

CANADIAN JOURNAL OF

Disability Studies

Published by the Canadian Disability Studies Association · Association Canadienne des Études sur l'Incapacité

Canadian Journal of Disability Studies

**Published by the Canadian Disability Studies Association
Association canadienne d'études sur le handicap**

Hosted by The University of Waterloo

www.cjds.uwaterloo.ca

**Are Students with LD Impacted by Online Learning Similarly to their Peers?
An Investigation from an Expectancy Value Theory Lens**

**Les effets de l'apprentissage en ligne sont-ils les mêmes pour les étudiantes et étudiants
ayant des troubles d'apprentissage que pour leurs pairs?
Une étude sous le prisme de la théorie de la valeur attendue**

Lauren D. Goegan
Assistant Professor
University of Manitoba
lauren.goegan@umanitoba.ca

Devon J. Chazan
PhD Candidate
University of Alberta
chazan@ualberta.ca

Lia M. Daniels
Professor
University of Alberta
lia.daniels@ualberta.ca

Abstract

The increased use of online learning in postsecondary education has documented negative impacts for students that may be particularly pronounced for students with learning disabilities (LD). We collected data from 224 postsecondary students with ($n = 44$) and without LD during the Fall 2020 semester when nearly all post-secondary courses in Canada were being offered exclusively online. Using an Expectancy-Value Theory lens, we examined how students' expectancy for success, value ascribed to an academic task, and potential costs were related to their satisfaction, academic achievement, and burnout. Moreover, we wanted to determine how students rated courses they completed before the switch to online learning because of the COVID-19 pandemic to their current courses in terms of expectancy, value, and cost. When considering courses completed after the shift to online learning to ones before, students with LD identified that they had lower expectancies to do well, and perceived their courses to have higher costs than their peers without LD. Moreover, for students with LD, academic achievement was associated with higher expectancy and cost, while burnout was also associated with higher cost, but lower expectancy. Ways to support students with LD during online learning are highlighted.

Résumé

Le recours accru à l'apprentissage en ligne au postsecondaire comporte des effets négatifs documentés chez les étudiants et étudiantes. Ces effets peuvent être particulièrement prononcés chez les personnes ayant des troubles d'apprentissage. Au cours de la session d'automne 2020,

nous avons recueilli des données auprès de 224 étudiantes et étudiants au postsecondaire avec un trouble d'apprentissage (n = 44) et sans trouble d'apprentissage. À l'époque, presque tous les cours de ce niveau étaient offerts exclusivement en ligne au Canada. En utilisant le prisme de la théorie de la valeur attendue, nous avons examiné la manière dont les attentes de réussite des étudiantes et étudiants, la valeur attribuée à une tâche académique et les coûts potentiels étaient liés à leur satisfaction, leur réussite scolaire et leur épuisement professionnel. De plus, nous voulions savoir comment les étudiantes et étudiants évaluaient les cours suivis avant le passage à l'apprentissage en ligne en raison de la pandémie de COVID-19 par rapport aux cours suivis actuellement en termes de leurs attentes, de la valeur et des coûts. En considérant les cours suivis après le passage à l'apprentissage en ligne par rapport aux cours antérieurs, les étudiantes et étudiants ayant des troubles d'apprentissage ont indiqué que leurs attentes de réussite avaient diminué. Elles et ils percevaient également un coût plus élevé que leurs pairs sans trouble d'apprentissage. De plus, chez les étudiants ayant des troubles d'apprentissage, la réussite scolaire était associée à des attentes et à des coûts plus élevés. L'épuisement professionnel était quant à lui associé à des coûts plus élevés et à des attentes plus faibles. Nous présentons également des moyens de soutenir les étudiant·es ayant des troubles d'apprentissage dans le cadre de l'apprentissage en ligne.

Keywords

Postsecondary Education, Learning Disabilities, Expectancy, Value, Cost, Satisfaction, Academic Achievement, Burnout.

Mots-clés

Éducation postsecondaire, troubles d'apprentissage, attentes, valeur, coût, satisfaction, réussite scolaire, épuisement professionnel.

Acknowledgement:

This work was supported by a Social Sciences and Humanities Research Council of Canada (SSHRC) Insight Development Grant (430-2020-00560) awarded to the first and third author.

Introduction

While online learning historically was something students could choose for flexibility or convenience, such choice was rendered irrelevant when public health requirements associated with the COVID-19 pandemic made online courses the norm. Data during COVID-19 suggests that required online learning had negative impacts on postsecondary students' success and well-being (Cantarero et al., 2020; Daniels et al., 2021). For students with learning disabilities (LD), the challenges with online learning were documented prior to the pandemic (Hollins & Foley, 2013). For example, students with LD report greater difficulty than their peers in terms of

navigating online learning platforms (Burgstahler, 2015), accessing accommodations (Simoncelli & Hinson, 2008), managing distractions (Hollins & Foley, 2013), and passing online modules or obtaining good grades (Richardson, 2015). Most often, these challenges are attributed to characteristics of the LD such as difficulties associated with word reading, comprehension, spelling, written expression, number sense, and mathematical reasoning (DSM–5-TR; American Psychiatric Association, 2022). Similarly, individuals with LD can have difficulties when it comes to processing speed, memory, attention, executive functions, and social perceptions or interactions (Learning Disabilities Association of Canada, 2015).

