the survey, with 65% of the total group remarking on the question of continuing entrepreneurial education in their schools. Comments fell into four general categories: 1) statements of approval or acclaim for the program in general, 2) specific plans on behalf of participants for continuing Entrepreneurial Education in their contexts, 3) connections made between the program and ongoing initiatives; and 4) critical feedback about the program, including recommendations for future implementations. The majority of remarks in this section were statements of approval for the program (44%). Participants who issued praise commented on its general benefits, as in the following example: "*Wave of the future for many of our students will engage in entrepreneurial thinking and doing*". They also pinpointed some more specific areas where they thought entrepreneurial education made a positive impact: *"Increases Engagement and Success and well-being (inter/intra personal skills)".* The number of positive comments affirms the beneficial impact of the program for participants, and supports the notion that participants perceived entrepreneurial education as effective, relevant and an exciting new opportunity for teachers, administrators and students alike.

As for the next category of comments, just over quarter of comments (26%) included brief descriptions of hoped-for next steps to scale up entrepreneurial education in their own contexts, such as in the following examples:

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- ➢ "I would like to see it embedded into all areas of the curriculum and in areas like EcoSchool initiatives".
- ➢ "Yes and also expanded to other schools within our family of schools in order to support an "Entrepreneurial thinking" continuum/path from grade 7 to high school".
- ➢ "Teacher professional development to spread the concept".

As indicated by these comments, scaling up entrepreneurial education through professional learning activities that can be open to more than a handful of teachers or administrators per school is what is needed to sustain the work in a meaningful way and appears to be much sought after.

A few participants (7%) also identified that entrepreneurial education can be easily integrated within existing practices, identifying the inquiry-based focus of the TDSB as the point of connection:

- ➢ "Easy to integrate because it syncs so well with TDSB inquiry process".
- ➢ "Good fit with our inquiry-based learning approach".

On the other hand, other participants (16%) identified professional or practical limitations that they felt needed to be addressed, such as in the examples below:

- ➢ "In all subjects, ideas can be sold. We teachers might know our students well enough, but did not necessarily learn how to sell. An art teacher for example, learned how to paint, but not how to run a gallery. We need more help/lessons to make us comfortable enough to teach it".
- ➢ "This Program needs to build sustainability in the current schools by next focusing on building consistency of other staff through the current staff involved in this project and/or new schools added who are paired with current schools".

The remaining 5% of participants who commented expressed frustration related to participant requirements and program expectations. For instance, one commenter stated that, *"If we simply were taught/given the tools and asked to use 1 to some of them, I would have loved it. The heavy hand of forcing a project was both confusing and off-putting."* The other commenter was more concerned over the time-commitment: *"I'm all for it, but 4 days in one semester is too much to ask!"*

Overall, participant comments supported the quantitative survey results that showed

overwhelming approval and support for the ET program. In addition to the praise, the critical commentary that was provided helps to pinpoint those areas that require further attention. Mainly, concern was not over the conceptual content of the modules, or the program structure itself, but rather on ways to continue and spread the learning that took place as a result of participation in the program. Based on the success of the program, this need is not surprising. However, addressing this need is something that demands more resources and development, and implicates the school board as a whole. To support scaling up entrepreneurial education in the TDSB, areas and mechanisms in existing professional learning networks need to be identified and leveraged to this end.

DISCUSSIONS

Overall, the ET modules were very well-received by participants, and were overwhelmingly perceived as being informative, of high quality, useful to participants' daily practice, and able to help deepen participant knowledge and skills around ET. Results from the survey also suggest that partnership programs, such as this one between the TDSB and MaRS, fills a professional learning void, and can help teachers and administrators develop their skills and knowledge in the area of ET.

Most of the participants shared similar perceptions about entrepreneurial education, with virtually all teachers and administrators indicating that they perceived it as encompassing a wide range of competencies and skills. The vast majority of participants also believed that entrepreneurship and education ought to be integrated in a wide range of subjects, with administrators more prone to see ET relevant to subjects beyond Science, Technology, Engineering and Math (STEM).

Participants saw themselves as knowledgeable about the majority of ET strategies introduced to them through the MaRS modules. Moreover, participants also felt high levels of self-efficacy with regards to teaching ET, as nearly two-thirds of educators indicated that they felt students had learned important entrepreneurial skills in their classroom. As noted, research has shown that increased levels of teacher self-efficacy in teaching entrepreneurship skills can also have a positive effect on student achievement.

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As the ET program continues, changes in both teacher and student perceptions of self-efficacy could be tracked and assessed in order to determine whether similar relationships emerge in this context. Another finding of interest related to this portion of the survey is the relatively high proportion of teachers who indicated some level of uncertainty with regards to assessment. Acknowledging the importance of robust and effective methods of assessment to capacity building, this could become an area of focus for improving the ET program.

When looking at the relationships between teachers' attitudes on entrepreneurial education and their assessment of their own teaching on ET, a general trend seemed to emerge. More specifically, those teachers who believed that ET should be a part of most curriculum subjects throughout Grades 7-12 also identified that they frequently encouraged their students to engage with a variety of ET skills and competencies either 'often' or 'all the time' in their classrooms. This suggests that those teachers who perceived ET to encompass a broader set of competencies and skills beyond those just relevant to business also tended to connect ET strategies to their own classroom practice to a greater extent than those who do not. What is not known is whether teachers held these perceptions before the module took place, and to what extent teachers were already engaging with some of the ET practices (e.g., 'enabling students to generate their own ideas about how to confront a problem or question') before their participation in the project. Therefore, it is difficult to tell to what extent their practice shaped their perception of entrepreneurial education or vice versa.

This problem points towards a larger limitation of this study, which is the lack of comparison data against which to evaluate the participants' post-module responses. With no pre-test survey, it is impossible to distinguish the extent to which participants' attitudes, perceptions, and practices around ET changed as a result of engagement with the ET program. Future evaluations will include a participant survey taken at the onset of the modules so that this type of assessments can be made.

Generally, all the ET tools/concepts/practices were deemed to be useful by participants, with Rapid Prototyping and Pivoting topping the list. Using Entrepreneurial Ecosystems and taking a field trip to a business or social/community enterprise were seen as more useful by administrators than teachers. We know that teachers tended not to use Entrepreneurial Ecosystems much in their practice, and so it is logical that their perceived utility would also be low. It would benefit the program that steps be taken to determine why this was so. In the case of taking a field trip, while the usefulness of this item was judged lower than others, in the survey comment fields teachers repeatedly requested more opportunities to connect with entrepreneurs and community leaders. Thus, mechanisms that would allow such connections to be made most effectively ought to be explored further between all stakeholders in the project.

The last item to note here is in regards to the section of the survey about Professional Learning and Organizational Support. In this portion of the survey, the majority of responses were positive. However, one item - namely, the perception that teachers are not perceived to be open to change, merits further exploration, given the potential challenges that this belief may pose to promote the spread and capacity building for ET. As indicated by participant comments, there was clear demand for more sustained collaboration with colleagues and subject-specific workshops. Getting feedback from teachers about which tools or concepts they found to be most useful for engaging students in their particular domain and grade level could provide valuable information on teacher practice and could feed into professional learning aspects of the program. Finally, as previously noted, there was great interest in developing more consistent relationships between schools and MaRS representatives or "expert entrepreneurs." An important consideration for the stakeholders in the project to discuss, therefore, would be the extent to which the TDSB-MaRS partnership can play a role in building up and sustaining the architecture of support needed to help promote the spread and capacity building for ET throughout the school board.

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POLICY IMPLICATIONS AND RECOMMENDATIONS

The growing prominence of entrepreneurship in 21st Century learning frameworks suggest that the benefits of entrepreneurial education for engaging students in critical competencies, such as the ability to collaborate, problem-solve, take risks, and innovate, are being increasingly recognized. As with any effort to make transformative change, there are many challenges to integrating entrepreneurial education successfully into pedagogical practice. As the OECD (2014) identifies:

> Lack of time, learning materials and financial resources; teachers and parents' fear of "commercialism"; rigid institutional frameworks; and difficulties in assessing learning outcomes of entrepreneurial education are some of the challenges practitioners have encountered when trying to infuse entrepreneurship into education. (para. 1)

Furthermore, the results of the EY G20 Entrepreneurship Barometer (2013) saw Canada score below the average among the G20 countries in the category of entrepreneurial education, with the author stating that, "too few education and training-related efforts focus specifically on the needs of entrepreneurs" (EY, 2013, p. 9). Acknowledging both of these very real challenges, and the relative lack of entrepreneurship opportunities for Canadian students up to recent years, the success of the Entrepreneurial Thinking and Youth Entrepreneurship program marks a significant achievement on behalf of the TDSB and MaRS. The integration of the professional learning modules and the co-development of ET curriculum resources with students, teachers, and MaRS representatives helped to make the program robust, accessible, and engaging. Policy makers should take notice of the "bottom-up" demand coming from practitioners in the field and help to facilitate existing and new opportunities for continued professional learning and increased integration of entrepreneurial education within Ontario schools.

The benefits of entrepreneurial education may not only impact student learning with regards to 21st Century learning skills, but can also help to facilitate the transition from school to the workplace. Indeed, students today will be entering a workplace that is and will continue to be characterized by complexity and unpredictability, competition, global

interconnectivity, and new technologies. Similarly, career education and workplace training for students is also undergoing rapid change (Connelly et al., 2013). In Canada, "approximately 35% of … students may immediately enter the workforce after leaving public education" (Connelly et al., 2013, p. 13). Supporting entrepreneurial education in schools could potentially directly benefit this large segment of Canadian students. Fostering youth entrepreneurship can also be beneficial to those students who are disengaged and dropping out of school, or to youth who remain unemployed or underemployed, issues that are prevalent on a global scale (WEF, 2009).

OECD data shows that community connections have been shown to be a marker of successful school-to-work transitions. As noted in *The Report on the Partnership Summit 2014* by the Learning Partnership, effectively all countries that are strong in this area have found ways to create strong partnerships between schools and community organizations and employers, and to support educational opportunities that leverage these linkages (The Learning Partnership, 2014). This same report includes the recommendation that this is one area where "Canada can learn something from the European countries doing well [in] that [area]" (The Learning Partnership, 2014, p. 15).

The partnership between the TDSB and MaRS has demonstrated itself to be a very valuable connection that holds a great deal of promise for scaling up entrepreneurial education in schools and for helping students achieve success both in the classroom and as they transition out into the workplace. As indicated by the survey results and commentary, many program participants want to be able to engage in a sustained relationship with representatives from MaRS or other community leaders, with more opportunities to connect and communicate. Policy makers could review the literature and data about the impacts on student success that strong school-community partnerships can have, and support opportunities to strengthen these connections where they can make the most difference in a provincial context. The Entrepreneurial Thinking and Youth Entrepreneurship program offers opportunities for these kinds of connections in an effective, desirable, and pedagogically powerful context.

