



Students' Perspectives of Transdisciplinary Financial Literacy Education in Ontario

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Abstract:

In increasingly uncertain economic times, education curricula around the world are changing to include the topic of financial literacy for students. This article reports the findings of a financial literacy study that examined the perspectives of students on their experiences with transdisciplinary teaching and learning of personal financial literacy. In this study, 344 post-secondary students reflected on their educational experiences in Ontario secondary schools by completing a quantitative survey composed of questions and self-assessments related to personal financial literacy curricula. While students felt that personal financial literacy education was important, they felt that there was a need for more knowledge and understanding in secondary school. Further, survey data identified variations in the personal financial literacy education students received that was linked to the stream (advanced or general) students were enrolled in. The findings are discussed, with particular attention to how students' perspectives can inform policy and curriculum design moving forward.

Keywords: financial literacy education; transdisciplinary education; student perspective; Ontario curriculum; curriculum studies

Perspectives des étudiants sur l'éducation financière transdisciplinaire en Ontario

Résumé :

Dans un contexte économique de plus en plus incertain, les programmes d'enseignement du monde entier évoluent pour inclure le thème de la littératie financière des élèves. Cet article présente les résultats d'une étude sur la littératie financière qui a examiné les points de vue des étudiants sur leurs expériences de l'enseignement et de l'apprentissage transdisciplinaires de la littératie financière personnelle. Dans le cadre de cette étude, 344 étudiants de l'enseignement postsecondaire ont réfléchi à leurs expériences éducatives dans les écoles secondaires de l'Ontario en répondant à une enquête quantitative composée de questions et d'auto-évaluations liées aux programmes de la littératie en matière de finances personnelles. Alors que les étudiants estimaient que l'éducation à la littératie financière personnelle est importante, ils pensaient qu'il est nécessaire d'approfondir les connaissances et la compréhension à l'école secondaire. En outre, les données de l'enquête ont mis en évidence des variations dans l'éducation à la littératie financière personnelle reçue par les élèves, en fonction de la filière (avancée ou générale) dans laquelle ils sont inscrits. Les résultats sont discutés, en accordant une attention particulière à la façon dont les perspectives des étudiants peuvent éclairer la politique et la conception des programmes d'études.

Mots clés : littératie financière; éducation transdisciplinaire; perspective étudiante; curriculum ontarien; programme d'études

The complexity and uncertainty of our economic world has prompted an increased demand for education curricula and teaching to enhance students' personal financial literacy (Fox & Bartholomae, 2005; Organisation for Economic Co-operation and Development, 2006; 2015). Governments and curriculum developers around the world have acknowledged the urgent need for youth to be better equipped to navigate financial matters (Financial Literacy and Education Commission [FLEC], 2006; Sridharan et al., 2017; Sjoberg, 2019). The response from various American, European and Canadian jurisdictions has been to mandate financial literacy training across all subjects (Garg & Singh, 2018; Ontario Ministry of Education [OME], 2016). Global economic uncertainty was underscored by the 2008 sub-prime mortgage crisis of the United States, when complex derivative instruments were easily accessible in the marketplace. The resulting uncertainty and ensuing economic crisis heightened awareness of the need to financial literacy education. Since the 2008 crisis, other events, including COVID-19, have disrupted global markets, and further contributed to the perception that financial literacy education is needed for youth across nations.

Consistent with other jurisdictions, the Ontario Ministry of Education addressed the need for financial literacy by mandating educators to integrate financial terms and concepts across the curricula (Government of Ontario, 2009). Because of this, financial education has been increasingly viewed as transdisciplinary. Teachers from all disciplines are now asked to teach financial literacy to their students with a focus on practical, real-world issues and problems (Kaur et al., 2016; Jagman et al., 2014). The goal of financial literacy education in Ontario is to encourage youth to contemplate world economic forces and the broad ethical, environmental and social implications of their financial decisions as consumers, while engaging in personal financial planning (OME, 2016). This goal is similar to that of many across Canada and around the world (Sherraden et al., 2011; Garg & Singh, 2018). However, little research exists to co-relate the efficacy of financial literacy education to better financial outcomes in students who have recently completed their secondary education or to secondary school students' perceptions of their ability to handle their own financial experiences. The limited financial literacy research that exists reflects, for the most part, teachers' and curriculum designers' perspectives rather than those of students. However, student assessments of financial literacy curricula would serve to inform and enlighten their learning experience, resulting in increased value and meaning for their paths ahead.