The existing data makes it unsurprising that when students with LD had to learn online during the COVID-19 pandemic they experienced both predictable and new challenges. For example, research by Gin et al., (2021) found that students who identified with a disability more broadly (many of whom identified as LD), had difficulties accessing accommodations, experienced issues with test proctoring technology, had reduced access to material and information, and found video delivery of information somewhat inaccessible. Zawadka et al. (2021) found that students with LD experienced higher stress and identified more difficulties with learning online compared to their peers. Moreover, Goegan et al. (2022) found that students with LD encountered challenges with group work, connecting with instructors for help, and increased workload in addition to regularly noted difficulties accessing their accommodations, even as they described some advantages to online learning.

As the restrictions associated with COVID-19 continued into a second year, students with LD would have become experienced with online learning thereby presenting an opportunity to look beyond the pragmatic challenges to instead consider motivational perspectives about online learning. Indeed, motivational beliefs have been shown to function as a protective factor in

online learning for students without LD (Juntunen et al., 2022). Despite this, motivational perspectives of students with LD are under-represented in the literature broadly. Thus, our purpose was to examine the experiences of students with LD compared to their peers in online learning environments from the motivational framework of Expectancy-Value Theory (EVT; Eccles & Wigfield, 2020) by testing connections between expectancy, value, and cost and three educational outcomes: academic satisfaction, achievement, and burnout.

Theoretical Framework

EVT is a popular theoretical framework for examining student motivation towards an academic task (Eccles & Wigfield, 2020), such as learning online. The theory purports that motivation is driven by two subjective beliefs: expectancy and value. Expectancy refers to the students' belief that they will be successful in a task. Eccles and Wigfield (2020) often refer to this as one's expectancy for success. Without expectancies for success, students are not motivated to invest the effort required to complete a task (Eccles & Wigfield, 2020). Expectancy can be categorized into different components. For example, *ability beliefs* consider one's current abilities to complete the task, while *expectancy beliefs* consider one's ability to complete a future task (Barron & Hulleman, 2015).

Value is described as the overall importance that a student ascribes to the task. Students who have identified value in a task are more likely to apply effort and engage with it than those who have not (Eccles & Wigfield, 2020). Like expectancy, value can be broken down into three components (Eccles & Wigfield, 2020). Students who engage in a task for its *intrinsic value* do so because they enjoy it. Students attach *utility value* to tasks when they perceive its practical purpose. *Attainment value* refers to the fulfillment of students' personal needs, separate from

other specific outcomes (Barron & Hulleman, 2015). Eccles and Wigfield (2020) identify that these components of value are quite subtle, and we consider them as one.

EVT also involves a cost component. Costs associated with pursuing a goal are weighed against the perceived value. The cost of a task is both what a student must sacrifice and the effort one must put into it (Eccles & Wigfield, 2020). Cost has three components. First, the cost of *effort* required to achieve success may be perceived by students as not worthwhile. Second, investing energy in one activity may reduce students' capacity for another. Indeed, when investing effort in one task, there are fewer resources (e.g., less time) to engage in other activities that might be seen as more valuable, defined as an *opportunity cost*. Third, whenever students invest effort, they risk failure and the *psychological costs* associated with potential social implications and negative emotions. Researchers have found cost to be negatively related with students' grades, engagement, motivation (Perez et al., 2019) and perceptions of their success (Goegan, Dueck & Daniels, 2021). Therefore, completing tasks requires a balance between expectancy, value, and cost (Eccles and Wigfield, 2020). From here on we refer to the theory as Expectancy-Value-Cost Theory (EVC-T).

Learning during the COVID-19 Pandemic

The public health requirements associated with the COVID-19 pandemic meant that most Canadian postsecondary institutions adopted full-time online learning from March 2020 to September 2021. For many students, the initial “pivot” to online learning impeded their academic engagement and achievement (Cantanero et al., 2020; Daniels et al., 2021). During this time, psychological distress, procrastination, feelings of isolation, technology-related issues with online communication, and limited resources all challenged students' motivation to learn (e.g., Pelikan et al., 2021). Postsecondary students also reported anxiety related to health uncertainty

(Cao et al., 2020) and substantial financial strain (Statistics Canada, 2020). For students who were switched to remote online learning due to the pandemic, worrying about these uncertainties exacerbated the academic challenges that are regularly experienced with online learning.

Expectancy, Value and Cost during the COVID-19 Pandemic

A handful of studies have examined how the constructs of EVC-T relate to students' experiences with the shift to online learning during COVID-19. For instance, Berweger and colleagues (2022) found that students who perceived their online learning environment as controllable regarding anticipated success (high success expectancies) had increased enjoyment and hope and decreased frustration levels compared to students who did not expect to be successful. They also found that students with high intrinsic value, who perceived their tasks as interesting, experienced more positive emotions and fewer negative emotions associated with their learning. In terms of utility value, more positive outcomes were found for students who considered online learning as a viable alternative for completing their studies and securing a career in the near future (Lin, 2021). Additionally, participants in Lin's study (2021) expressed concerns about the perceived costs associated with online learning, such as the isolation from peers or instructors that comes alongside diminished opportunities for social interaction. Juntunen and colleagues (2022) examined students of different expectancy-value-cost profiles in their relation to psychological wellbeing during online learning. They resolved that a student profile with moderate to high expectancy paired with high value and low costs can buffer the negative psychological impacts associated with online learning during the pandemic.

Students with LD. No study to date has examined the potential contribution of EVC-T components in relation to the online learning experiences of students with LD. We fill this gap by focusing on the impact of mandated online learning on three relevant outcomes to students

with LD: academic satisfaction, academic achievement, and experiences of burnout. Importantly, existing evidence suggests that all three of these outcomes were impacted by online learning during the pandemic. Moreover, academic satisfaction and achievement can be buffered by expectancy and value and hindered by costs, while the opposite is found for burnout (Lent et al. 2007; Rostami et al., 2012; Trautwein & Lüdtke, 2007).