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Effective entrepreneurial education can be beneficial to both students and to society at large. Numerous recent studies show that entrepreneurship is a critical element driving economic and social progress (Cotis, 2007; Naudé, 2013; Independent Evaluation Group [IEG World Bank], 2013). In Canada, recent data shows that in regards to the contemporary workplace, there is a significant lack of workers with 21st Century competencies needed for many jobs that are in demand (see Connelly et al., 2013). For instance, a 2012 CIBC report found that nearly 30% of Canadian employers are confronted with a workplace deficit (Tal, 2012, p. 1), especially those in STEM fields, which also represents the high growth employment sectors. At the same time, many young Canadians are either without jobs or underemployed. Currently, the youth unemployment rate is sitting at approximately 14.5%, which is twice the normative unemployment rate and growing (CBC News, 2013). Policies that help to strengthen, support, and engender opportunities for entrepreneurial education, which include school-community connections and facilitate classroom to work transitions, can help to address these challenges and support students in achieving success in the Canadian workplace.

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tdsb
Toronto District School Board

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Entrepreneurial Thinking and Youth Entrepreneurial Learning Educator/Administrator Survey

Winter 2015

Dear Educator/Administrator:

This survey is being conducted by the Toronto District School Board's (TDSB) Academic, Research and Information Services department. The goal of the survey is to collect teachers' and administrators' perceptions and practices relating to *Entrepreneurial Thinking and Youth Entrepreneurship Learning* and to identify the effectiveness of Professional Learning. The findings from the survey will be used for effective Board Improvement Planning towards the *TDSB's Years of Action 2013-2017.*

Completion of the survey should take approximately **25 minutes**.

> **Please note: Educators are asked to complete all four Parts of the survey, while Administrators (Superintendents of Education, Principals, and Vice-Principals) are asked to complete all Parts except for Part B.**

Your participation in the survey is important and your identity and responses are anonymous and will be kept strictly confidential.

For coding purposes, you will be asked to create your own identification which will provide us with anonymous responses.

Please provide the first letters of your mother's first and last name and the two digits of your own birth month and day. For example, if your mother's name is **J**ane **B**rown, and you were born on September 12, then your participant identification for this study will be "**JB0912**".

Please use the same ID for future surveys on *Entrepreneurial Thinking*.

Please type your ID in the box

What is your school name?

Did you participate in the *Entrepreneurial Thinking and Youth Entrepreneurship Learning* professional learning sessions in 2014?

- □ Yes
- □ No
- □ Not sure

Thank you for your participation.

ALL respondents are asked to complete this section.

1. **What are the first words, phrases, or thoughts that come to mind when you think about**
    Entrepreneurial Thinking?

2. **For each of the following pairs of statements, <u>choose the one that you agree with more</u>. Please answer as honestly as possible.**

    ☐ *Entrepreneurial Thinking* is about the process of starting a business

    ☐ *Entrepreneurial Thinking* consists of competencies that involve a wide range of entrepreneurial attitudes, knowledge and skills

    ☐ Entrepreneurship and education are two different things, and should remain so

    ☐ It is important and essential that entrepreneurship and education go together

    ☐ Everyone can be an *Entrepreneurial Thinker*

    ☐ *Entrepreneurial Thinking* is a characteristic of eminent people only (such as Bill Gates and Steve Jobs)

3. Please rate how much you agree or disagree with the following statements about *Entrepreneurial Thinking*.

	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
Entrepreneurial Thinking should be required for all students in Grades 9-12	O	O	O	O
Entrepreneurial Thinking should be integrated only in Business Studies for students in Grades 9-12	O	O	O	O
Entrepreneurial Thinking should be integrated in most subjects in Grades 7-12	O	O	O	O

4. Please tell us the school subject or subjects in which you consider it likely to integrate *Entrepreneurial Thinking* (Check all that apply).

☐ The Arts   ☐ Mathematics

☐ Computer Studies   ☐ Music

☐ Environmental Studies   ☐ Physical Education/Health

☐ Foreign Languages   ☐ Science

☐ Geography   ☐ Social Sciences

☐ History   ☐ Technological Education

☐ Language Arts   ☐ Other (please specify): [   ]

5. Please rate your level of knowledge in the following areas:

	No Knowledge 1	2	3	Highly Knowledgeable 4
Developing *Entrepreneurial Thinking* lesson plans	O	O	O	O
Helping students to structure brainstorms using Design Thinking	O	O	O	O
Enabling students to assess their ideas using a Strengths, Weaknesses, Opportunities and Threats (SWOT) Diagram	O	O	O	O
Teaching students to understand the value of their work by measuring Social Return on Investment (SROI)	O	O	O	O
Helping students to conduct better research by learning to Pivot	O	O	O	O
Teaching students to refine their ideas using an Idea Canvas	O	O	O	O
Helping students to address research bias through Customer Discovery	O	O	O	O

Enabling students to test their hypotheses through Rapid Prototyping	○	○	○	○
Helping students to refine their arguments by Crafting Pitches	○	○	○	○
Facilitating students to form complementary groups by communicating their Personal Brand	○	○	○	○
Helping students to engage their audience with a Creative Slide Deck	○	○	○	○
Helping students to identify career paths by exploring Entrepreneurial Ecosystems	○	○	○	○
Using digital learning strategies in teaching *Entrepreneurial Thinking*	○	○	○	○
Using inquiry-based strategies in teaching *Entrepreneurial Thinking*	○	○	○	○
Using problem-based strategies in teaching *Entrepreneurial Thinking*	○	○	○	○
Preparing entrepreneurship-related exercises, presentations, and essays	○	○	○	○
Using financial literacy in your assignments (e.g., how to read and interpret financial statements, how to estimate a budget, how to control costs for projects)	○	○	○	○

6. **To what extent do you agree with the following statements about your current teaching?**

	Not Really 1	To a Minor Extent 2	To a Moderate Extent 3	To a Great Extent 4
I have tried to <u>develop</u> students' entrepreneurial thinking skills	○	○	○	○
Most students have <u>learned</u> entrepreneurial thinking skills while in my class	○	○	○	○
I have been able to effectively <u>assess</u> students' entrepreneurial thinking skills	○	○	○	○

Please indicate any comments in this space.

PART B: TEACHING ENTREPRENEURIAL THINKING SKILLS – PRACTICES

If you are a Superintendent of Education or a School Administrator, please SKIP this section and go to PART C.

In your current teaching, how often do you enable students to do the following?	Never or Rarely 1	Sometimes 2	Often 3	All the Time 4
Generate their own ideas about how to confront a problem or question	○	○	○	○
Test out different ideas and work to improve them	○	○	○	○
Invent a solution to a complex, open-ended question or problem	○	○	○	○
Create an original product or performance to express their ideas	○	○	○	○
Generate ideas using different strategies (e.g., brainstorming, sticky notes, mind-mapping)	○	○	○	○
Analyze and organize ideas from multiple perspectives using empathy	○	○	○	○
Creatively synthesize information (e.g., students build on each other's ideas or students try multiple headings or themes when organizing ideas)	○	○	○	○
Use rapid prototyping by having them create a rough sketch or diagram of one way that their ideas could be executed	○	○	○	○
Ask many questions before they try to find a possible solution	○	○	○	○
Analyze competing arguments, perspectives or solutions to a problem	○	○	○	○
Provide graphs and/or diagrams to support their solutions to a problem	○	○	○	○
Develop a persuasive argument based on supporting evidence or reasoning	○	○	○	○
Take initiative when confronted with a difficult problem or question	○	○	○	○
Choose their own topics of learning or questions to pursue	○	○	○	○
Plan the steps they will take to accomplish a complex task	○	○	○	○
Monitor their own progress towards completion of a complex task and modify their work accordingly	○	○	○	○
Learn from different cases of problems	○	○	○	○
Follow through on a solution until the end	○	○	○	○
Develop different iterations of a solution to a challenge/problem	○	○	○	○
Accept failure as part of the learning process	○	○	○	○
Assign students to groups which contain members who have a wide range of skills and interests	○	○	○	○
Create joint products using contributions from each student	○	○	○	○
Work as a team to incorporate feedback on group tasks or products	○	○	○	○
Give feedback to peers or assess other students' work	○	○	○	○

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In your current teaching, how often do you enable students to do the following?	Never or Rarely 1	Sometimes 2	Often 3	All the Time 4
Convey their ideas using media other than a written paper (e.g., posters, video, blogs, etc.)	O	O	O	O
Prepare and deliver an oral presentation to the teacher or others	O	O	O	O
Engage in activities where they learn to communicate in a language that the target audience will understand	O	O	O	O
Understand the responsible use of social technology (e.g., use social media to gather market data or draft a value proposition that explains to the target audience the value of a product)	O	O	O	O

Please indicate any comments in this space.

PART C: PROFESSIONAL LEARNING AND ORGANIZATIONAL SUPPORT

ALL respondents are asked to complete this section.

1. **Which of the professional learning sessions on *Entrepreneurial Thinking* did you attend, and what impact did the sessions have on your teaching/work? If you answer "Yes" in Column (a), please answer Column (b).**

Professional Learning Sessions	(a) Attended Session		(b) Impact of this Session on my Teaching/ Work		
	Yes	No	No Impact	Somewhat Positive Impact	Positive Impact
October 14, 2014	◯	◯	◯	◯	◯
November 4, 2014	◯	◯	◯	◯	◯
December 11, 2014	◯	◯	◯	◯	◯
January 8, 2015	◯	◯	◯	◯	◯
Other Sessions (*please specify*):	◯	◯	◯	◯	◯

2. **Were these modules your first exposure to *Entrepreneurial Thinking*? *(Check all that apply)***

☐ Yes

☐ No, I learned about E-Thinking during my initial teacher training

☐ No, I took a workshop or course on E-Thinking in university or college

☐ No, I learned about E-Thinking through self-study (e.g., Internet)

☐ Other (please specify): _____

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3. Have you applied any of the following entrepreneurship tools/concepts/practices in your classes, and how useful did you find them?
      If you are a teacher, please answer both Columns (a) and (b).
      If you are a School Administrator or Superintendent of Education, tell us whether you are aware of the tools/concepts/practices in Column (a), and in Column (b) indicate how useful you think the tools/concepts/practices will be for teachers.