This article reports the findings of a financial literacy study (Matheson, 2019) that examined the perspectives of students on their experiences with teaching and learning of personal financial literacy in school. The study identifies student-centered inquiry and implementation challenges as educators seek to equip students with the skills and knowledge they are expected to need going forward. Finally, it serves to place emphasis in the value and meaning students perceive in appropriately taught financial literacy curricula and engagement.

Financial Literacy Education

Due to the limited support and resources available, teachers have reported that both their knowledge and confidence in teaching financial literacy are lacking (Baron-Donovan et al., 2005; Loibl, 2008). Further, according to Fernandes et al. (2014) and Arceo-Gómez & Villagómez (2016),

teachers reported that students lacked interest in the topic. While improving the knowledge and confidence of educators teaching about financial literacy is desirable, and may even be possible, greater investments by schools in terms of resources, training and class time are needed for students to learn the fundamentals of financial literacy (Baron-Donovan et al., 2005; Deng, et al., 2013). Most vital is the need for curriculum concepts to be made relevant and applicable to students' lived experiences.

A series of JumpStart Financial Literacy Surveys (1997-2006) suggests an overall declining trend in the financial knowledge of American secondary school students (Cameron et al., 2014; Mandell, 2008). Seeking to ascertain the perceived value and impact of financial education by students at different levels, Peng et al. (2007) found that financial education at the secondary school level yielded little student impact, while there was a perceived impact at the college level. In two other studies, one conducted by Valentin and Khayum (2005) and one by Varcoe and colleagues (2005), the researchers found that students improved their financial literacy after completing a financial literacy course, regardless of their socio-economic status or previous financial experience. Although an impact of financial literacy education was reported in the secondary school students, these studies did little analysis of the factors that supported this impact. Nor did they suggest ways to enhance the courses for greater student impact.

Financial literacy knowledge and its practical application in terms of financial decisions and choices, may, and perhaps should, vary for students, based on influencing factors. These factors could include the following: personal, cognitive and behavioural predispositions; gender; culture; family; peers; economic well-being; as well as community and institutional contexts (Blue, 2016; Lahn, 2008; Pinto & Chan, 2010; Pinto & Coulson, 2011). Any (and/or a mix) of these factors may influence individual financial knowledge, learning and decision-making and therefore require attention and consideration when teaching with standardized, and perhaps limited, financial literacy curricular resources.

There is a consistent theme across financial literacy education literature, that the curriculum should be the same for all students, that is, standardized and standards-based (e.g., Erner et al., 2016). Proponents of this approach to financial literacy education note that it yields equal and efficient opportunities for learning and is more easily measured (Erner et al., 2016; Jang et al, 2014). Others, with an eye to equity and student engagement, recognize that societal diversity calls for a more nuanced and differentiated approach to financial literacy education, particularly in relation to students' socio-economic backgrounds, level of parental support and access to financial resources (Lucey, 2007; Lucey & Giannongelo, 2006; Totenhagen et al., 2015). While a standardized approach readily aligns with easily measured quantitative assessments of student knowledge and readiness for financial planning, students' lived experiences—with economic injustices, for example—need to be taken into consideration as well. Mandell (2008) and Valentin and Khayum (2005) suggest that these experiences could also provide a valuable foundation for student-centered learning. If a financial literacy curriculum responded to and aligned with students' financial experiences and interests, financial literacy education could prove more relevant and meaningful.