Student Outcomes

Academic Satisfaction

Academic satisfaction refers to the enjoyment an individual derives from their educational experiences (Svanum & Aigner, 2011). In addition to being positively related with overall grades, academic satisfaction has also been positively associated with a focus on learning and improvement (i.e., mastery orientation), which suggests it is a construct that encompasses facets beyond grades alone (Svanum & Aigner, 2011). Researchers indicate that academic satisfaction in online learning environments relate to the quality of their online interactions, technological skills, level of teacher support, and quality of course design, among other factors (Kuo et al., 2014). Hamdan and colleagues (2021) examined university students' satisfaction with online learning during the pandemic. Among others, the authors found that self-regulation and self-efficacy, specifically tailored to navigating remote learning, to be positive predictors of students' satisfaction with their online courses. Cataudella and colleagues (2021) note self-efficacy to be markedly low among LD students learning online due to reduced accessibility. Further, tasks that are perceived to be personally relevant, aligned with one's goals, and interesting (i.e., value perceptions) have also been found to positively predict academic satisfaction. Therefore, examining these EVC-T components as potential buffers to the negative impact of online learning on satisfaction among LD students is a worthwhile endeavor.

Academic Achievement

Despite debate as to the validity of using grades as a central indicator of academic success grade point average (GPA) is the most utilized indicator of academic success practiced in research (York et al., 2015). As a result of the many school closures during the pandemic, students experienced lost learning (e.g., Dorn et al., 2020). Moreover, Breaux and colleagues (2021) found that GPA significantly dropped from pre-pandemic semesters to during-pandemic semesters for students with ADHD, whereas they did not find this same change in GPA for students without ADHD. As students with LD can have similar impairments in executive functioning, it is possible that their academic achievement might be impacted to a greater degree than their peers without LD during online learning. EVC-T beliefs also strongly link to students' academic achievement (Trautwein & Lüdtke, 2007). Students with high expectancies for success, high value of the task, and low costs to engaging with the material, are more likely to obtain higher grades than students with an inverse EVC-T profile. Achievement falls when expectancy and value beliefs are low due to the fact that students with low expectancy beliefs are less likely to invest effort into their schoolwork (Trautwein et al., 2009), whereas those with low value beliefs lack the interest necessary for optimal academic engagement (Trautwein et al., 2006).

Burnout

Described as a psychological state caused by prolonged stress, burnout is typically associated with prolonged work or school-related stress (Maslach & Leiter, 2016). Burnout includes emotional exhaustion (e.g., energy depletion, fatigue), feeling disconnected (e.g., withdrawal, negative attitudes), and reduced personal accomplishment (e.g., decreased productivity/ ability to cope; Maslach & Leiter, 2016). The many stressors previously identified with online learning might similarly influence postsecondary students' burnout experiences. It is likely that burnout is

especially important to consider in students with LD who already report increased levels of fatigue associated with learning and higher dropout rates compared to their peers prior to the pandemic (Ben-Naim et al., 2017; Cortiella & Horowitz, 2014).

Additionally, the outcome of burnout also has links to the EVC-T components. First, some seminal work in the field of burnout actually conceptualizes the construct as a “crisis in self-efficacy” (Leiter, 1991). Namely, that weak expectancies for success and perceived expertise in an area relate to having a decreased sense of accomplishment and, consequently, increased experience of psychological burnout. Second, researchers have examined a link between interest/task value and academic burnout, where greater interest is related to decreased burnout experiences (Rostami et al., 2012). Third, cost is inherently enmeshed with burnout as the measurement of emotional/psychological cost is operationalized as exhaustion, mental depletion, stress, and anxiety, all characteristics of burnout as we understand it (Flake et al., 2015). Perhaps the protective effects of an adaptive EVC-T student profile, high in expectancy and value and low in cost, on psychological impacts outlined by Juntunen and colleagues (2022) would work similarly in buffering LD students’ experiences of burnout during online learning.

The Current Study

Using EVC-T as our theoretical model (Eccles & Wigfield, 2020), the purpose of the current research was to examine the experiences of students with LD in online learning environments and the outcomes of academic satisfaction, achievement, and burnout. In particular, we were interested in these outcomes because they are student outcomes that were compromised during online learning in the pandemic and maybe buffered by EVT. This investigation is important as learning online continues for many students. As such, our research questions were as follows, (a) Are there group differences between students with LD and their non-LD peers when self-

reporting levels of expectancy, value and cost for online learning? (b) Do the EVC-T components of expectancy, value and cost predict students' academic satisfaction, achievement, and burnout for students with LD and their non-LD peers?

Method

Using a correlational design, we administered an online survey in the Fall of 2020 to collect students' responses on measures of EVT, academic satisfaction, academic achievement, and burnout. During this semester, students were learning almost exclusively online due to the COVID-19 pandemic. Before data collection, ethics approval was obtained from the Human Ethics Research Office at the researchers' university.

Procedures

A link to our survey was posted online to various social media platforms including Reddit and Facebook. Specifically, we posted to subreddits and Facebook groups that were designated for postsecondary students in Western Canada. Moreover, we contacted various postsecondary institutions asking them to share the link through the undergraduate listservs. Once students clicked on the link to the survey, they were prompted to read the information letter that outlined the details of the study and consent was implied by their completion of the survey. The survey required 10-15 minutes to complete.

Participants

In total, 283 postsecondary students completed the survey. We then removed students from the sample if a) they were not an undergraduate student ($n = 34$) and b) students who were not taking courses online ($n = 25$). The final sample consisted of 224 undergraduate students who were taking courses online in a synchronous (49%) or asynchronous format (51%). Moreover, of these students 44 identified as having an LD. Participants ranged in age from 18 to 46 ($m = 21.33$).

