Does Inclusive Teaching Impact College Adjustment and Performance for Students With and Without Disabilities?

Catherine Beaulieu[3]
Simon Larose[1]
Géraldine Heilporn[1]
Julien S. Bureau[1]
Caroline Cellard[1]
Michel Janosz[2]
Geneviève Boisclair Châteauvert[1]

Abstract

The rise in numbers of postsecondary students who require adapted services underscores the need for inclusive teaching practices to help students with disabilities adjust and succeed. Despite the growth in studies on this topic, quantitative data are lacking on the prevalence of these practices in high school and college, and their predictive ability for student adjustment and academic performance. This repeated measures study involved students attending 10 colleges in the Province of Quebec (Canada), 42% of whom disclosed a disability at college entry. Students completed a battery of online questionnaires in October 2019 (n = 1,826) and a second battery in April–May 2020 (n = 1,435). They included assessments of teachers' use of inclusive teaching practices in high school and college, as well as student adjustment and academic performance in college. Results indicate that inclusive practices were perceived by students as not universally applied, and that their prevalence varied according to teaching level and disability status. While some inclusive practices positively predicted college adjustment and academic performance, others had negative effects on these outcomes. Results are discussed in light of the principles of Universal Design for Learning and with a view to developing inclusive teaching practices in high school and college.

Keywords: disability in higher education, inclusive teaching, college adjustment, high school, college, academic performance

In the past two decades, the number of students with disabilities (SWD) who attend postsecondary schools has grown significantly. The data from college and university support services in the U.S. and Canada suggest that about 10-20% of the total student population is currently receiving disability services (NCES, 2021; AQUICESH, 2020). However, this number includes only those students who receive the services, leaving out all those who decline to seek help. At college entry, this silent group is estimated at almost two-thirds the size of the population of students who were identified as disabled in high school (Gaudreault et al., 2018; Sanford et al., 2011; Newman et al., 2011).

In this context, and in view of the adaptation challenges that SWD must overcome (DuPaul et al., 2009; Nordstrom et al., 2014; Pievky & McGrath, 2018), many colleges are promoting and prioritizing inclusive teaching practices, particularly for newly arrived students. Inclusive teaching practices aim to adapt traditional curricula to better respond to diverse student needs by providing a variety of methods and materials for instruction, engagement, learning, and assessment (Gawronski et al., 2016; Orr & Hammig, 2009; Schreffler et al., 2019). Yet, despite the merits of these practices, few studies have documented their prevalence in college and their links with adjustment in SWD. Following Lombardi et al. (2011)

[1]Université Laval; [2] Université de Montréal; [3] Cégep de Saint-Laurent

and Gawronski et al. (2016), the general objective of the present study was to describe inclusive teaching practices in high school and college as perceived by Quebec students and to determine their capacity to predict adjustment and academic performance in college. Below, we define inclusive teaching practices in detail, consider their prevalence, and examine their empirical relationships with various indicators of adjustment and academic performance.

Definition of Inclusive Teaching Practices

Inclusive teaching practices are defined based on the principles of universal accessibility, known as Universal Design (UD). In the UD framework, physical and environmental barriers are removed to allow equal access for as many people with a disability as possible (Lombardi & Murray, 2011; Schreffler et al., 2019). When applied to teaching settings, one promising approach derived from UD principles is Universal Design for Learning (UDL) that aims to adapt courses by providing options to answer the needs of diverse students, and particularly SWD (Basham et al., 2020; Orr & Hammig, 2009; Schreffler et al., 2019). To this end, UDL-informed inclusive teaching practices are articulated around three main principles: multiple means of engagement, multiple means of representation, and multiple means of action and expression (Basham et al., 2020; Cumming & Rose, 2021; Schreffler et al., 2019). To foster engagement, the practices should be motivating and interesting for students, at least in theory (e.g., using interactive technology, active student participation in learning, content that students from various contexts can identify with). Representation is enabled by the use of materials that students with particular sensory and perceptual disabilities can access (e.g., multiple formats: pdf, audio, braille). Action and expression are encouraged when students have various options for demonstrating and sharing their knowledge (e.g., oral presentation, portfolio, written exam, video clip; (CAST, 2015, Meyer et al., 2014). Thus, inclusive teaching practices attempt to eliminate barriers to inclusion through a variety of instructional methods and materials, flexible assessments, and technologies that accommodate individual needs (Gawronski et al., 2016). They are designed to facilitate the integration of diverse types of learners (e.g., SWD, first generation college students, students coming from other culture or native language than their peers). In addition, they can reduce requests for specific accommodations in the classroom (Lombardi et al., 2011). Hence, inclusive teaching environments lessen the need for individual accommodations and promote full inclusion of populations of SWD.