A Transdisciplinary Approach

In addition to more responsive curriculum considerations, it may be equally necessary to consider where and how financial literacy education is best situated in the curriculum. Financial literacy terms and concepts, for example, are primarily linked to subject or discipline areas such as mathematics or economics (Kaur et al., 2016; Jagman et al., 2014), aspects of financial literacy may apply to other aspects of the curriculum. Consider the example of Ontario. Simple and compound interest are a component of study in mathematics curricula (OME, 2016, p. 230). in some Ontario curricula. Savings and investments are often studied in microeconomics (OME, 2016, p. 287). Learning how to properly use and manage financial resources, a topic that includes money and budget management, is taught as a part of a civics (politics) course (OME, 2016, p. 270). Exploring financial factors, such as taxation, tax provisions and economy trends, which contribute to socio-economic situations, fits in the social studies curriculum (OME, 2016, p. 53). It makes sense, then, that financial literacy education may be strongest when it is transdisciplinary (Cameron et al., 2014; Arceo-Gómez & Villagómez, 2016). It also makes sense that financial literacy be linked to motivated student-driven inquiry (Posner, 1995). Marsh and Willis (2006) and Oliva (2009) suggest that as more linkages are made between subject areas, and as students become aware of this interrelatedness, they engage in and develop more advanced thinking skills and increase their motivation to learn.

In a transdisciplinary curriculum, students are considered learning agents whose particular interests and queries drive the educational process; students become architects of their own personal learning experiences (Oliva, 2009; Wiggins & McTighe, 2011). A transdisciplinary curriculum aligns well with pragmatic learning experiences associated with practical skills-development related to budgets, credit and investments. It might also capture students' interest in real-world topics, thus making the learning experience more relevant, meaningful and ultimately beneficial (McNeil, 2006; Ornstein & Hunkins, 2013).

A transdisciplinary curriculum involves four interrelated strands: i) authentic student interests; ii) collaborative engagement; iii) student-driven learning; and iv) flexible inquiry (Ornstein & Hunkins, 2013). Authentic student interest means that topics of inquiry are conceived by students due to their relevance to them, either currently or for the future (Oliva, 2009; Ornstein & Hunkins, 2013; Wiggins & McTighe, 2011). These topics could be money-management, investments, debt, and so on. Collaborative engagement refers to the involvement of teachers, other mentors and resources, and how they become active in the learning process (Wiggins & McTighe, 2011). Student-driven learning means that students are their own learning architects and that they are responsible for determining the ways and means of their inquiry-based learning and assessment (Wiggins & McTighe, 2011). Finally, a flexible inquiry means that no learning formula is prescribed, thereby enabling full and free student expression in the inquiry process.

In some learning models in Europe, the United States and Canada (Ornstein & Hunkins, 2013), students choose the financial literacy topic of study rather than pursue a prescribed topic given by the teacher or pre-determined by the curriculum. A student may have an interest in how to utilize earnings from a job to create a budget. Through such an inquiry, the student may seek collaborative

engagement with a financial advisor or bank contact. The first two strands may be used in this interrelated manner.

Similarly, drawing on the last two strands, the same student may be motivated to determine how their learning should proceed, including success and assessment factors—in effect, developing their own template for the learning process. This strand is interrelated with the final flexible inquiry strand where the students choose the manner in which they express themselves (e.g., voice, art, written form, multimedia, etc.), free of any prescribed curriculum constraints.

The United States' approach to financial literacy education provides further examples, as documented in the FLEC national strategy (McCormick, 2009). It recommended that financial literacy education begin in the early grades by integrating it into the sciences, social studies and mathematics curriculums, and it recommended integration with business studies and economics in secondary school (FLEC, 2006). The Council for Economic Education (CEE) conducted the American national biennial surveys to measure the extent to which financial literacy was delivered from Kindergarten through Grade 12 (Sole, 2014). The survey differentiated between financial literacy instruction directly focused on financial education and financial literacy instruction that was integrated with existing curricula. The CEE study stated that positive financial behaviours occurred in States that mandate economics and personal finance as standalone classes, compared to integrating such topics within a related class (CEE, 2020). Nonetheless, the CEE supported, even preferred a transdisciplinary integrated curricular approach to financial literacy with its orientation toward practical life skills.

A similar American study was undertaken by Totenhagen et al. (2015) on financial literacy, involving data from multiple stakeholders, including students, teachers, parents and finance professionals. The study found that foundational knowledge, student interests, early start, parental involvement, instructor knowledge and the accommodation of diverse backgrounds were key to successful financial literacy education (Totenhagen et al., 2015). The study, which reviewed 200 financial literacy programs, concluded that students and families benefitted from youth-oriented financial education, drawing on simple monetary terms and concepts (e.g., savings, debt, budget, etc.). As well, the authors found that students who worked with community financial professionals had enhanced hands-on experience and knowledge. While this study focused on students' perspectives related to transdisciplinary financial literacy education, more work needs to be done to find out what specific information students want, or feel was lacking in their financial literacy education.