Most of the participants identified as women (77%), while 15% identified as men, 6% identified as non-binary, and 2% preferred not to disclose. Participants ranged in what year of their program they were currently enrolled in with 18% in their first year, 29% in their second, 23% in their third, 19% in their fourth and 11% in their fifth year or higher. Participants self-identified as Black (2.8%), Chinese (11.1%), South Asian (8.9%), Southeast Asian (5.6%), Latin American (2.2) and White (59.4%), with the remaining 10% indicating that was less than 2% of the sample. Moreover, students were from a variety of faculties with the most common being Science, Arts, Engineering, Education, and Social Sciences.

Measures

Descriptive Measures

Participants responded to five items that we utilized to describe the sample: age, gender, year in program, ethnicity, and faculty. Students self-identified as having an LD or not. Students were also prompted at the beginning of the survey: “thinking about one required course you are taking in the fall 2020 semester, list that course by number here: (e.g., BIOL107)” and indicate the class size and delivery format for this course (i.e., synchronous, or asynchronous).

Expectancy Value Theory

Comparison Items. To evaluate students' perceptions of their online courses during the COVID-19 pandemic to their previous learning experiences we used a semantic differential-type scale (Stoklasa et al., 2019) and three direct questions about expectancy, value, and cost. For expectancy we asked, “I feel I can be successful in this course,” for value we asked, “I do not value the course.” and for cost, we asked “I feel like there is too much work to do in this course.” The semantic differential-type scale used 1 = a lot less than before COVID-19 to 7 = a lot more than before COVID-19. Means and standard deviations are provided in Table 1.

Expectancy-Value-Cost Scales. To measure EVT in the current online courses, we utilized 10 items developed by Kosovich et al. (2015). These items were originally developed to assess math or science with middle school students but were modified here to assess a course more broadly. We included three items to assess expectancy (e.g., I believe I can be successful in my class), three items to assess value (e.g., I think my class is useful) and four items to assess cost (e.g., I'm unable to put in the time needed to do well in my class). Students respond to each item on a 6-point Likert scale from 1 (strongly disagree) to 6 (strongly agree).

Criterion Measures

Academic Satisfaction. Academic satisfaction was assessed using six items developed by Schmitt et al. (2008). These items examine students' overall satisfaction with their academic experiences and were modified to examine their specific course. For example, "I'm happy with the amount I learn in my classes" became singular. Students responded to each item on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

Academic Achievement. For academic achievement, we asked the following item "What do you anticipate your grade in the course to be? Students were provided with a scale from A/A+ to F. Responses were then re-coded into the traditional GPA 4.0 scale with A = 4.0, A- = 3.70, B+ = 3.3 and so forth. Higher scores indicated higher anticipated grades in the course.

Burnout. Burnout was assessed using six items that were modified from the Copenhagen Burnout Inventory (Kristensen, et al., 2005). This scale was designed for work-related burnout, however, the items were adjusted to reflect school. For example, the item "Do you feel burnt out because of your work?" became "Do you feel burnt out because of your *course*? (italics added for emphasis). Moreover, the seventh item in the scale was removed because it is a reverse-coded item which have been found to be difficult for individuals with LD (Geiger & Brewster, 2018).

Based on the specific question, students responded on a 5-point Likert scale with the increments of 0 – To a very low degree, 25 – To a low degree, 50 – Somewhat, 75 – To a high degree, and 100 – To a very high degree, or with the increments 0 – Never/Almost Never, 25 – Seldom, 50 – Sometimes, 75 – Often, and 100 – Always. To calculate burnout scores, students’ responses were summed and averaged with higher scores indicating they experienced more burnout.

Rationale for Analysis

Due to unequal sample sizes, all analyses treated students with and without LD as separate groups ($n = 44$ and $n = 180$ respectively). First, we performed three independent samples *t*-tests to examine the differences between students with LD and their peers on the comparison items of EVC-T. Second, we conducted correlations and coefficient alpha on the main study variables. Third, we used regression analyses to examine the relationship between the EVC-T subscales of expectancy, value, and cost and the three outcome variables of academic satisfaction, academic achievement, and burnout.

Table 1

Descriptive Statistics and Independent Samples T-tests of Perceptions of EVC-T

Variable	Students with LD		Non-LD Students		<i>t</i> -value
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
COVID – Expectancy	3.52	1.89	4.36	1.70	-2.68**
COVID – Value	3.23	1.88	2.89	1.72	1.13
COVID – Cost	4.98	1.77	3.89	1.75	3.64***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. Midpoint of this scale would be neutral at 4.0; (1) = a lot less than before COVID-19 to (7) = a lot more than before COVID-19

Results

Independent Samples T-tests – COVID Specific

The descriptive statistics and results for the independent samples T-tests for the COVID specific items are provided in Table 1. Within the group, students with LD reported feeling slightly lower expectancy and value regarding their current online courses relative to their courses before COVID-19. They also perceived their current learning circumstances as having more costs than before COVID-19. In contrast, within the group students without LD scored essentially neutral on expectancy and cost indicating no real change to these beliefs because of COVID-19. However, they perceived a substantial reduction in value, indicating that it was harder for them to find value in online learning during COVID-19 relative to their previous learning experiences. In terms of comparisons between the two groups of students, the changes in expectancy and cost differed significantly such that students with LD had further reduced expectancy and increased costs relative to non-LD students.