	Tools/ Concepts/ Practices					
	(a) Aware/Used		(b) Usefulness			
	Yes	No	Not Useful	Somewhat Useful	Useful	Very Useful
Inviting entrepreneurs or representatives from social/community enterprises to take part in classroom learning activities	○	○	○	○	○	○
Taking a field trip to a business enterprise and/or to a social/community enterprise	○	○	○	○	○	○
Pivoting (focusing on the most valuable elements of an idea through a process of hypothesizing, researching, and modification)	○	○	○	○	○	○
Customer discovery (a process by which entrepreneurs come to understand people's reaction to their ideas)	○	○	○	○	○	○
Idea canvas (a diagram used to visualize the strategy needed to execute an idea)	○	○	○	○	○	○
Rapid prototyping (a process of giving an idea a physical form so that it can be tested and improved)	○	○	○	○	○	○
Crafting a compelling argument/pitch (a creative argument that encourages a particular audience to do something)	○	○	○	○	○	○
Social Return on Investment (SROI) (a measurement of the social value generated by a project or organization)	○	○	○	○	○	○
Personal Branding (a concise and highly creative way of expressing an identity)	○	○	○	○	○	○
Strengths, Weaknesses, Opportunities and Threats (SWOT) Diagram	○	○	○	○	○	○
Creative Slide Deck to support your points and increase audience engagement	○	○	○	○	○	○
Entrepreneurial Ecosystems (networks of programs and organizations that supports entrepreneurs)	○	○	○	○	○	○

4. Overall, how would you rate the quality of the sessions that you attended on *Entrepreneurial Thinking*?

Excellent	Good	Fair	Poor
○	○	○	○

5. **What types of professional learning support in *Entrepreneurial Thinking* would you find helpful?**

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6. **How would you rate each of the following as related to the modules you attended on *Entrepreneurial Thinking*?**

	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
The content was relevant	○	○	○	○
The presenters were knowledgeable about the topic	○	○	○	○
The teaching materials were appropriate	○	○	○	○
I have gained new information and knowledge from the sessions	○	○	○	○
I will be able to apply what I learned in the sessions to my teaching practice/work	○	○	○	○

7. **Did the sessions you attend on *Entrepreneurial Thinking***

	Yes	No
Emphasize Entrepreneurship Education and *Entrepreneurial Thinking*?	○	○
Provide adequate Entrepreneurial toolkits?	○	○
Facilitate your understanding of strategies used for *Entrepreneurial Thinking*?	○	○
Emphasize working with the school community and stakeholders?	○	○

8. **Would you like to see *Entrepreneurial Thinking* Education continued at your school?**

Yes	No	Not Sure
○	○	○

Please explain:

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FOSTERING ENTREPRENEURIAL THINKING AND ENTREPRENEURSHIP LEARNING IN THE TORONTO DISTRICT SCHOOL BOARD: ASSESSING TEACHERS' AND ADMINISTRATORS' ATTITUDES, PERCEPTIONS, KNOWLEDGE, SKILLS AND PRACTICES AND STUDENTS' MINDSET AND SELF-EFFICACY

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9. How would you rate each of the following as related to the organizational support you receive in your school environment?

	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
Our school provides enough time for teachers to plan and implement Entrepreneurial teaching activities	O	O	O	O
Most teachers in our school are open to changes in teaching	O	O	O	O
The teachers in my school really work as an innovative team	O	O	O	O
Our school creates opportunities for partnerships beyond school (e.g., involvement with business, sports, and arts communities)	O	O	O	O
Our school leaders and teachers provide high quality professional learning needed to foster Entrepreneurship teaching and learning in my school	O	O	O	O
Our school/district leaders are willing to listen attentively to teachers` thoughts	O	O	O	O

Please indicate any comments in this space.

<u>ALL</u> respondents are asked to complete this section.

1. Please describe your role within the Board:

☐ Superintendent of Education **– Please answer questions 5 to 8**   ☐ Coach

☐ Principal **– Please answer questions 5 to 8 below**   ☐ Librarian

☐ Vice-Principal **– Please answer questions 5 to 8 below**   ☐ Instructional Leader

☐ Teacher   ☐ Other (please specify: _____)

2.   **Grade in which you teach:** *(Check all that apply).*

☐ Grade 7   ☐ Grade 9   ☐ Grade 11

☐ Grade 8   ☐ Grade 10   ☐ Grade 12

  ☐ None of the above

3. Concentration area in which you teach: *(Check all that apply).*

☐ Classroom Teacher   ☐ Mathematics

☐ The Arts   ☐ Music

☐ Business Studies   ☐ Physical Education/Health

☐ Foreign Languages   ☐ Science

☐ Gifted/Enrichment   ☐ Social Sciences

☐ Guidance   ☐ Special Education

☐ Language Arts   ☐ Technology

☐ Library or Media Services   ☐ Other (please specify: _____)

4. How many years in total have you been teaching?

☐ 1-2 years   ☐ 6-10 years

☐ 3-5 years   ☐ 11 or more years

5. What is the highest level of education you have completed?

☐ Bachelor's Degree   ☐ Certificate of Advanced Study

☐ Bachelor's Degree plus credits   ☐ Doctorate

☐ Master's Degree   ☐ Other (please specify: _____)

☐ Master's Degree plus credits

6. Select the gender identity that best fits you:

☐ Female

☐ Male

☐ Other

7. To which age group do you belong?

☐ 20-29   ☐ 50-59

☐ 30-39   ☐ 60+

☐ 40-49

8. If you are a Superintendent of Education or a School Administrator, how many years in total have you served in your position?

☐ 1-2 years   ☐ 6-10 years

☐ 3-5 years   ☐ 11 or more years

THANK YOU FOR YOUR PARTICIPATION!

Entrepreneurial Thinking Student Survey

Winter 2014

Dear Student,

The Toronto District School Board is involved in a project on entrepreneurial thinking for students, teachers, and schools to improve their lives, schools, and communities.

We need your help with a survey. Your answers will be kept confidential. No one, including your teachers or your principal, will read your answers. Your completed form will be sent to the school board's Research Department for analysis.

Take your time to answer each question completely and think about what is true for yourself.

This is <u>not</u> a test. There are no right or wrong answers. Please be honest with your answers

Thank you for your participation.

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Which school do you attend?

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[                                    ]
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Did you participate in the *Entrepreneurial Thinking and Youth Entrepreneurship Learning* program in your school?

○ Yes

○ No

○ Not sure

PART A. ENTREPRENEURIAL THINKING: YOUR VIEW

1. What are the first words, phrases, or thoughts that come to mind when you think about *Entrepreneurial Thinking*?

2. Please rate how much you agree or disagree with the following statements about yourself. Please mark one choice for each statement.

	Strongly disagree						Strongly agree
I am often the first one to suggest a solution to a problem	1	2	3	4	5	6	7
I keep trying until I find the solution to a problem	1	2	3	4	5	6	7
I see possibilities where others see problems	1	2	3	4	5	6	7
I am confident I will succeed in life	1	2	3	4	5	6	7
When I try, I generally succeed	1	2	3	4	5	6	7
I complete tasks successfully	1	2	3	4	5	6	7
Overall, I am satisfied with myself	1	2	3	4	5	6	7
I feel I can determine what happens in my life	1	2	3	4	5	6	7
I am capable of coping with most of my problems	1	2	3	4	5	6	7
I have a strong sense of vision to succeed that keeps me going	1	2	3	4	5	6	7
Once I have set out on the path to a solution, I follow it through until the end	1	2	3	4	5	6	7
I test out new ideas to solve common problems	1	2	3	4	5	6	7
I feel proud when I have designed something myself and made it	1	2	3	4	5	6	7
I ask many questions before I try to find a possible solution	1	2	3	4	5	6	7

FOSTERING ENTREPRENEURIAL THINKING AND ENTREPRENEURSHIP LEARNING IN THE TORONTO DISTRICT SCHOOL BOARD: ASSESSING TEACHERS' AND ADMINISTRATORS' ATTITUDES, PERCEPTIONS, KNOWLEDGE, SKILLS AND PRACTICES AND STUDENTS' MINDSET AND SELF-EFFICACY

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3. Please rate how much you agree or disagree with the following statements about <u>Entrepreneurial Thinking Education</u>. Please mark one choice for each statement.

In school I have been taught …	Strongly disagree						Strongly agree
How to think creatively	1	2	3	4	5	6	7
How to come up with ideas	1	2	3	4	5	6	7
How to translate ideas into action	1	2	3	4	5	6	7
How to create a business	1	2	3	4	5	6	7
How to evaluate a business idea	1	2	3	4	5	6	7
About the role of the entrepreneur in society	1	2	3	4	5	6	7
Generate ideas using different strategies (e.g., brainstorming, sticky notes, mind mapping)	1	2	3	4	5	6	7
How to take initiative when confronted with a difficult problem or question	1	2	3	4	5	6	7
How to listen helpfully for feedback	1	2	3	4	5	6	7
How to communicate ideas to other people	1	2	3	4	5	6	7
How to take leading roles in project-based work	1	2	3	4	5	6	7
To understand what customers think and need	1	2	3	4	5	6	7
How to do research on customers	1	2	3	4	5	6	7
To stick to a solution until the end	1	2	3	4	5	6	7
How to work together with other people	1	2	3	4	5	6	7
How to plan a project	1	2	3	4	5	6	7
How to set project goals	1	2	3	4	5	6	7

4. Please rate how much you agree or disagree with the following statements about <u>Entrepreneurial Thinking Education</u>. Please mark one choice for each statement.

I feel that …	Strongly disagree						Strongly agree
Teachers encourage me to participate in extra activities	1	2	3	4	5	6	7
Teachers listen to my ideas	1	2	3	4	5	6	7
Teachers say it is alright to make mistakes	1	2	3	4	5	6	7

5. Please rate how much you agree or disagree with the following statements about <u>Entrepreneurial Thinking Education</u>. Please mark one choice for each statement.

I understand …	Strongly disagree						Strongly agree
The role entrepreneurs that play in our society	1	2	3	4	5	6	7
That there are different reasons why people start businesses (making money, helping others, or doing something different)	1	2	3	4	5	6	7
That some business ideas work and others don't	1	2	3	4	5	6	7

6. Please rate how much you agree or disagree with the following statements about what you are good at. Please mark one choice for each statement.

I am able to …	Strongly disagree						Strongly agree
Deal with sudden changes and surprises	1	2	3	4	5	6	7
Structure tasks in a project	1	2	3	4	5	6	7
Set project goals	1	2	3	4	5	6	7
Work under stress and pressure	1	2	3	4	5	6	7
Estimate a budget for a new project	1	2	3	4	5	6	7
Come up with new and different solutions	1	2	3	4	5	6	7
Continue work despite problems	1	2	3	4	5	6	7
Control costs for projects	1	2	3	4	5	6	7
Find new ways of doing things	1	2	3	4	5	6	7
Work together with other people	1	2	3	4	5	6	7
Create a project plan	1	2	3	4	5	6	7
Form partnerships in order to achieve goals	1	2	3	4	5	6	7
Actively participate in team work	1	2	3	4	5	6	7
Network (i.e., make contact and exchange information with others)	1	2	3	4	5	6	7
Promote my own ideas and opinions when working in a group	1	2	3	4	5	6	7
Establish new contacts	1	2	3	4	5	6	7

FOSTERING ENTREPRENEURIAL THINKING AND ENTREPRENEURSHIP LEARNING IN THE TORONTO DISTRICT SCHOOL BOARD: ASSESSING TEACHERS' AND ADMINISTRATORS' ATTITUDES, PERCEPTIONS, KNOWLEDGE, SKILLS AND PRACTICES AND STUDENTS' MINDSET AND SELF-EFFICACY

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7. **Please rate how much you agree or disagree with the following statements about your plans for the future. Please mark one choice for each statement.**

I would like to have a job that allows me to …	Strongly disagree						Strongly agree
Solve problems in new ways	1	2	3	4	5	6	7
Work on my own ideas	1	2	3	4	5	6	7
Define my own tasks	1	2	3	4	5	6	7

8. **Please rate how strongly you agree or disagree with these statements about yourself**. **Please mark one choice for each statement.**

	Strongly disagree						Strongly agree
I often think of starting a business	1	2	3	4	5	6	7
I have business ideas I am going to implement	1	2	3	4	5	6	7
My goal is to become entrepreneur	1	2	3	4	5	6	7
I would like to design or create something new, such as music, software, dance, TV or fashion	1	2	3	4	5	6	7
I would like to do something no one has ever thought of before that would bring about positive changes to society or the environment	1	2	3	4	5	6	7
When I leave school/college, I intend to look for opportunities to make a lot of money	1	2	3	4	5	6	7
I would like to invent something that is new to the world	1	2	3	4	5	6	7

PART B. A LITTLE MORE ABOUT YOU

1. Have you been in charge of an activity or a project outside school (e.g., sports, music, drama, politics)?

O Yes
O No

2. Have you started an activity or a project outside school (e.g., sports, music, drama, politics)?

O Yes
O No

3. Has anyone close to you started a company? (Check all that apply)

O Mother/Stepmother/Female Guardian
O Father/ Stepfather/Male Guardian
O Other relative
O Friend
O No

4. What grade are you in?

O 7th
O 8th
O 9th
O 10th
O 11th
O 12th

5. Select the gender identity(ies) that best fits you:

O Female
O Male
O Trans
O Androgynous
O Genderqueer
O Other

Thank you for your participation.