Methods

Ontario schools present an ideal context to investigate students' perspectives toward financial literacy as a transdisciplinary experience. In 2016, the Ontario Ministry of Education released the curriculum document *Grades 9-12: Financial Literacy Scope and Sequence of Expectations*. The document targeted the development of financial literacy knowledge and skills with a focus on decision-making, critical thinking, problem-solving and critical literacy. Of particular interest was the

transdisciplinary approach it supported, as evidenced by its call for all educators to incorporate financial literacy knowledge and skills into all 17 established curricular subject areas across all four grades.

This article reports on the findings of the study carried out by Matheson (2019) regarding the perspectives of students on their experiences with transdisciplinary teaching and learning of personal financial literacy in school. The study surveyed 344 participants drawn from one Ontario college and one Ontario university. Both institutions attracted students from all over the province. All participants attended a secondary school in the province of Ontario.

The college was situated in south-eastern Ontario. Administrative staff at the colleges suggested instructors who might be willing to distribute a survey to their students. Those instructors were then contacted by phone or by email by members of the research team to get permission and arrange logistics. The instructors contacted taught trades and business courses and it was their students who completed the survey. The university was also located in south-eastern Ontario. University participants were drawn from a program in teacher training. Table 1 provides an overview of the sample (N = 344).

Variable	<i>M (SD)</i>	%
Post-Secondary Route		University (56.4) College (43.6)
Gender		Female (63.37) Male (34.3)
Age, University Participants	18.64 (SD = 1.38)	
Age, College Participants	22.42 (SD = 4.67)	

Table 1. Overview of the Sample.
 Note: *M* = Mean; *SD* = Standard Deviation.

The majority of participants, 95% of university students and 59% of college students, reported taking courses that were in a stream designed to prepare them for their post-secondary education. Secondary school graduates in their first year of college or university were purposefully selected for this study so that they might provide a retrospective report of their secondary school experience with financial literacy learning. The college and university survey participants were chosen because they were easily accessible and willing to assist with the research. Though the university participants were drawn from a program in teacher training, they came from many different schools across the province of Ontario and thus represented a broad cross-section of diverse financial literacy learning experiences similar to the college participants. An initial draft of the survey was pilot tested with five secondary school and early university students to ensure readability and clarity of items. Small revisions were made to survey questions following the pilot test. The study was approved by a research ethics board, and informed consent was received by all participants.

Data was collected via a paper-based survey. Participants completed the survey in one of two settings: a technical college classroom, in programs focused on trades and business, or a university classroom, in a program focused on teacher training. Survey questions probed students' experiences and perspectives about their financial literacy education and about their self-perceived personal finance knowledge. The survey consisted of 32 closed-ended and contained questions concerning their knowledge level about several personal finance topics including budgeting, credit and savings. Several questions asked about their general secondary school learning experiences with financial literacy education or experiences. The first 24 questions were adapted from the National Youth Survey (British Columbia Services Commission, 2011). These questions focused on participants' knowledge of financial literacy terms and were consistent with the aims of a transdisciplinary curriculum. They could also be co-related to the core strand definition of financial literacy used in the Ontario Ministry of Education curriculum which states that students should be taught both the knowledge and skills in order to make responsible decisions related to managing financial well-being with both competence and confidence (OME, 2016, p. 2). The first 24 questions were presented as Likert type scale items with a 5-point scale where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. Questions 25–32 addressed preferred personal finance learning sources, secondary school courses taken and related demographic information, including age, gender, graduation year, and type of postsecondary institution they were enrolled in at the time of the study.

All data were analyzed using a statistical software platform (the IBM SPSS, version 26). The dataset was first cleaned by identifying any unusable information, such as incomplete surveys. The data were then analyzed using descriptive statistics (mean responses and standard deviation) and inferential statistics with some significance testing (t-test) for comparison of groups (college-based vs. university-based, applied vs. academic, etc.).