Table 2
Descriptive Statistics

Variable	Students with LD			Non-LD Students		
	α	M	SD	α	M	SD
Expectancy	.84	4.23	1.18	.86	4.63	.86
Value	.94	4.36	1.40	.89	4.86	.89
Cost	.72	4.06	1.10	.80	3.64	1.20
Academic Satisfaction	.86	3.47	.95	.84	3.72	.76
Academic Achievement	N/A	2.95	.79	N/A	3.30	.71
Burnout	.85	65.60	22.11	.91	54.94	22.27

Preliminary Analyses for Regressions

The descriptive statistics for the predictor and criterion variables are provided in Table 2 and correlations are in Table 3. For both groups there was evidence of good internal consistency. For both groups, expectancy and value were positively correlated, and for non-LD students, value and cost were negatively correlated. For students with LD, academic satisfaction was positively correlated with value, and academic achievement and burnout were both negatively correlated with expectancy and positively correlated with cost. For non-LD students, academic satisfaction and achievement were positively correlated with expectancy and value, but negatively correlated with cost. Alternatively, burnout was negatively correlated with expectancy and value and positively correlated with cost.

Regression Analyses

The results from the regression analyses are provided in Table 4 separate for students with LD and their non-LD peers.

Table 3
Correlations – Students with LD below and students without LD above diagonal

	1	2	3	4	5	6	7	8
1. Delivery	-	.18**	.06	.04	.05	-.05	.15	.02
2. Class Size	.08	-	-.03	.04	-.02	-.04	-.03	.01
3. EVT – Expectancy	-.26	-.41**	-	-.25**	.61***	.44***	.36***	-.34***
4. EVT – Cost	-.17	.03	-.05	-	-.11	-.33***	-.18*	.54***
5. EVT – Value	-.22	-.33*	.69***	-.13	-	.52***	.33***	-.26***
6. Academic Satisfaction	-.08	-.09	.23	-.14	.40**	-	.44***	-.40***
7. Academic Achievement	-.16	-.35*	-.37*	.49**	.09	-.14	-	-.31***
8. Burnout	.20	.13	-.32*	.46**	-.11	-.36*	.08	-

Note. Delivery: format as 1 = synchronous, 2 = asynchronous, EVT = Expectancy Value Theory

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 4
Regression Analyses for Academic Satisfaction, Achievement and Burnout

	Academic Satisfaction				Academic Achievement				Burnout			
	Students with LD		Non-LD students		Students with LD		Non-LD students		Students with LD		Non-LD students	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
1. Class Size	-.07	.04	-.01	.01	-.36*	-.27*	-.04	-.03	.10	.02	-.01	-.02
2. Delivery	-.08	-.04	-.07	-.09	-.11	.03	.14	.12	.20	.26	.02	.01
3. Expectancy		-.09		.15		.46**		.24*		-.45*		-.14
4. Value		.45*		.39***		-.25		.15		.33		-.13
5. Cost		-.09		-.24***		.49***		-.10		.53***		.49***
Adjusted R^2	-.04	.07	-.01	.32***	.11*	.42***	.01	.14***	.02	.33***	-.01	.33***

Note. Delivery: format as 1 = synchronous, 2 = asynchronous, * $p < .05$, ** $p < .01$, *** $p < .001$.

Academic Satisfaction

For students with LD at Step 1, neither class size or delivery format were significant predictors, $F(2, 40) = .26, p = .078$. At Step 2, value was a significant positive predictor of academic satisfaction, however, the overall model remained non-significant $F(5, 37) = 1.58, p = .019$. For the non-LD students at Step 1, none of the variables were significant predictors, $F(2, 176) = .47, p = .62$. At Step 2, value was a significant positive predictor while cost was a significant negative predictor of academic satisfaction, $F(5, 173) = 18.07, p < .001$.

Academic Achievement

In terms of academic achievement, for students with LD, at Step 1 class size was a significant negatively predictor, $F(2, 40) = 3.50, p = .04$, meaning that smaller classes were related to higher

self-reported academic achievement. Delivery format was not a significant predictor. At Step 2, class size remained a significant predictor, along with expectancy and cost that were both positive predictors of academic achievement, $F(5, 37) = 6.97, p < .001$. In terms of the non-LD students, at Step 1, neither class size or delivery format were significant predictors $F(2, 176) = 1.71, p = .18$. At Step 2, only expectancy was a significant, positive predictor of academic achievement $F(5, 173) = 6.64, p < .001$.

Burnout

In terms of burnout for students with LD, at Step 1 there were no significant predictors, $F(2, 40) = 1.15, p = .33$. At Step 2, expectancy and cost were significant predictors, with expectancy being a negative predictor and cost being a positive one, $F(5, 37) = 4.97, p = .001$. For the non-LD students, in Step 1 class size and delivery format were not significant predictors, $F(2, 176) = .06, p = .94$. In Step 2, cost significantly and positively predicted burnout, $F(5, 173) = 17.95, p < .001$.

Discussion

Our findings highlight the connections between expectancy, value, and cost to important educational outcomes, including academic satisfaction, achievement, and burnout during online learning. In so doing, we advanced the field by contributing to the research examining online learning from an EVT lens and expanding the findings to include individuals with LD specifically. Overall, students with LD perceived online learning differently from their peers when reflecting on the expectations, value, and costs associated with online learning. Differences between the two groups of students were also evident in the results from the regression analyses. We discuss a) the perceptions of students when considering courses pre-pandemic to their current online courses students were taking because of the pandemic, b) extending the use of

EVC-T to examine the online learning experiences of students broadly, but students with LD in particular, and c) providing recommendations for instructors and administrators at postsecondary institutions for supporting students with courses taught online. Moreover, we discuss the limitations of our study and possible directions for future research.