ENTREPRENEURIAL THINKING: CLUSTERING SURVEY QUESTIONS AND CONSTRUCTS

Educators' & Administrators' Surveys

PART A. ATTITUDES, PERCEPTIONS & KNOLEDGE OF ENTREPRENEURIALTHINKING AND ENTREPRENUSHIP EDUCATION			
Question#	Items#	Constructs	Source
1	1	Perceptions about Entrepreneurial Thinking	TDSB Research Team
2 (a, b, c)	3	Perceptions about Entrepreneurial Thinking and Entrepreneurship Education	TDSB Res Team Inspired by Kampylis et al., 2009; Kampylis, 2010; van Dam, Schipper, & Runhaar, 2010; MaRS 2014a; MaRS 2014b; MaRS 2014c
3 (a, b, c)	3	Attitudes about Entrepreneurship Education	TDSB Res Team Inspired by Denton 1985
4	1	Opinions about Entrepreneurship Education	TDSB Res Team Inspired by Kampylis et al., 2009; ; Kampylis, 2010
5	17	Perceived knowledge about Entrepreneurship Education, Social Entrepreneurship, and MaRS Entrepreneurial Thinking Toolkit for K-12 Educators	MaRS, 2014c; Moberg, 2014; Ruskovaara, n.d.; MOE 2006; TDSB Res Team; Roberts & Woods, 2005; WEF, 2009.
6	3	Perceptions about Entrepreneurial Thinking teaching	TDSB Res Team Inspired by Ravitz, 2014
PART B. SKILLS & PRACTICES OF ENTREPRENEURIAL THINKING			
Question#	Items#	Constructs	Source
1-4	4	Creativity and Innovation Skills	Ravitz, 2014
5-8	4	Design Thinking Skills	TDSB Res Team; MaRS, 2014c
9-12	5	Critical Thinking Skills	Ennis, 2000; Ennis, n.d.; Ravitz, 2014
13-16	4	Self-Direction Skills	Ravitz, 2014
17-20	3	Resiliency Skills	Buang, 2012
21-24	5	Collaboration Skills	Ravitz, 2014; MaRS, 2014c
25-28	3	Communication Skills	Ravitz, 2014; MaRS, 2014b
PART C. PROFESSIONAL LEARNING & ORGANIZATIONAL SUPPORT			
Question#	Items#	Examined	Source
1	1	Attendance in professional learning (PL) sessions & impact on teaching/work	TDSB Res Team; MaRS, 2014c
2	1	Exposure to Entrepreneurial Thinking	TDSB Res Team
3	12	Practices of Entrepreneurship Education	Ruskovaara, n.d.; TDSB Research Team; MaRS, 2014c
4	1	Quality of PL sessions	TDSB Res Team; MaRS, 2014c
5	1	Type of PL support needed in Entrepreneurship Education	TDSB Res Team; MaRS, 2014c
6	5	Quality of Entrepreneurial Thinking modules	TDSB Res Team; MaRS, 2014c
7	4	Quality of Entrepreneurial Thinking modules	TDSB Res Team; MaRS, 2014c
8	1	Willingness for continuation of Entrepreneurship Education	TDSB Res Team; MaRS, 2014c
9	6	Support received by School Environment	Zhu, 2014
PART D. BACKGROUND CHARACTERISTICS			
Question#	Items#	Examined	Source
1-8	8	Demographic characteristics	TDSB Research Team
TOTAL	96		

ENTREPRENEURIAL THINKING: CLUSTERING SURVEY QUESTIONS AND CONSTRUCTS

Students' Survey

PART A. ENTREPRENEURIALTHINKING MINDSET, LEARNING AT SCHOOL, SELF-EFFICACY, FUTURE CAREERS			
Question #	Items #	Constructs	Source
1	1	Perceptions about Entrepreneurial Thinking	TDSB Research Team
2	3	Entrepreneurial Mindset	ASTEE, n.d. (ASTEE questionnaire Secondary level)_
2	6	Entrepreneurial Mindset (Core Self-evaluation)	ASTEE, n.d. (ASTEE questionnaire Secondary level)_
2	5	Creativity, Creative problem-solving, Critical thinking, Resilience	Buang ,2012; Chell & Athayde, 2009; Cho, 2003; Ennis, 2000; Ennis, n.d.
3	6	Connectedness to education -Teaching methods	ASTEE, n.d. (ASTEE questionnaire Secondary level)_
3	11	Entrepreneurial self-efficacy- Planning, Team Work Design thinking, Communication, Leadership, Empathy, Research, Resilience, Team work, Self-direction	ASTEE, n.d. (ASTEE questionnaire Secondary level); MaRS, 2014c; MaRS 2014b; MaRS, 2014c; Ravitz, 2014; TDSB Research Team
4	3	Connectedness to education (entrepreneurial teachers)	ASTEE, n.d. (ASTEE questionnaire Secondary level)_
5	3	Connectedness to education- Teaching methods Entrepreneurial knowledge	ASTEE, n.d. (ASTEE questionnaire Secondary level)_
6	16	Entrepreneurial self- efficacy: Creativity, Financial literacy, Managing Ambiguity, Marshalling of resources, Planning, Team work	ASTEE, n.d. (ASTEE questionnaire Secondary level)_
7	3	Connectedness to labour market (Innovative Employee-Future careers)	ASTEE, n.d. (ASTEE questionnaire Secondary level)_
8	3	Connectedness to labour market (Innovative Employee-Future careers)	ASTEE, n.d. (ASTEE questionnaire Secondary level)_
8	4	Future intentions to be innovative	Chell & Athayde, 2009
PART B. BACKGROUND CHARACTERISTICS			
1-3	3	Demographics	ASTEE, n.d. (ASTEE questionnaire Secondary level)_
4-5	2	Demographics	TDSB Research Team
TOTAL	69		

OVERALL SURVEY RESULTS - TEACHERS

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Toronto District School Board

Toronto District School Board

Entrepreneurial Thinking and Youth Entrepreneurial Learning
Winter 2015 - TEACHERS (total cases : 50)
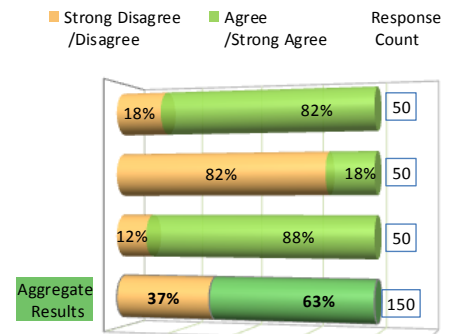
	YES	No	Not Sure	n/a
Did you participate in the Entrepreneurial Thinking and Youth Entrepreneurship Learning professional learning sessions in 2014?	86% (42)	12% (6)	2% (1)	(1)

PART A: ENTREPRENEURIAL THINKING AND ENTREPRENEURSHIP EDUCATION ATTITUDES, PERCEPTIONS, AND KNOWLEDGE

2. For each of the following pairs of statements, choose the one that you <u>agree with more</u>. Please answer as honestly as possible.	**More**
Entrepreneurial Thinking is about the process of starting a business	0% (0)
Entrepreneurial Thinking consists of competencies that involve a wide range of entrepreneurial attitudes, knowledge and skills	100% (50)
Entrepreneurship and education are two different things, and should remain so	4% (2)
It is important and essential that entrepreneurship and education go together	96% (47)
Everyone can be an Entrepreneurial Thinker	100% (50)
Entrepreneurial Thinking is a characteristic of eminent people only (such as Bill Gates and Steve Jobs)	0% (0)
Perceptions about Entrepreneurial Thinking and Entrepreneurship Education	

3. Please rate how much you agree or disagree with the following statements about Entrepreneurial Thinking.	**Strongly Disagree** **1**	**Disagree** **2**	**Agree** **3**	**Strongly Agree** **4**
Entrepreneurial Thinking should be required for all students in Grades 9-12	4% (2)	14% (7)	34% (17)	48% (24)
Entrepreneurial Thinking should be integrated only in Business Studies for students in Grades 9-12	44% (22)	38% (19)	8% (4)	10% (5)
Entrepreneurial Thinking should be integrated in most subjects in Grades 7-12	2% (1)	10% (5)	56% (28)	32% (16)
Attitudes about Entrepreneurship Education	**17% (25)**	**21% (31)**	**33% (49)**	**30% (45)**

■ Strong Disagree /Disagree   ■ Agree /Strong Agree   Response Count

18%	82%		50
82%		18%	50
12%	88%		50
Aggregate Results 37%	63%		150

Opinions about Entrepreneurship Education		**4. Please tell us the school subject or subjects in which you consider it likely to integrate *Entrepreneurial Thinking***	

□ The Arts	62% (31)	□ History	42% (21)	□ Science	80% (40)
□ Computer Studies	78% (39)	□ Language Arts	70% (35)	□ Social Sciences	64% (32)
□ Environmental Studies	64% (32)	□ Mathematics	66% (33)	□ Technological Education	82% (41)
□ Foreign Languages	34% (17)	□ Music	46% (23)	□ Other (please specify):	22% (11)
□ Geography	48% (24)	□ Physical Education/Health	38% (19)		

FOSTERING ENTREPRENEURIAL THINKING AND ENTREPRENEURSHIP LEARNING IN THE TORONTO DISTRICT SCHOOL BOARD: ASSESSING TEACHERS' AND ADMINISTRATORS' ATTITUDES, PERCEPTIONS, KNOWLEDGE, SKILLS AND PRACTICES AND STUDENTS' MINDSET AND SELF-EFFICACY