Results

Across the sample, there was a neutral ranking of personal financial knowledge across the topics. Knowledge of budgeting ($M = 3.43$, $SD = 1.11$) and credit/debt ($M = 3.29$, $SD = 1.19$) were on the higher end, with taxes/inflation ($M = 2.56$, $SD = 1.13$) and saving/investing ($M = 2.64$, $SD = 1.15$) at the lower end of self-reported knowledge. Personal financial literacy was seen as useful in participants' daily lives ($M = 3.87$, $SD = 1.11$); however, most participants disagreed with the statement that they remembered and used most of the financial skills taught in secondary school ($M = 2.38$, $SD = 1.15$). Participants overwhelmingly did not subscribe to the statement that they knew everything they needed to know about personal finance ($M = 1.60$, $SD = 0.89$). Overall, these descriptive trends painted a largely unfavourable portrait of students' knowledge of and learning experiences with financial literacy, despite participants' favourable responses concerning the usefulness of personal financial literacy. Participants' recall and use of secondary school financial instruction was negligible, as was their perceived general knowledge of these topics.

The majority of participants viewed their secondary school personal finance teaching and learning experience unfavourably. The highest ranking within the survey was related to budgeting

($M = 2.03$, $SD = 1.04$). Personal finance, teaching and learning in secondary school were among the lowest ranked ($M = 1.66$, $SD = 0.81$) in the survey. Underscoring these negative perceptions of their secondary school learning experience, participants indicated that instruction was not relevant to their situation and goals ($M = 2.00$, $SD = 0.97$); teaching did not help participants to navigate financial topics in their daily lives ($M = 1.88$, $SD = 1.01$); and the instructional methods were not deemed effective or interesting ($M = 1.89$, $SD = 0.99$). Consistent with these trends, participants reported strongly that there should have been more time spent teaching personal finance in secondary school ($M = 4.60$, $SD = 0.81$) and that personal finance is an important and valuable topic for secondary school students ($M = 4.67$, $SD = 0.79$). Participants asserted that secondary school personal finance teaching and learning was lacking in all of the topics. At the same time, participants declared that more personal finance teaching was needed in secondary school, and that financial literacy is important and valuable for secondary school students.

Nearly 80% of all participants indicated that parents were the primary source of personal financial knowledge with approximately 65% of college and 89% of university participants reporting this. Of this group, approximately 87% were female and 70% were male participants. Despite this, only 36% of participants across the full sample indicated that parents should be the primary source of personal financial knowledge. Approximately 42% of all participants indicated that they felt that secondary school courses should be the primary source of personal financial knowledge. Approximately 12% of participants across the full sample indicated that they felt that banks should be the primary source of personal financial knowledge and approximately 4% of all participants indicated that they felt that the individual should be the primary source of personal financial knowledge. The data suggests that students' financial learning experiences in secondary school are less than optimal for gaining an enduring and deep understanding of the topic. As a result, students are seeking knowledge outside of the classroom from parental discussion related to financial literacy; a source that may be potentially limiting.

Inferential Statistics

An exploratory factor analysis was conducted on the first 23 survey items, with the intention of identifying the number of factors within this set of items. Four factors were extracted; the first extracted factor was labeled *secondary school learning* and had an internal consistency of .94. It contained 11 items that directly related to participants' secondary school personal finance curriculum and teaching experiences. The second extracted factor related to participants' general knowledge of personal finance and associated topics with an internal consistency of .87. This factor contained seven items directly related to general knowledge of personal finance. The third factor related to the importance and value participants attached to secondary school personal finance teaching and learning; this factor had an internal consistency of .83 and contained two items. Finally, the fourth extracted factor related to participants' knowledge level of fraud/ID theft as represented by a single item. The following items did not load onto any factor or double-loaded across factors: *Personal financial literacy is useful in my daily life* ($M = 3.87$, $SD = 1.11$); and *I needed help in understanding difficult financial topics taught in secondary school* ($M = 2.97$, $SD = 1.21$). These items were

independent of the factors identified, or too closely related to multiple factors to be a clean fit within a single factor.