Changes in EVC-T

The results of our independent samples *t*-tests paint a concerning picture for students with LD and learning online during the pandemic. Indeed, even though they continued to value their courses similarly to their peers, students with LD did not expect to be as successful and identified higher costs with their online courses. While we did not provide students with an opportunity to explain their responses, this notion of increased costs is supported by previous literature showing students with LD experience delayed responses from their instructors, increased written communication, and problems accessing accommodations (e.g., Cataudella et al., 2021). Their concerns for success are also found with previous research showing students with LD have lower grades and being less likely to pass online learning modules compared to their peers (Richardson, 2015). Taken together, the responses from the students with LD suggest they have a less motivating experience with learning online than their peers.

EVT and Outcomes

The results from our regression analyses provide an additional layer to understanding the online learning experiences of students. Like Berweger and colleagues (2022) who found a positive association amongst valuing online learning and positive emotions, we found value associated with academic satisfaction. It is important to note that while value was a significant predictor for academic satisfaction, the overall model was non-significant for students with LD. This could be the result of a small sample size ($n = 44$) that led to an instability in the coefficients in the

regression analyses. Therefore, future research is needed to further examine the connections between the components of EVT and academic satisfaction for these students.

The result from our regressions examining academic achievement and burnout provide important distinctions between LD and non-LD students. Expectancy positively predicted academic achievement in both groups; however, for LD students only cost was also positively associated with achievement. This positive association is counterintuitive and contrary to most existing literature which overwhelmingly shows costs as bad for achievement in typical samples (Flake et al., 2015). This finding may in part be related to the perception of students with LD that they need to work harder than their peers to be successful (Goegan, Pelletier & Daniels, 2021). In other words, students with LD have already accepted the costs associated with learning and in this instance that works to their advantage. The harm of the cost of online learning for all students is clear in terms of burnout. The positive association between cost and burnout was strong for both groups; however, burnout was buffered by expectations for students with LD. Previous research has found that more than half of students experienced a larger or significantly larger workload during online learning (Aristovnik et al., 2020).

Recommendations for Postsecondary Institutions

Overall, our results lead to two recommendations: increase expectations and decrease cost. For students with LD, the difference between greater academic achievement or greater burnout was whether expectancy was a positive or negative predictor. For academic achievement, the valence of expectancy was positive, for burnout it was negative. Therefore, instructors could focus their efforts on ensuring that students with LD believe they are capable of completing the tasks in their courses. This highlights the importance of developing self-efficacy, that is “beliefs in one's capabilities to mobilize the motivation, cognitive resources, and courses

of action needed to meet given situational demands.” (Wood and Bandura, 1989, p. 407).

Indeed, previous research has found that students with LD identify lower self-efficacy compared to their peers (Ben-Naim et al., 2017; Goegan & Daniels, 2022), and challenges with online learning can impact a student’s self-efficacy (Cataudella et al., 2021). To combat this, we draw on the principles for instructional design from Linnenbrink-Garcia et al. (2016) and encourage instructors to create tasks that are well suited to students’ existing skills, provide models for demonstrating tasks, support students in setting specific and attainable goals, and providing positive and encouraging feedback. These recommendations are further supported by the guidelines of universal design for learning (UDL; CAST, 2018). For example, checkpoint 9.1 of the guidelines outlines promoting expectations and beliefs that optimize motivation, while checkpoint 6.1, provides information about appropriate goal-setting.

Moreover, to assist students during online learning, it is important to consider ways to reduce motivational costs. Indeed, researchers have found that greater cost is associated with more negative learner outcomes such as reduced grades, engagement, motivation (Perez et al., 2019). Our results extend the findings here to highlight an additional negative outcome, that is burnout. One potential avenue to reduce costs associated with online learning is to consider effort costs (Eccles & Wigfield, 2020). While effort is important for academic achievement, researchers highlight the importance of connecting effort to strategy use (e.g., Linnenbrink-Garcia et al., 2016). Some strategies for online learning could include, providing step-by-step instruction guides for completing online tasks to ensure students are able to navigate the online learning environment, or creating short videos with important information (Rao et al., 2021). Moreover, for completing online tasks, instructors could provide sample assignments students can reference. Utilizing strategies was found to be an important theme for students with LD

during the early stages of learning online as a result of the COVID-19 pandemic and their persistence and resilience in their academic studies (Goegan et al., 2022). Another important perceived cost to consider is the isolation for peers or instructors, and the decrease in opportunities to connect with others (Goegan et al., 2022; Lin, 2021). Therefore, additional strategies could be around findings ways to stay connected with others when completing online courses. This recommendation is supported by the UDL guidelines that highlight the importance of fostering collaboration and community (CAST, 2018). Potential avenues for creating a sense of community could be attending social events online, forming virtual study groups or staying connected via email. Furthermore, staying connected with others, could provide an important resource for developing new strategies based on the recommendations for others.

Limitations and Future Research Directions

The results here should be considered in light of three limitations. First, we recruited a convenience sample of students at postsecondary institutions across Western Canada. As such, this could impact the generalizability of our findings to other groups of students. Moreover, students with LD were required to self-identify as having a LD. While students with LD often do not self-identify for fear of discrimination (Goegan et al., 2018), self-report methods have been suggested by previous researchers to be a valid way for identifying individuals with LD in research (McGonnell et al., 2007). Indeed, for our study in particular, students completed the questionnaire anonymously, which could have been encouraging for students with LD to self-identify. Wanting to ensure anonymity of our participants, we were unable to follow-up with them to further examine why students with LD felt lower expectancies for success or higher costs. Therefore, future research could implement a phenomenological approach to further

examine the lived experiences of students with LD learning online to examine more of the *why* behind their responses here.