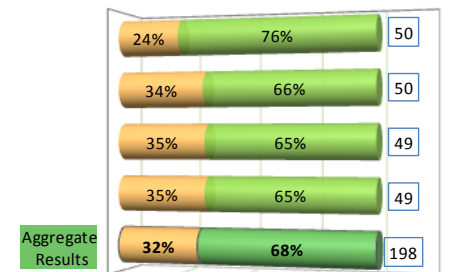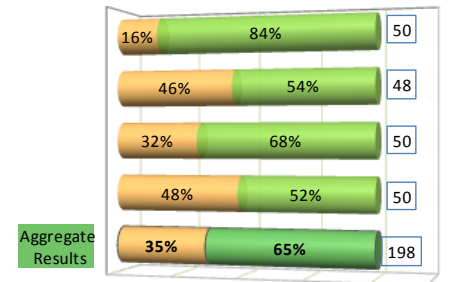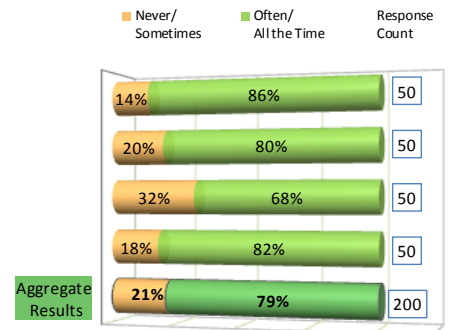| 5. Please rate your level of knowledge in the following areas:	No Knowledge 1	2	3	Highly Knowledgeable 4				
					1, 2 No/Less Knowledge	3,4 More/Highly Knowledgeable	Response Count	
Developing *Entrepreneurial Thinking* lesson plans	2% (1)	29% (14)	55% (27)	14% (7)	31%	69%	49
Helping students to structure brainstorms using Design Thinking	4% (2)	18% (9)	58% (29)	20% (10)	22%	78%	50
Enabling students to assess their ideas using a Strengths, Weaknesses, Opportunities and Threats (SWOT) Diagram	8% (4)	27% (13)	49% (24)	16% (8)	35%	65%	49
Teaching students to understand the value of their work by measuring Social Return on Investment (SROI)	18% (9)	48% (24)	24% (12)	10% (5)	66%	34%	50
Helping students to conduct better research by learning to Pivot	0% (0)	22% (11)	50% (25)	28% (14)	22%	78%	50
Teaching students to refine their ideas using an Idea Canvas	6% (3)	22% (11)	49% (24)	22% (11)	29%	71%	49
Helping students to address research bias through Customer Discovery	8% (4)	18% (9)	57% (28)	16% (8)	27%	73%	49
Enabling students to test their hypotheses through Rapid Prototyping	9% (4)	13% (6)	62% (29)	17% (8)	21%	79%	47
Helping students to refine their arguments by Crafting Pitches	0% (0)	30% (15)	46% (23)	24% (12)	30%	70%	50
Facilitating students to form complementary groups by communicating their Personal Brand	0% (0)	34% (17)	46% (23)	20% (10)	34%	66%	50
Helping students to engage their audience with a Creative Slide Deck	12% (6)	31% (15)	43% (21)	14% (7)	43%	57%	49
Helping students to identify career paths by exploring Entrepreneurial Ecosystems	24% (12)	48% (24)	26% (13)	2% (1)	72%	28%	50
Using digital learning strategies in teaching *Entrepreneurial Thinking*	6% (3)	24% (12)	41% (20)	29% (14)	31%	69%	49
Using inquiry-based strategies in teaching *Entrepreneurial Thinking*	4% (2)	10% (5)	52% (26)	34% (17)	14%	86%	50
Using problem-based strategies in teaching *Entrepreneurial Thinking*	6% (3)	6% (3)	47% (23)	41% (20)	12%	88%	49
Preparing entrepreneurship-related exercises, presentations, and essays	6% (3)	24% (12)	52% (26)	18% (9)	30%	70%	50
Using financial literacy in your assignments (e.g., how to read and interpret financial statements, how to estimate a budget, how to control costs for	12% (6)	38% (19)	34% (17)	16% (8)	50%	50%	50
Perceived knowledge about Entrepreneurship Education, Social Entrepreneurship and MaRS Entrepreneurial Thinking Toolkit for K-12 Educators (17 items)	7% (62)	26% (219)	46% (390)	20% (169)	Aggregate Results 33%	67%	840
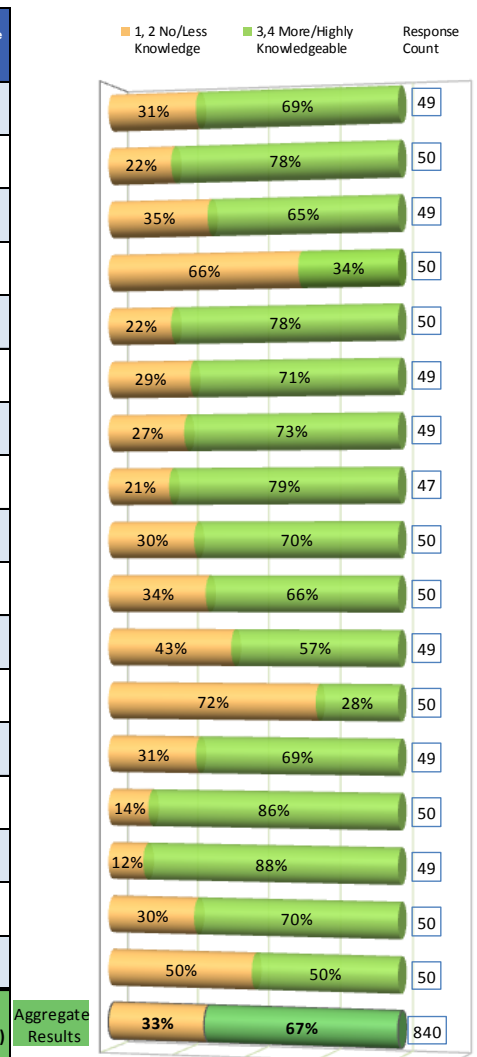
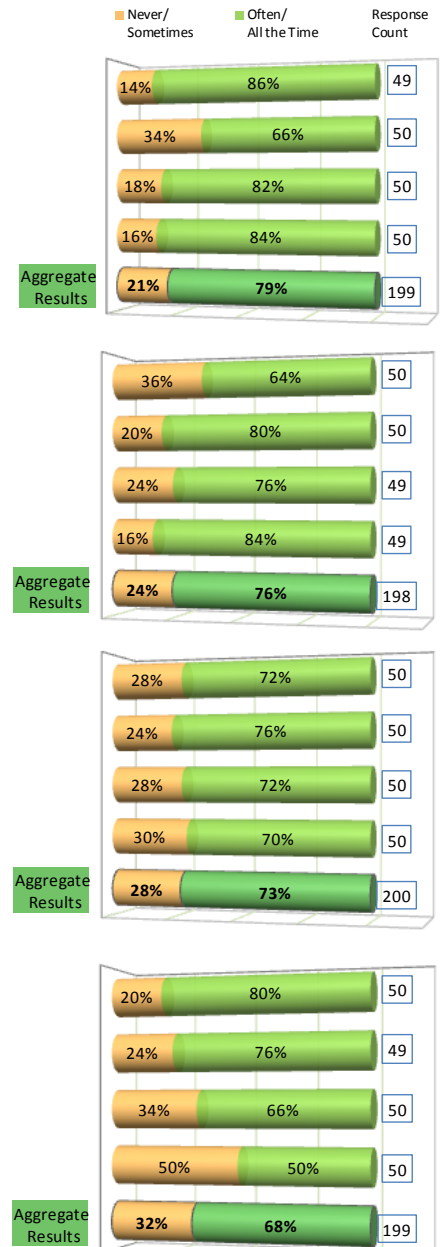| 6. To what extent do you agree with the following statements about your current teaching?	Not Really 1	To a Minor Extent 2	To a Moderate Extent 3	To a Great Extent 4
I have tried to <u>develop</u> students' entrepreneurial thinking skills	8% (4)	16% (8)	48% (24)	28% (14)
Most students have <u>learned</u> entrepreneurial thinking skills while in my class	8% (4)	26% (13)	48% (24)	18% (9)
I have been able to effectively <u>assess</u> students' entrepreneurial thinking skills	8% (4)	40% (20)	42% (21)	10% (5)
Perceptions about Entrepreneurial Thinking Teaching	**8% (12)**	**27% (41)**	**46% (69)**	**19% (28)**
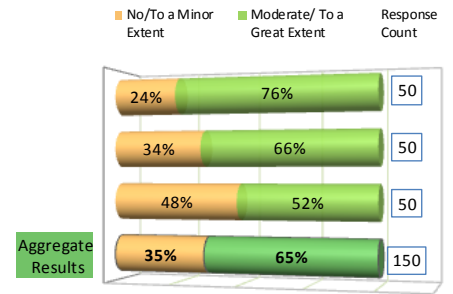
PART B: TEACHING ENTREPRENEURIAL THINKING SKILLS – PRACTICES

In your current teaching, how often do you enable students to do the following?	Never or Rarely 1	Sometimes 2	Often 3	All the Time 4
Generate their own ideas about how to confront a problem or question	0% (0)	14% (7)	56% (28)	30% (15)
Test out different ideas and work to improve them	2% (1)	18% (9)	50% (25)	30% (15)
Invent a solution to a complex, open-ended question or problem	2% (1)	30% (15)	42% (21)	26% (13)
Create an original product or performance to express their ideas	4% (2)	14% (7)	50% (25)	32% (16)
a) Creativity and Innovation Skills	**2% (4)**	**19% (38)**	**50% (99)**	**30% (59)**
Generate ideas using different strategies (e.g., brainstorming, sticky notes, mind-mapping)	0% (0)	16% (8)	40% (20)	44% (22)
Analyze and organize ideas from multiple perspectives using empathy	8% (4)	38% (18)	38% (18)	17% (8)
Creatively synthesize information (e.g., students build on each other's ideas or students try multiple headings or themes when organizing ideas)	4% (2)	28% (14)	48% (24)	20% (10)
Use rapid prototyping by having them create a rough sketch or diagram of one way that their ideas could be executed	6% (3)	42% (21)	42% (21)	10% (5)
b) Design Thinking Skills	**5% (9)**	**31% (61)**	**42% (83)**	**23% (45)**
Ask many questions before they try to find a possible solution	2% (1)	22% (11)	50% (25)	26% (13)
Analyze competing arguments, perspectives or solutions to a problem	2% (1)	32% (16)	48% (24)	18% (9)
Provide graphs and/or diagrams to support their solutions to a problem	6% (3)	29% (14)	43% (21)	22% (11)
Develop a persuasive argument based on supporting evidence or reasoning	6% (3)	29% (14)	39% (19)	27% (13)
c) Critical thinking Skills	**4% (8)**	**28% (55)**	**45% (89)**	**23% (46)**