A statistical comparison of factor scores was conducted by the following categories: i) source of financial literacy (i.e., parents, secondary school courses, bank, self, other); ii) secondary school stream; iii) current institution; and iv) gender (see Table 2). With regards to the source of financial literacy, a statistically significant difference was detected for students who identified either parents, secondary school courses, bank, or self as the primary sources of financial literacy and *Secondary School Learning* determined by one-way ANOVA ($F[2,337] = 8.550, p < .001$). A Bonferonni post hoc test revealed that students who selected secondary school ($M = 3.03, SD = 0.76$) reported significantly higher *Secondary School Learning* than students who selected parent ($M = 1.85, SD = 0.76$), bank ($M = 1.70, SD = 0.90$), or self ($M = 2.03, SD = 0.85$). A statistically significant difference was also observed between students' identification of the primary source of financial literacy and *General Knowledge* by a one-way ANOVA ($F[2,337] = 8.340$). A Bonferonni post hoc test revealed that students who selected self ($M = 3.49, SD = 0.80$) reported greater general knowledge than those who selected parents ($M = 2.61, SD = 0.80$) or bank ($M = 2.45, SD = 0.80$).

There was a statistically significant difference between students enrolled in different secondary school courses (applied, academic, applied/academic) and *general knowledge* as determined by one-way ANOVA ($F[2,337] = 11.660, p < .001$). A Bonferonni post hoc test revealed that students enrolled in applied ($M = 3.10, SD = 0.70$), and academic and applied, courses ($M = 3.14, SD = 0.85$) received significantly more useful learning opportunities throughout secondary school compared to students enrolled in academic courses ($M = 2.59, SD = 0.82$). Further, these same student groups (applied, academic and applied, and academic) reported below average assessments of the quality of the personal finance related instruction, as seen in the low mean scores across the other survey questions.

The participants' current educational institution, be it college or university, was significantly associated with two factors. First, students enrolled in college ($M = 3.06, SD = 0.81$) reported greater general knowledge than students enrolled in university ($M = 2.50, SD = 0.80$), ($t[338] = 6.224, p < .001$). Second, students enrolled in college ($M = 3.37, SD = 1.13$) reported greater knowledge of fraud/ID theft than students enrolled in university ($M = 3.11, SD = 1.13$), ($t[338] = 2.038, p = .042$). These differences may be attributed to college students being on average slightly older than university students, having more life experience and therefore more exposure to personal finance issues or having been exposed to slightly more learning opportunities (Sole, 2014).

Noteworthy gender differences emerged in terms of general knowledge. Cohen's d was 1.16 which represented a substantial difference between the groups. Males reported significantly higher scores than females across three of the four factors. Firstly, males ($M = 2.22, SD = 0.83$) reported greater *secondary school learning* than females ($M = 1.72, SD = 0.70$), ($t[333] = 5.828, p < .001, d = .65$). Secondly, males ($M = 3.26, SD = 0.81$) reported greater general knowledge than females ($M = 2.39, SD = 0.69$), ($t[334] = 9.927, p < .001, d = 1.16$). Finally, males ($M = 3.57, SD = 1.06$) reported greater fraud/ID theft than females ($M = 3.00, SD = 1.17$), ($t[331] = 4.358, p < .001, d = .51$).

These differences may in part have been attributable to more males attending college than females within this pool of participants, thus being slightly more exposed to personal finance-related learning opportunities through their chosen secondary school courses.

		Secondary School Learning	General Knowledge	HS Import/Value	Fraud/ID theft
Source of Financial Literacy	Parents	1.85(.75)*	2.61(.80)*	4.55(.85)	3.17(.18)
	Secondary school	3.03(.76)*	2.92(.73)	4.69(.52)	3.64(1.22)
	Bank	1.70(.90)*	2.45(.80)*	4.67(.61)	2.88(1.16)
	Self	2.03(.85)*	3.49(.80)*	4.86(.27)	3.50(.94)
Secondary School Stream	Applied	2.17(.89)	3.10(.70)*	4.67(.89)	3.18(1.05)
	Academic	1.87(.78)	2.59(.82)*	4.61(.77)	3.15(1.16)
	Academic/ Applied	1.94(.79)	3.14(.85)*	4.48(.88)	3.51(1.20)
Current Institution	College	1.95(.82)	3.06(.81)*	4.54(.87)	3.37(1.13)*
	University	1.89(.78)	2.50(.80)*	4.61(.76)	3.11(1.18)*
Gender	Female	1.72(.70)*	2.39(.69)*	4.65(.78)	3.00(1.17)*
	Male	2.22(.83)*	3.26(.81)*	4.49(.82)	3.57(1.06)*
All Participants		1.91(.80)	2.70(.84)	4.59(.80)	3.20(1.16)

Table 2. Descriptive Statistics (Mean, Standard Deviation) of Factor Scores by Demographic Grouping.
 Note: * denotes significance at alpha = 0.05.