A second limitation to our study is that we used a correlational design. A longitudinal research design could provide further information concerning students' comparison to courses before and during the COVID-19 pandemic as well as, between students with LD and their non-LD peers. Moreover, our regression analyses were able to predict up to 40% of the variance in our outcome measures and thus future research should consider additional variables in similar analyses. For example, including students' previous GPA as a predictor for current GPA in their online course could account for additional variance in scores and provided further information to the result here.

A third limitation to our study is that additional information about a student's online courses was not obtained. For example, we did not ask students whether the course they identified as completing online was a required course or an elective. This could have impacted the results here concerning value, as value was not significant in the regression analysis concerning academic achievement and burnout. Moreover, we were unable to control for level of the course. As our questions were retrospective in nature, it seems logical that when looking back courses may have been considered easier because they were of a lower level compared to the course they were currently enrolled in, regardless of online status. Therefore, future research should include additional items about courses when asking students to reflect on their learning experiences. Indeed, these additional items could have accounted for further variance in our regression analyses here.

Conclusion

Our findings contribute to the growing research examining the impact of online learning on students with LD. Moreover, our findings advance the field by examining online learning from the theoretical lens of Expectancy Value Theory. This study emphasizes the importance of considering theory when examining the online learning experiences of students. Overall, our findings demonstrate that there are higher costs for students with LD when it comes to learning online when compared to their peers. Therefore, to aid them in their learning, appropriate resources and services need to be developed. As such, we have provided several strategies for supporting postsecondary institutions and instructors when developing or adapting their online courses to aid students with LD. As online learning continues for students, further research is needed to continue to examine how to best support learners online.

References

- American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.). <https://doi.org/10.1176/appi.books.9780890425787>
- Barron, K. E., & Hulleman, C. S. (2015). Expectancy-value-cost model of motivation. *Psychology, 84*, 261-271. <https://doi.org/10.1016/B978-0-08-097086-8.26099-6>
- Ben-Naim, S., Laslo-Roth, R., Einav, M., Biran, H., & Margalit, M. (2017). Academic self-efficacy, sense of coherence, hope and tiredness among college students with learning disabilities. *European Journal of Special Needs Education, 32*(1), 18-34.
- Berweger, B., Born, S., & Dietrich, J. (2022). Expectancy-value appraisals and achievement emotions in an online learning environment: Within-and between-person relationships. *Learning and Instruction, 77*, 101546.
- Breaux, R., Dvorsky, M. R., Marsh, N. P., Green, C. D., Cash, A. R., Shroff, D. M., ... & Becker, S. P. (2021). Prospective impact of COVID-19 on mental health functioning in adolescents with and without ADHD: Protective role of emotion regulation abilities. *Journal of Child Psychology and Psychiatry, 62*(9), 1132-1139.
- Cantarero, K., van Tilburg, W. A., & Smoktunowicz, E. (2020). Affirming basic psychological needs promotes mental well-being during the COVID-19 outbreak. *Social Psychological and Personality Science, 12*(5), 821-828. <https://doi.org/10.1177/1948550620942708>
- Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry research, 287*, 112934.
- CAST (2018). Universal Design for Learning Guidelines 2.2. <http://udlguidelines.cast.org>
- Cortiella, C., & Horowitz, S. H. (2014). The state of learning disabilities: Facts, trends and emerging issues. *New York: National center for learning disabilities, 25*(3), 2-45.
- Daniels L. M. & Goegan, L. D., Parker, P. C. (2021). The impact of COVID-19 triggered changes to instruction and assessment on university students' self-reported motivation, engagement, and perceptions. *Social Psychology of Education, 24*(1), 299-318. <https://doi.org/10.1007/s11218-021-09612-3>
- Dorn, E., Hancock, B., Sarakatsannis, J., & Viruleg, E. (2020). COVID-19 and learning loss—disparities grow and students need help. *McKinsey & Company, December, 8*, 6-7.
- Eccles, J. S., & Wigfield, A. (2020). From expectancy-value theory to situated expectancy-value theory: A developmental, social cognitive, and sociocultural perspective on motivation. *Contemporary educational psychology, 61*, 101859.

- Flake, J. K., Barron, K. E., Hulleman, C., McCoach, B. D., & Welsh, M. E. (2015). Measuring cost: The forgotten component of expectancy-value theory. *Contemporary educational psychology, 41*, 232-244. <https://doi-org.uml.idm.oclc.org/10.1016/j.cedpsych.2015.03.002>
- Geiger, E. F., & Brewster, M. E. (2018). Development and evaluation of the individuals with learning disabilities and/or difficulties perceived discrimination scale. *The Counseling Psychologist, 46*(6), 708–737. <https://doi.org/10.1177/0011000018794919>
- Goegan, L. D., Daniels L. M. (2022). Online learning for students with LD and their peers: The association between basic psychological needs and outcomes. *Learning Disabilities Research & Practice, 37*(2), 140-150. <https://doi.org/10.1111/ldrp.12277>
- Goegan, L. D., Dueck, B. S. & Daniels, L. M. (2021). Are you feeling successful? – Examining postsecondary student perceptions of success with an Expectancy Value Theory lens. *Social Psychology of Education, 24*(4), 985-1001. <https://10.1007/s11218-021-09641-y>
- Goegan, L. D., Li, L. & Daniels, L. M. (2022). Online learning is a rollercoaster: Postsecondary students with learning disabilities navigate the COVID-19 pandemic. *Learning Disabilities Quarterly. https://doi.org/10.1177/07319487221090912*
- Goegan, L. D., Pelletier, G. N., & Daniels, L. M. (2021). I just have to try harder: Examining the mindsets of students with LD. *Canadian Journal of School Psychology. https://doi.org/10.1177/0829573521998954*
- Goegan, L. D., Radil, A. I. & Daniels L. M. (2018). Accessibility in questionnaire research: Integrating universal design to increase the participation of individuals with learning disabilities. *Learning Disabilities: A Contemporary Journal, 16*(2), 177-190.
- Government of Canada. (2020, May 13). *Impacts of the COVID-19 pandemic on postsecondary students*. Statistics Canada. Retrieved from <https://www150.statcan.gc.ca/n1/daily-quotidien/200512/dq200512a-eng.htm>
- Hamdan, K. M., Al-Bashaireh, A. M., Zahran, Z., Al-Daghestani, A., Samira, A. H., & Shaheen, A. M. (2021). University students' interaction, Internet self-efficacy, self-regulation and satisfaction with online education during pandemic crises of COVID-19 (SARS-CoV-2). *International Journal of Educational Management.*
- Harackiewicz, J. M., Canning, E. A., Tibbetts, Y., Priniski, S. J., & Hyde, J. S. (2016). Closing achievement gaps with a utility-value intervention: Disentangling race and social class. *Journal of personality and social psychology, 111*(5), 745.