FOSTERING ENTREPRENEURIAL THINKING AND ENTREPRENEURSHIP LEARNING IN THE TORONTO DISTRICT SCHOOL BOARD: ASSESSING TEACHERS' AND ADMINISTRATORS' ATTITUDES, PERCEPTIONS, KNOWLEDGE, SKILLS AND PRACTICES AND STUDENTS' MINDSET AND SELF-EFFICACY
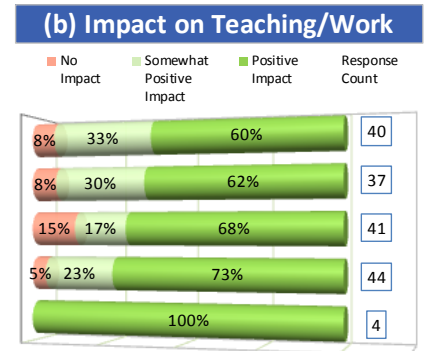
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In your current teaching, how often do you enable students to do the following?	Never or Rarely	Sometimes	Often	All the Time
Take initiative when confronted with a difficult problem or question	2% (1)	12% (6)	57% (28)	29% (14)
Choose their own topics of learning or questions to pursue	4% (2)	30% (15)	42% (21)	24% (12)
Plan the steps they will take to accomplish a complex task	0% (0)	18% (9)	50% (25)	32% (16)
Monitor their own progress towards completion of a complex task and modify their work accordingly	0% (0)	16% (8)	60% (30)	24% (12)
d) Self-Direction Skills	**2% (3)**	**19% (38)**	**52% (104)**	**27% (54)**
Learn from different cases of problems	6% (3)	30% (15)	44% (22)	20% (10)
Follow through on a solution until the end	0% (0)	20% (10)	40% (20)	40% (20)
Develop different iterations of a solution to a challenge/problem	6% (3)	18% (9)	59% (29)	16% (8)
Accept failure as part of the learning process	0% (0)	16% (8)	41% (20)	43% (21)
e) Resiliency Skills	**3% (6)**	**21% (42)**	**46% (91)**	**30% (59)**
Assign students to groups which contain members who have a wide range of skills and interests	4% (2)	24% (12)	38% (19)	34% (17)
Create joint products using contributions from each student	10% (5)	14% (7)	52% (26)	24% (12)
Work as a team to incorporate feedback on group tasks or products	4% (2)	24% (12)	42% (21)	30% (15)
Give feedback to peers or assess other students' work	4% (2)	26% (13)	46% (23)	24% (12)
f) Collaboration Skills	**6% (11)**	**22% (44)**	**45% (89)**	**28% (56)**
Convey their ideas using media other than a written paper (e.g., posters, video, blogs, etc.)	2% (1)	18% (9)	36% (18)	44% (22)
Prepare and deliver an oral presentation to the teacher or others	4% (2)	20% (10)	47% (23)	29% (14)
Engage in activities where they learn to communicate in a language that the target audience will understand	4% (2)	30% (15)	46% (23)	20% (10)
Understand the responsible use of social technology (e.g., use social media to gather market data or draft a value proposition that explains to the target audience the value of a product)	12% (6)	38% (19)	40% (20)	10% (5)
g) Communication Skills	**6% (11)**	**27% (53)**	**42% (84)**	**26% (51)**

FOSTERING ENTREPRENEURIAL THINKING AND ENTREPRENEURSHIP LEARNING IN THE TORONTO DISTRICT SCHOOL BOARD: ASSESSING TEACHERS' AND ADMINISTRATORS' ATTITUDES, PERCEPTIONS, KNOWLEDGE, SKILLS AND PRACTICES AND STUDENTS' MINDSET AND SELF-EFFICACY
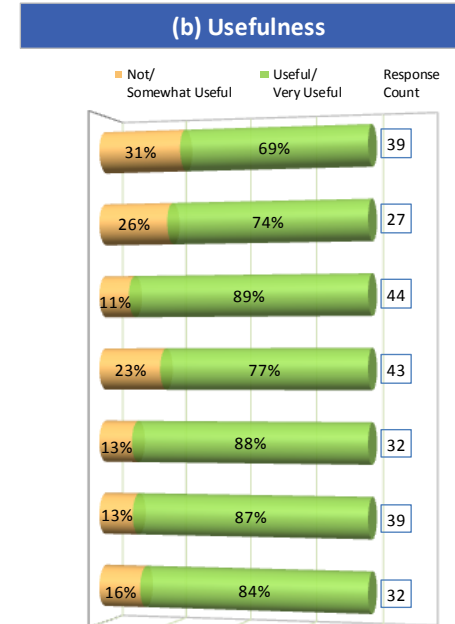
PART C: PROFESSIONAL LEARNING AND ORGANIZATIONAL SUPPORT

1. Which of the professional learning sessions on Entrepreneurial Thinking did you attend, and what impact did the sessions have on your teaching/work? If you answer "Yes" in Column (a), please answer Column (b).	(a) Attended Session		(b) Impact of this Session on my Teaching/ Work		
	Yes	No	No Impact	Somewhat Positive Impact	Positive Impact
14-Oct-14	84% (42)	16% (8)	8% (3)	33% (13)	60% (24)
04-Nov-14	78% (39)	22% (11)	8% (3)	30% (11)	62% (23)
11-Dec-14	90% (44)	10% (5)	15% (6)	17% (7)	68% (28)
08-Jan-15	100% (50)	0% (0)	5% (2)	23% (10)	73% (32)
Other Sessions (please specify):	60% (3)	40% (2)	0% (0)	0% (0)	100% (4)

(b) Impact on Teaching/Work

Legend: No Impact · Somewhat Positive Impact · Positive Impact · Response Count

- 8% / 33% / 60% → 40
- 8% / 30% / 62% → 37
- 15% / 17% / 68% → 41
- 5% / 23% / 73% → 44
- 100% → 4

2. Were these modules your first exposure to *Entrepreneurial Thinking*?	un Checked	Checked
☐ Yes	24% (12)	76% (38)
☐ No, I learned about E-Thinking during my initial teacher training	98% (49)	2% (1)
☐ No, I took a workshop or course on E-Thinking in university or college	98% (49)	2% (1)
☐ No, I learned about E-Thinking through self-study (e.g., Internet)	96% (48)	4% (2)
☐ Other (please specify):	82% (41)	18% (9)

3. Have you applied any of the following entrepreneurship tools/concepts/practices in your classes, and how useful did you find them?	Tools/ Concepts/ Practices					
	(a) Used		(b) Usefulness			
	Yes	No	Not Useful	Somewhat Useful	Useful	Very Useful
Inviting entrepreneurs or representatives from social/community enterprises to take part in classroom learning activities	62% (31)	38% (19)	3% (1)	28% (11)	26% (10)	44% (17)
Taking a field trip to a business enterprise and/or to a social/community enterprise	40% (19)	60% (29)	7% (2)	19% (5)	26% (7)	48% (13)
Pivoting (focusing on the most valuable elements of an idea through a process of hypothesizing, researching, and modification)	88% (44)	12% (6)	2% (1)	9% (4)	39% (17)	50% (22)
Customer discovery (a process by which entrepreneurs come to understand people's reaction to their ideas)	74% (37)	26% (13)	7% (3)	16% (7)	37% (16)	40% (17)
Idea canvas (a diagram used to visualize the strategy needed to execute an idea)	57% (28)	43% (21)	3% (1)	9% (3)	47% (15)	41% (13)
Rapid prototyping (a process of giving an idea a physical form so that it can be tested and improved)	68% (34)	32% (16)	0% (0)	13% (5)	31% (12)	56% (22)
Crafting a compelling argument/pitch (a creative argument that encourages a particular audience to do something)	61% (30)	39% (19)	3% (1)	13% (4)	41% (13)	44% (14)

(b) Usefulness

Legend: Not/ Somewhat Useful · Useful/ Very Useful · Response Count

- 31% / 69% → 39
- 26% / 74% → 27
- 11% / 89% → 44
- 23% / 77% → 43
- 13% / 88% → 32
- 13% / 87% → 39
- 16% / 84% → 32

FOSTERING ENTREPRENEURIAL THINKING AND ENTREPRENEURSHIP LEARNING IN THE TORONTO DISTRICT SCHOOL BOARD: ASSESSING TEACHERS' AND ADMINISTRATORS' ATTITUDES, PERCEPTIONS, KNOWLEDGE, SKILLS AND PRACTICES AND STUDENTS' MINDSET AND SELF-EFFICACY
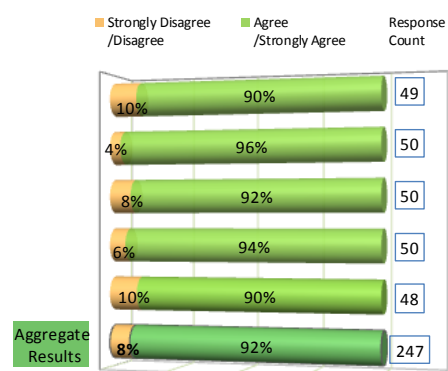
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3. Have you applied any of the following entrepreneurship tools/concepts/practices in your classes, and how useful did you find them?	Tools/ Concepts/ Practices					
	(a) Used		(b) Usefulness			
	Yes	No	Not Useful	Somewhat Useful	Useful	Very Useful
Social Return on Investment (SROI) (a measurement of the social value generated by a project or organization)	27% (13)	73% (36)	13% (3)	21% (5)	50% (12)	17% (4)
Personal Branding (a concise and highly creative way of expressing an identity)	74% (37)	26% (13)	3% (1)	21% (8)	41% (16)	36% (14)
Strengths, Weaknesses, Opportunities and Threats (SWOT) Diagram	42% (20)	58% (28)	7% (2)	3% (1)	62% (18)	28% (8)
Creative Slide Deck to support your points and increase audience engagement	31% (15)	69% (33)	4% (1)	20% (5)	40% (10)	36% (9)
Entrepreneurial Ecosystems (networks of programs and organizations that supports entrepreneurs)	10% (5)	90% (43)	16% (3)	37% (7)	32% (6)	16% (3)
Practices of Entrepreneurship Education			5% (19)	17% (65)	39% (152)	40% (156)
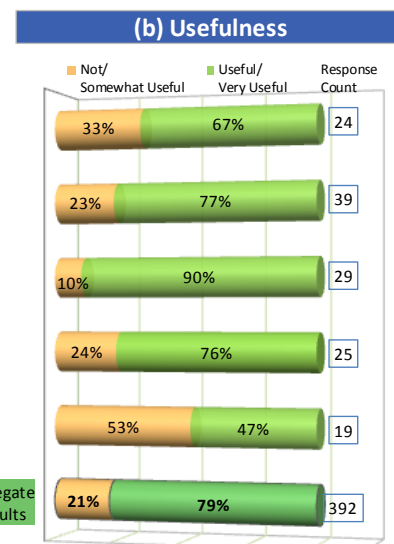
(b) Usefulness

	Not/ Somewhat Useful	Useful/ Very Useful	Response Count
	33%	67%	24
	23%	77%	39
	10%	90%	29
	24%	76%	25
	53%	47%	19
Aggregate Results	21%	79%	392

4. Overall, how would you rate the quality of the sessions that you attended on Entrepreneurial Thinking?	Excellent	Good	Fair	Poor
Quality of PL Sessions	39% (19)	43% (21)	16% (8)	2% (1)
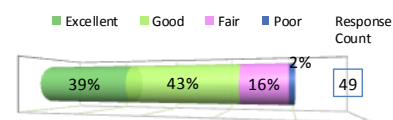
|	Excellent	Good	Fair	Poor	Response Count
	39%	43%	16%	2%	49

6. How would you rate each of the following as related to the modules you attended on Entrepreneurial Thinking?	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
The content was relevant	4% (2)	6% (3)	43% (21)	47% (23)
The presenters were knowledgeable about the topic	4% (2)	0% (0)	30% (15)	66% (33)
The teaching materials were appropriate	4% (2)	4% (2)	36% (18)	56% (28)
I have gained new information and knowledge from the sessions	4% (2)	2% (1)	36% (18)	58% (29)
I will be able to apply what I learned in the sessions to my teaching practice/work	4% (2)	6% (3)	31% (15)	58% (28)
Quality of Entrepreneurial Thinking modules 1	4% (10)	4% (9)	35% (87)	57% (141)