A Friedman test detected a statistically significant difference in where students believed they should learn the most about personal finance (item #25), $X^2(4) = 252.190, p < .001$. Post-hoc analysis (Wilcoxon signed-rank test) was used to examine which sources were statistically different. There was no statistical difference in students' belief that parents (mean rank = 2.08) and secondary school courses (mean rank = 2.21) should form the primary source of financial literacy, $p = .223$. However, both were ranked statistically higher than the bank (mean rank = 2.76) and self (mean rank = 3.45), $p < .001$. Interestingly, the bank was ranked higher than self, $p < .001$. These data underscored the potential learning value that both parents and secondary school instruction provided, and the potential role for parental engagement in secondary school learning. At the same time, other survey findings brought to light the inadequacy of these learning opportunities particularly when factored in with participants' self-assessments of personal finance knowledge and secondary school financial learning experiences.

The data indicated that college and university participants did not have a favourable view of their knowledge of personal finance. Similarly, they had an unfavourable view of their secondary school personal finance curriculum and teaching experience. Consistent with these findings, participants indicated that more personal finance teaching time was needed and that personal finance topics were deemed important and valuable. Participants who were enrolled in applied, or applied and academic, secondary school courses perceived their teaching and learning as more useful compared to participants who were enrolled in academic courses. Students enrolled in college reported greater general knowledge of personal finance compared to university students.

Discussion

The impetus for this study was the need to gather current data from students about their perspectives on the quality and impact of a transdisciplinary approach to financial literacy curriculum. Personal financial literacy has garnered a growing amount of interest within the ministry curriculum document and schools across Ontario (OME, 2016). While personal financial knowledge and skills are seen as fundamental to productive and successful living, this study identified significant gaps in students' secondary school financial learning experiences.

The findings from the present study suggest that secondary school graduates (college and university track students) think they are largely unprepared to address personal finance matters after completing secondary school. In terms of perceived knowledge of personal finance topics, three of the eight knowledge topics related to personal finance were ranked near or just above neutral (three out of five). These topics were budgeting, credit/debt and fraud/ID theft. The remaining five topics were reported below the neutral rank. Consistent with their negative perceptions of personal finance knowledge, students reported that secondary school teaching and learning were lacking (below neutral ranking) in all topics. Given that participants did not remember or use financial skills taught in secondary school, the impact of any teaching that occurred during secondary school was limited. Despite these negative perceptions, students did indicate that there was an important role for secondary school curriculum and teaching in building personal finance knowledge and skills, and that more time on financial topics was needed.

The findings from this research are consistent with previous scholarship as several studies have highlighted the value of financial literacy instruction when teachers were properly trained and had access to appropriate tools and resources (Baron-Donovan et al., 2005; Deng et al., 2013; Loibl, 2008; Totenhagen et al., 2015). Importantly, however, in studies where financial education was mandated, findings about the efficacy and effectiveness were more mixed (Cite). Some studies found that instruction had no positive impact on learning outcomes (Mandell, 2008; Peng et al., 2007). Other studies found measurable positive outcomes as a result of mandated instruction (Bernheim et al., 2001; Danes & Haberman, 2007; Varcoe et al., 2005). The findings from our study suggest that effective financial literacy learning was largely lacking for the participants. Such a result may be due to the fact that the financial literacy curriculum document in Ontario is still relatively new and that all teachers may not have fully integrated it into their teaching. Our results may also be due to the limited effectiveness of a transdisciplinary approach in province-wide mandated curricula.