- Hollins, N., & Foley, A. R. (2013). The experiences of students with learning disabilities in a higher education virtual campus. *Educational Technology Research and Development, 61*(4), 607-624.
- Juntunen, H., Tuominen, H., Viljaranta, J., Hirvonen, R., Toom, A., & Niemivirta, M. (2021). Feeling exhausted and isolated? The connections between university students' remote teaching experiences, motivation, and psychological well-being during the COVID-19 pandemic.
- Kosovich, J. J., Hulleman, C. S., Barron, K. E., & Getty, S. (2015). A practical measure of student motivation: Establishing validity evidence for the expectancy-value-cost scale in middle school. *The Journal of Early Adolescence, 35*(5-6), 790-816.
- Kuo, Y. C., Walker, A. E., Schroder, K. E., & Belland, B. R. (2014). Interaction, Internet self-efficacy, and self-regulated learning as predictors of student satisfaction in online education courses. *The internet and higher education, 20*, 35-50.
- Learning Disabilities Association of Canada (LDAC; 2015, March). *Official Definition of Learning Disabilities*. <http://www.ldac-acta.ca/learn-more/ld-defined/official-definition-of-learning-disabilities>.
- Lent, R. W., Singley, D., Sheu, H. B., Schmidt, J. A., & Schmidt, L. C. (2007). Relation of social-cognitive factors to academic satisfaction in engineering students. *Journal of Career Assessment, 15*(1), 87-97.
- Lin, T. J. (2021). Exploring the differences in Taiwanese university students' online learning task value, goal orientation, and self-efficacy before and after the COVID-19 outbreak. *The Asia-Pacific Education Researcher, 30*(3), 191-203.
- Maslach, C., & Leiter, M. P. (2016). Understanding the burnout experience: recent research and its implications for psychiatry. *World psychiatry, 15*(2), 103-111.
- McGonnell, M., Parilla, R., & Deacon, S. H. (2007). The recruitment and description of university students who self-report difficulty acquiring early reading skills. *Exceptionality Education Canada, 17*(2), 155-174. <https://doi.org/10.5206/eei.v17i2.7602>
- Pelikan, E. R., Lüftenegger, M., Holzer, J., Korlat, S., Spiel, C., & Schober, B. (2021). Learning during COVID-19: the role of self-regulated learning, motivation, and procrastination for perceived competence. *Zeitschrift für Erziehungswissenschaft, 24*(2), 393-418.
- Rao, K., Torres, C., & Smith, S. J. (2021). Digital Tools and UDL-Based Instructional Strategies to Support Students With Disabilities Online. *Journal of Special Education Technology, 1-8*. <https://doi.org/10.1177/0162643421998327>

- Richardson, J. T. (2015). Academic attainment in students with dyslexia in distance education. *Dyslexia*, 21(4), 323-337. <https://doi.org/10.1002/dys.1502>
- Schmitt, N., Oswald, F. L., Friede, A., Imus, A., & Merritt, S. (2008). Perceived fit with an academic environment: Attitudinal and behavioral outcomes. *Journal of Vocational Behavior*, 72(3), 317-335.
- Simoncelli, A., & Hinson, J. M. (2008). College students' with learning disabilities personal reactions to online learning. *Journal of College Reading and Learning*, 38(2), 49-62.
- Stoklasa, J., Talášek, T., & Stoklasová, J. (2019). Semantic differential for the twenty-first century: scale relevance and uncertainty entering the semantic space. *Quality & Quantity*, 53(1), 435-448. <https://doi.org/10.1007/s11135-018-0762-1>
- Sukhawathanakul, P., Hadwin, A., Rostampour, R., Bahena Olivares, M., & Shostak, K. (2022). Studying Under Stress: The Effect of COVID-19 Psychological Distress on Academic Challenges and Performance of Post-Secondary Students. *Journal of College Student Retention: Research, Theory & Practice*, 15210251221104245.
- Sung, C. W., Chen, C. H., Fan, C. Y., Chang, J. H., Hung, C. C., Fu, C. M., ... & Lee, T. S. H. (2021). Mental health crisis in healthcare providers in the COVID-19 pandemic: a cross-sectional facility-based survey. *BMJ open*, 11(7), e052184.
- Svanum, S., & Aigner, C. (2011). The influences of course effort, mastery and performance goals, grade expectancies, and earned course grades on student ratings of course satisfaction. *British Journal of Educational Psychology*, 81(4), 667-679.
- York, T. T., Gibson, C., & Rankin, S. (2015). Defining and measuring academic success. *Practical assessment, research, and evaluation*, 20(1), 5.