	Strongly Disagree /Disagree	Agree /Strongly Agree	Response Count
	10%	90%	49
	4%	96%	50
	8%	92%	50
	6%	94%	50
	10%	90%	48
Aggregate Results	8%	92%	247

Quality of Entrepreneurial Thinking modules 2

7. Did the sessions you attend on Entrepreneurial Thinking	Yes	No
Emphasize Entrepreneurship Education and *Entrepreneurial Thinking* ?	100% (49)	0% (0)
Provide adequate Entrepreneurial toolkits?	96% (47)	4% (2)
Facilitate your understanding of strategies used for *Entrepreneurial Thinking* ?	94% (45)	6% (3)
Emphasize working with the school community and stakeholders?	83% (39)	17% (8)

8. Would you like to see Entrepreneurial Thinking Education continued at your school?	Yes	No	Not Sure	Response Count
Willingness for continuation of Entrepreneurship Education	86% (42)	0% (0)	14% (7)	
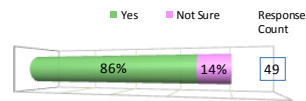
9. How would you rate each of the following as related to the organizational support you receive in your school environment?	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
Our school provides enough time for teachers to plan and implement Entrepreneurial teaching activities	8% (4)	18% (9)	53% (26)	20% (10)
Most teachers in our school are open to changes in teaching	9% (4)	36% (17)	51% (24)	4% (2)
The teachers in my school really work as an innovative team	2% (1)	33% (15)	57% (26)	9% (4)
Our school creates opportunities for partnerships beyond school (e.g., involvement with business, sports, and arts communities)	4% (2)	18% (9)	52% (26)	26% (13)
Our school leaders and teachers provide high quality professional learning needed to foster Entrepreneurship teaching and learning in my school	4% (2)	20% (10)	51% (25)	24% (12)
Our school/district leaders are willing to listen attentively to teachers` thoughts	0% (0)	14% (7)	59% (29)	27% (13)
Support received by School Environment	4% (13)	23% (67)	54% (156)	19% (54)

FOSTERING ENTREPRENEURIAL THINKING AND ENTREPRENEURSHIP LEARNING IN THE TORONTO DISTRICT SCHOOL BOARD: ASSESSING TEACHERS' AND ADMINISTRATORS' ATTITUDES, PERCEPTIONS, KNOWLEDGE, SKILLS AND PRACTICES AND STUDENTS' MINDSET AND SELF-EFFICACY
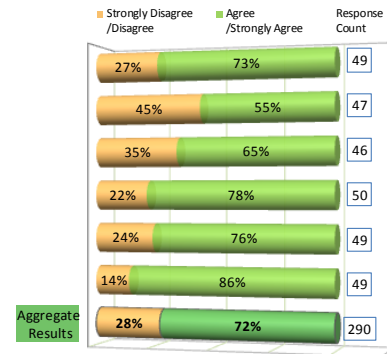
OVERALL SURVEY RESULTS - ADMINISTRATORS

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Toronto District School Board

Toronto District School Board

Entrepreneurial Thinking and Youth Entrepreneurial Learning
Winter 2015 - ADMINISTRATORS (total cases : 19)

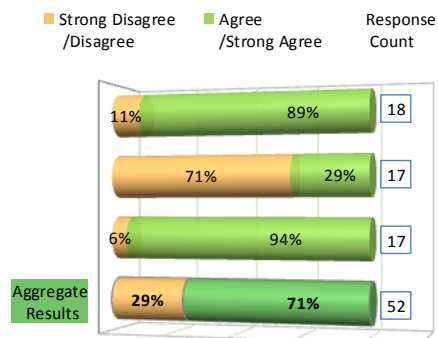|	YES	No	Not Sure	n/a
Did you participate in the Entrepreneurial Thinking and Youth Entrepreneurship Learning professional learning sessions in 2014?	83% (15)	11% (2)	6% (1)	(1)

PART A: ENTREPRENEURIAL THINKING AND ENTREPRENEURSHIP EDUCATION ATTITUDES, PERCEPTIONS, AND KNOWLEDGE

2. For each of the following pairs of statements, choose the one that you <u>agree with more</u>. Please answer as honestly as possible.	**More**
Entrepreneurial Thinking is about the process of starting a business	6% (1)
Entrepreneurial Thinking consists of competencies that involve a wide range of entrepreneurial attitudes, knowledge and skills	94% (16)
Entrepreneurship and education are two different things, and should remain so	0% (0)
It is important and essential that entrepreneurship and education go together	100% (17)
Everyone can be an Entrepreneurial Thinker	100% (17)
Entrepreneurial Thinking is a characteristic of eminent people only (such as Bill Gates and Steve Jobs)	0% (0)

Perceptions about Entrepreneurial Thinking and Entrepreneurship Education

3. Please rate how much you agree or disagree with the following statements about Entrepreneurial Thinking.	**Strongly Disagree** 1	**Disagree** 2	**Agree** 3	**Strongly Agree** 4
Entrepreneurial Thinking should be required for all students in Grades 9-12	6% (1)	6% (1)	33% (6)	56% (10)
Entrepreneurial Thinking should be integrated only in Business Studies for students in Grades 9-12	24% (4)	47% (8)	0% (0)	29% (5)
Entrepreneurial Thinking should be integrated in most subjects in Grades 7-12	6% (1)	0% (0)	41% (7)	53% (9)
Attitudes about Entrepreneurship Education	**12% (6)**	**17% (9)**	**25% (13)**	**46% (24)**

■ Strong Disagree /Disagree   ■ Agree /Strong Agree   Response Count

|	Strong Disagree/Disagree	Agree/Strong Agree	Response Count
	11%	89%	18
	71%	29%	17
	6%	94%	17
Aggregate Results	29%	71%	52

Opinions about Entrepreneurship Education	**4. Please tell us the school subject or subjects in which you consider it likely to integrate _Entrepreneurial Thinking_**

☐ The Arts	89% (16)	☐ History	61% (11)	☐ Science	78% (14)
☐ Computer Studies	78% (14)	☐ Language Arts	83% (15)	☐ Social Sciences	89% (16)
☐ Environmental Studies	83% (15)	☐ Mathematics	72% (13)	☐ Technological Education	94% (17)
☐ Foreign Languages	33% (6)	☐ Music	56% (10)	☐ Other (please specify):	17% (3)
☐ Geography	83% (15)	☐ Physical Education/Health	50% (9)		

FOSTERING ENTREPRENEURIAL THINKING AND ENTREPRENEURSHIP LEARNING IN THE TORONTO DISTRICT SCHOOL BOARD: ASSESSING TEACHERS' AND ADMINISTRATORS' ATTITUDES, PERCEPTIONS, KNOWLEDGE, SKILLS AND PRACTICES AND STUDENTS' MINDSET AND SELF-EFFICACY

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| 5. Please rate your level of knowledge in the following areas:	No Knowledge 1	2	3	Highly Knowledgeable 4
Developing *Entrepreneurial Thinking* lesson plans	6% (1)	39% (7)	44% (8)	11% (2)
Helping students to structure brainstorms using Design Thinking	0% (0)	39% (7)	44% (8)	17% (3)
Enabling students to assess their ideas using a Strengths, Weaknesses, Opportunities and Threats (SWOT) Diagram	6% (1)	33% (6)	44% (8)	17% (3)
Teaching students to understand the value of their work by measuring Social Return on Investment (SROI)	17% (3)	50% (9)	33% (6)	0% (0)
Helping students to conduct better research by learning to Pivot	0% (0)	28% (5)	61% (11)	11% (2)
Teaching students to refine their ideas using an Idea Canvas	11% (2)	22% (4)	61% (11)	6% (1)
Helping students to address research bias through Customer Discovery	11% (2)	39% (7)	44% (8)	6% (1)
Enabling students to test their hypotheses through Rapid Prototyping	6% (1)	24% (4)	71% (12)	0% (0)
Helping students to refine their arguments by Crafting Pitches	11% (2)	17% (3)	67% (12)	6% (1)
Facilitating students to form complementary groups by communicating their Personal Brand	11% (2)	33% (6)	50% (9)	6% (1)
Helping students to engage their audience with a Creative Slide Deck	17% (3)	22% (4)	56% (10)	6% (1)
Helping students to identify career paths by exploring Entrepreneurial Ecosystems	0% (0)	56% (10)	39% (7)	6% (1)
Using digital learning strategies in teaching *Entrepreneurial Thinking*	0% (0)	56% (10)	39% (7)	6% (1)
Using inquiry-based strategies in teaching *Entrepreneurial Thinking*	0% (0)	22% (4)	56% (10)	22% (4)
Using problem-based strategies in teaching *Entrepreneurial Thinking*	0% (0)	28% (5)	61% (11)	11% (2)
Preparing entrepreneurship-related exercises, presentations, and essays	11% (2)	33% (6)	56% (10)	0% (0)
Using financial literacy in your assignments (e.g., how to read and interpret financial statements, how to estimate a budget, how to control costs for	6% (1)	39% (7)	33% (6)	22% (4)
Perceived knowledge about Entrepreneurship Education, Social Entrepreneurship and MaRS Entrepreneurial Thinking Toolkit for K-12 Educators (17 items)	7% (20)	34% (104)	50% (154)	9% (27)
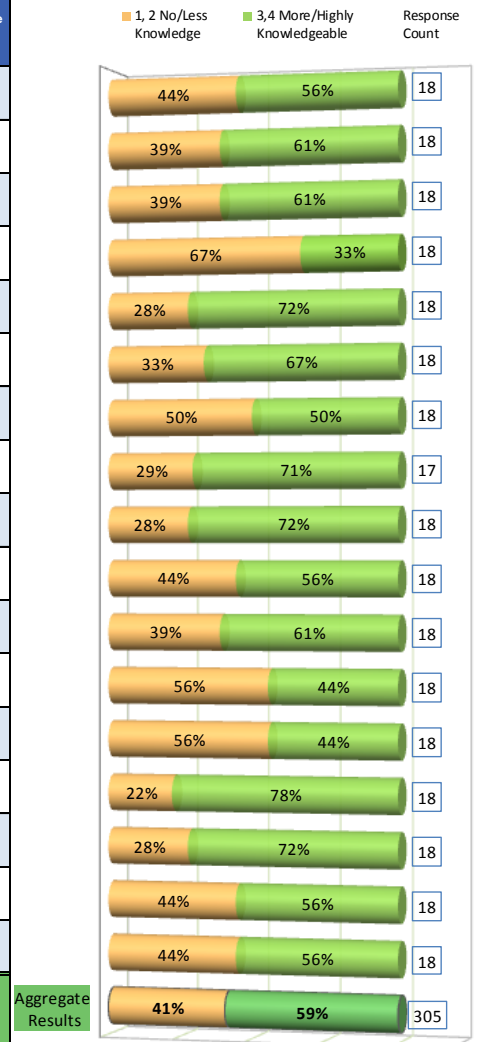
6. To what extent do you agree with the following statements about your current teaching?	Not Really 1	To a Minor Extent 2	To a Moderate Extent 3	To a Great Extent 4
I have tried to <u>develop</u> students' entrepreneurial thinking skills	0% (0)	14% (2)	79% (11)	7% (1)
Most students have <u>learned</u> entrepreneurial thinking skills while in my class	15% (2)	15% (2)	69% (9)	0% (0)
I have been able to effectively <u>assess</u> students' entrepreneurial thinking skills	23% (3)	23% (3)	54% (7)	0% (0)
Perceptions about Entrepreneurial Thinking Teaching	13% (5)	18% (7)	68% (27)	3% (1)