Although a transdisciplinary instructional model was advanced from various perspectives in this study, this model does not appear to effectively contribute to student learning in the province, at least not yet. Despite being conceptually well aligned to a transdisciplinary instructional model from an enactment perspective, this instructional model did not appear to yield the desired learning effects in Ontario classrooms (Drake et al., 2014; FLEC, 2006; McCormick, 2009). In our view, there remains a gap between the transdisciplinary model suggested in curriculum documents in Ontario and the instructional ways and means that teachers are employing this curriculum in Ontario. A core challenge in mandating a transdisciplinary curriculum within a framework of education that remains largely predicated on individual disciplines is that there may not be a primary coordinator within school contexts to direct and connect financial literacy teaching for students (Fernandes et al., 2014). Further, the differences between students who took applied courses and those who did not, as well as those in college and those in university, may suggest that there is less focus on financial literacy in curricula that are focused on preparation for university (academic stream) as opposed to college (applied stream). In Ontario, applied courses have an emphasis on hands-on learning, whereas academic courses focus more on abstract reasoning (Hamlin & Cameron, 2015). Despite the perceived value expressed by all students in the sample concerning financial literacy education, it appears that financial literacy education was less effective in educational settings focused on abstract reasoning as compared with learning that is more applied and practical.

Moving forward from a research perspective, further studies are needed to assess teachers' implementation practices of a transdisciplinary financial literacy approach and school-level coordination of a transdisciplinary financial literacy education curriculum. Ideally, these studies would look at different learning settings, such as applied versus academic courses, to see how financial literacy is taught in different settings. Multiple stakeholder perspectives continue to be important—there is an ongoing need to understand how teachers view all aspects of the delivery of financial literacy curricula, how students experience it and how parents/guardians may supplement what is taught to their children in schools.

In terms of implications for practice, there might be great value for all stakeholders in having a coordinator within schools who is focused on ensuring that transdisciplinary curricula is responsive to student's needs, that it is effective in its design and that it is delivered consistently across learning settings. Given that so many students in the sample, close to 80%, reported parents as their primary source of financial knowledge, teachers need to take into account students' current and acquired knowledge in determining what responsive teaching of financial literacy could be. While there is no data from this study to support this, it is possible that the reason why so many reported that they felt their financial literacy education was so ineffective is that it was at odds with what they were learning at home. Teachers must consider what knowledge their students already have, whether or not it is in line with the current curricula, and how they can make the learning experience more valuable for the students. Each of these suggestions necessitates drawing on the perspectives of students to shape a learning experience that is meaningful for them. This is of particular importance because there is no guarantee that other sources of their financial knowledge offer accurate information, and ultimately,

because students seem to value secondary school as the primary source from which their financial literacy education should come.

Although the findings cited here offered insights into the inner workings of personal finance curriculum and teaching within the Ontario secondary school system, they should not be considered generalizable, but rather as reflective of the current state of financial literacy education in Ontario from students' perspectives. Further, and as with several American studies, our survey could have included knowledge and skill-based questions with defined answers to "test" students' knowledge, rather than only using self-reports on their perceived knowledge in the area (Danes & Haberman, 2007; Deng et al., 2013; Mandell, 2008; Peng et al., 2007). Such an approach might have provided greater insight and comparability into student knowledge levels and associated knowledge gaps. Finally, while this study does provide critical information from students' perspective—addressing a persistent gap in the field—we call for additional complementary studies that leverage qualitative data from multiple-stakeholders including teachers, school administrators and the public. Inputs from these additional stakeholders in further studies will offer insights into this study's findings and into the experiences, expectations and outcomes of financial literacy education.

Conclusion

In the context of growing global interest in financial literacy education, this study offers valuable findings with respect to instructional theory and classroom practice. To date, there has been no transdisciplinary framework-related research on the topic of secondary school personal financial curriculum and teaching. Drawing on quantitative survey data, this study showed how secondary school graduate students perceived their experiences with transdisciplinary financial literacy education. Education policymakers and researchers should play close attention to gaps in learning suggested by this research. Empirically, there is a need to further study transdisciplinary curricular implementation of financial literacy curricula. From a policy perspective, we see value in investing in resources and systemic structures to support teachers and school administrators in coordinating and implementing financial literacy curricula. Specifically, findings emphasize the value of more instructional time within a transdisciplinary framework of student inquiry.

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