PART B: TEACHING ENTREPRENEURIAL THINKING SKILLS – PRACTICES (Skipped)
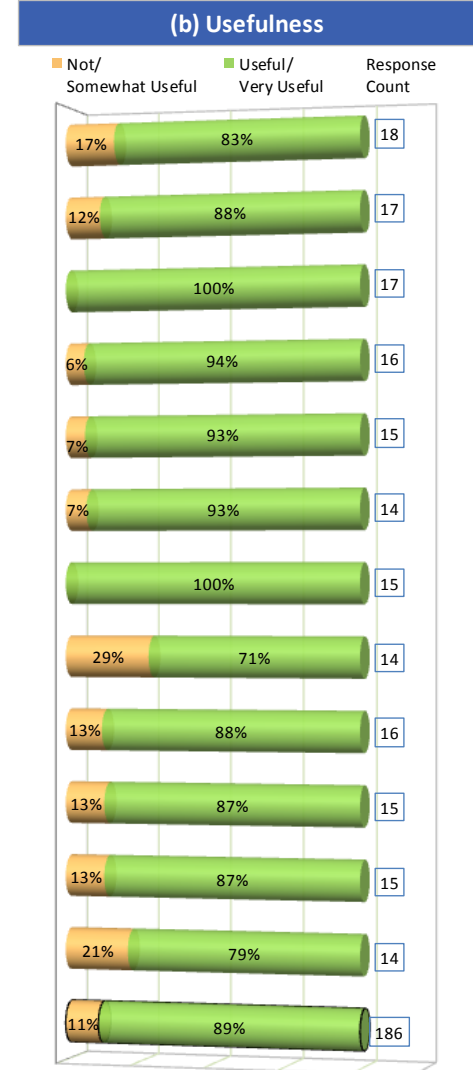
FOSTERING ENTREPRENEURIAL THINKING AND ENTREPRENEURSHIP LEARNING IN THE TORONTO DISTRICT SCHOOL BOARD: ASSESSING TEACHERS' AND ADMINISTRATORS' ATTITUDES, PERCEPTIONS, KNOWLEDGE, SKILLS AND PRACTICES AND STUDENTS' MINDSET AND SELF-EFFICACY

1. Which of the professional learning sessions on Entrepreneurial Thinking did you attend, and what impact did the sessions have on your teaching/work? If you answer "Yes" in Column (a), please answer Column (b).	(a) Attended Session		(b) Impact of this Session on my Teaching/ Work		
	Yes	No	No Impact	Somewhat Positive Impact	Positive Impact
14-Oct-14	94% (16)	6% (1)	7% (1)	27% (4)	67% (10)
04-Nov-14	83% (15)	17% (3)	0% (0)	47% (7)	53% (8)
11-Dec-14	89% (16)	11% (2)	0% (0)	20% (3)	80% (12)
08-Jan-15	100% (19)	0% (0)	0% (0)	22% (4)	78% (14)
Other Sessions (please specify):	100% (2)	0% (0)	0% (0)	0% (0)	100% (2)
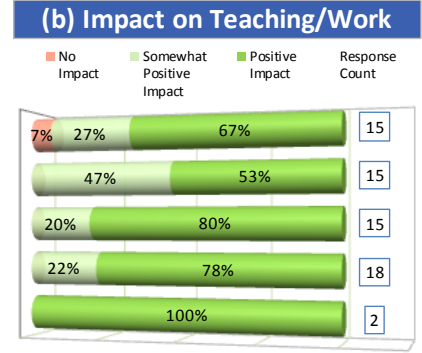
(b) Impact on Teaching/Work

| 2. Were these modules your first exposure to *Entrepreneurial Thinking*?	un Checked	Checked
☐ Yes	32% (6)	68% (13)
☐ No, I learned about E-Thinking during my initial teacher training	100% (19)	0% (0)
☐ No, I took a workshop or course on E-Thinking in university or college	95% (18)	5% (1)
☐ No, I learned about E-Thinking through self-study (e.g., Internet)	89% (17)	11% (2)
☐ Other (please specify):	79% (15)	21% (4)

3. Have you applied any of the following entrepreneurship tools/concepts/practices in your classes, and how useful did you find them?	Tools/ Concepts/ Practices					
	(a) Used		(b) Usefulness			
	Yes	No	Not Useful	Somewhat Useful	Useful	Very Useful
Inviting entrepreneurs or representatives from social/community enterprises to take part in classroom learning activities	87% (13)	13% (2)	6% (1)	11% (2)	28% (5)	56% (10)
Taking a field trip to a business enterprise and/or to a social/community enterprise	71% (10)	29% (4)	0% (0)	12% (2)	29% (5)	59% (10)
Pivoting (focusing on the most valuable elements of an idea through a process of hypothesizing, researching, and modification)	87% (13)	13% (2)	0% (0)	0% (0)	24% (4)	76% (13)
Customer discovery (a process by which entrepreneurs come to understand people's reaction to their ideas)	73% (11)	27% (4)	0% (0)	6% (1)	44% (7)	50% (8)
Idea canvas (a diagram used to visualize the strategy needed to execute an idea)	71% (10)	29% (4)	0% (0)	7% (1)	40% (6)	53% (8)
Rapid prototyping (a process of giving an idea a physical form so that it can be tested and improved)	53% (8)	47% (7)	0% (0)	7% (1)	21% (3)	71% (10)
Crafting a compelling argument/pitch (a creative argument that encourages a particular audience to do something)	67% (10)	33% (5)	0% (0)	0% (0)	7% (1)	93% (14)
Social Return on Investment (SROI) (a measurement of the social value generated by a project or organization)	43% (6)	57% (8)	14% (2)	14% (2)	36% (5)	36% (5)
Personal Branding (a concise and highly creative way of expressing an identity)	79% (11)	21% (3)	0% (0)	13% (2)	44% (7)	44% (7)
Strengths, Weaknesses, Opportunities and Threats (SWOT) Diagram	71% (10)	29% (4)	7% (1)	7% (1)	27% (4)	60% (9)
Creative Slide Deck to support your points and increase audience engagement	50% (7)	50% (7)	0% (0)	13% (2)	20% (3)	67% (10)
Entrepreneurial Ecosystems (networks of programs and organizations that supports entrepreneurs)	43% (6)	57% (8)	7% (1)	14% (2)	29% (4)	50% (7)
Practices of Entrepreneurship Education			3% (5)	9% (16)	29% (54)	60% (111)

(b) Usefulness

FOSTERING ENTREPRENEURIAL THINKING AND ENTREPRENEURSHIP LEARNING IN THE TORONTO DISTRICT SCHOOL BOARD: ASSESSING TEACHERS' AND ADMINISTRATORS' ATTITUDES, PERCEPTIONS, KNOWLEDGE, SKILLS AND PRACTICES AND STUDENTS' MINDSET AND SELF-EFFICACY

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| 4. Overall, how would you rate the quality of the sessions that you attended on Entrepreneurial Thinking?	Excellent	Good	Fair	Poor
Quality of PL Sessions	56% (10)	44% (8)	0% (0)	0% (0)
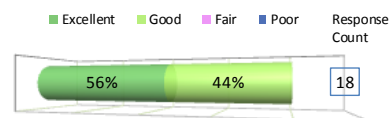
6. How would you rate each of the following as related to the modules you attended on Entrepreneurial Thinking?	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
The content was relevant	0% (0)	0% (0)	53% (10)	47% (9)
The presenters were knowledgeable about the topic	0% (0)	0% (0)	42% (8)	58% (11)
The teaching materials were appropriate	0% (0)	0% (0)	53% (10)	47% (9)
I have gained new information and knowledge from the sessions	0% (0)	5% (1)	21% (4)	74% (14)
I will be able to apply what I learned in the sessions to my teaching practice/work	0% (0)	0% (0)	61% (11)	39% (7)
Quality of Entrepreneurial Thinking modules 1	0% (0)	1% (1)	46% (43)	53% (50)
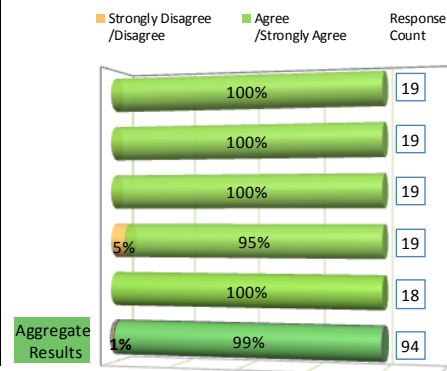
Quality of Entrepreneurial Thinking modules 2		

7. Did the sessions you attend on Entrepreneurial Thinking	Yes	No
Emphasize Entrepreneurship Education and *Entrepreneurial Thinking* ?	100% (19)	0% (0)
Provide adequate Entrepreneurial toolkits?	94% (17)	6% (1)
Facilitate your understanding of strategies used for *Entrepreneurial Thinking* ?	100% (19)	0% (0)
Emphasize working with the school community and stakeholders?	89% (17)	11% (2)

8. Would you like to see Entrepreneurial Thinking Education continued at your school?	Yes	No	Not Sure
Willingness for continuation of Entrepreneurship Education	100% (19)	0% (0)	0% (0)
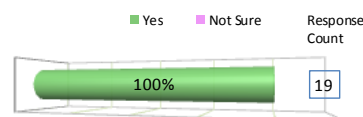
9. How would you rate each of the following as related to the organizational support you receive in your school environment?	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
Our school provides enough time for teachers to plan and implement Entrepreneurial teaching activities	0% (0)	7% (1)	60% (9)	33% (5)
Most teachers in our school are open to changes in teaching	7% (1)	40% (6)	47% (7)	7% (1)
The teachers in my school really work as an innovative team	7% (1)	27% (4)	40% (6)	27% (4)
Our school creates opportunities for partnerships beyond school (e.g., involvement with business, sports, and arts communities)	0% (0)	13% (2)	53% (8)	33% (5)
Our school leaders and teachers provide high quality professional learning needed to foster Entrepreneurship teaching and learning in my school	0% (0)	21% (3)	64% (9)	14% (2)
Our school/district leaders are willing to listen attentively to teachers` thoughts	0% (0)	7% (1)	47% (7)	47% (7)
Support received by School Environment	2% (2)	19% (17)	52% (46)	27% (24)

FOSTERING ENTREPRENEURIAL THINKING AND ENTREPRENEURSHIP LEARNING IN THE TORONTO DISTRICT SCHOOL BOARD: ASSESSING TEACHERS' AND ADMINISTRATORS' ATTITUDES, PERCEPTIONS, KNOWLEDGE, SKILLS AND PRACTICES AND STUDENTS' MINDSET AND SELF-EFFICACY