Prevalence of Inclusive Teaching Practices

It is difficult to determine the prevalence of inclusive teaching practices in high school and college due to the variability of practices measured across studies, and the scarcity of quantitative studies in this area (Rao et al., 2014; Seok et al., 2018; Schreffler et al., 2019). However, recent studies surrounding the development and validation of the Inclusive Teaching Strategies Inventory (ITSI) have taken the first steps toward this objective (Lombardi et al., 2011; Lombardi & Murray, 2011). The ITSI was developed to examine teachers' and students' attitudes toward the tenets of UDL and their perceptions of the use of inclusive practices in postsecondary education (Gawronski et al., 2016; Lombardi et al., 2015; Lombardi et al., 2011). It measures six constructs: (a) Accommodations (e.g., SWD could use technology to enroll in the course; SWD have extended time for exams), (b) Accessible Course Materials (e.g., teachers provide online lecture notes, audio files), (c) Course Modifications (e.g., teachers reduce the reading load for students with or without disabilities), (d) Inclusive Lecture Strategies (e.g., teachers summarize key points throughout each class, repeat students' questions back to the class before answering), (e) Inclusive Classroom (e.g., teachers use interactive technology to facilitate class communication and participation, small groups, peer assisted learning, discussion boards), and (f) Inclusive Assessment (e.g., teachers allow students to express comprehension in multiple ways). By operationalizing the principles of UDL, the ITSI provides the first validated tool for describing inclusive teaching practices and for examining relationships between these practices and student adjustment and performance (Lombardi et al., 2015; Lombardi et al., 2011).

When the ITSI was administered to various faculty members at a university (N = 223) and a community college (N = 179) in the U.S., over 88% of respondents reported that they used Inclusive Lecture Strategies, between 56% and 64% used inclusive classroom, and between 46% and 85% used a variety of accessible course materials (Gawronski et al., 2016; Lombardi et al., 2011). Otherwise, they were more reluctant to use inclusive assessments: only 25% of university faculty reported using them, and 68% of college faculty admitted that they never used them (Gawronski et al., 2016; Lombardi et al., 2011). Of all the inclusive instructional practices, inclusive assessment practices were the least often implemented at university (Lombardi et al., 2015), and faculty attitudes toward them were mixed (Gawronski et al., 2016, Lombardi et al., 2011). Moreover, postsecondary faculty did not generally believe that course mod-

ifications were important, even though the strategic end goal was to meet the needs of SWD (Dallas & Sprong, 2015; Gawronski et al., 2016).

The ITSI has been adapted for students (ITSI-S) to assess their attitudes toward inclusive teaching practices and their perceptions of faculty implementation of these practices at college (Gawronski et al., 2016). In line with their faculty, students generally had positive attitudes toward the practices, but noted that they were rarely implemented in class: 83% felt that it was important to have accessible course materials, but only 42% reported that this need was met. Similarly, 66% of students believed that inclusive assessment was important, but only 23% reported that it was actually provided (Gawronski et al., 2016). Moreover, students generally had more positive attitudes toward course modifications to meet students' needs compared to faculty, at 86% versus 43%, respectively (Gawronski et al., 2016).

Therefore, both students and faculty perceptions of inclusive teaching practices indicate a low integration of these in college teaching settings, as measured with ITSI(-S). Few SWD were also included in the previous studies (with only 13% of SWD in Gawronski et al., 2016), which prevents comparing perceptions of inclusive teaching practices between students with and without disabilities. Furthermore, no study has compared these perceptions between high school and college, to our best knowledge. To fill these gaps, the present study examines the perceived use of inclusive teaching practices from the perspectives of thousands of Quebec students who participated in a longitudinal panel study (from Fall 2019 to Spring 2020) on the high school–college transition, and who completed the ITSI-S at two time points. The novel aspects of this study include a comparison between the perceptions of students with and without disabilities plus a consideration of their class experiences in high school and their first year of college.

Inclusive Teaching Practices and Student Adjustment and Academic Performance

Inclusive teaching practices are promoted because they are believed to have positive effects on students' outcomes, and notably SWD. According to the recent literature review from Cumming and Rose (2021), multiple studies reported that the use of inclusive teaching practices in postsecondary settings yields high levels of satisfaction and a sense of added value for both students with and without disabilities. Multiple studies also indicated that the use of inclusive teaching practices enhances student engagement and participation, thanks to an increased recognition of their diverse needs (Cumming & Rose, 2021; Seok et al., 2018). Interestingly, some studies also reported that the use of inclusive teaching practices reduces students' stress related to their course workload (Cumming & Rose, 2021). This latter outcome raises the question of whether students' adjustment from high school to college could be facilitated by inclusive teaching practices, with adjustment being defined as the student capacity to deal efficiently with the multiple requests of the environment, which addresses emotional, social and academic spheres as well as bonding with the institution (Baker & Siryk, 1984).

However, with regard to student performance, the effects of inclusive teaching practices are still unclear (Cumming & Rose, 2021; Murphy, 2021). In particular, no study has shown that such practices yield increased students' grades, although they seem to have positive effects on students' learning. For instance, Yuval et al. (2004) invited faculty to incorporate a series of inclusive practices into their courses (e.g., use of a course website, course notes provided in digital format, books and textbooks available in audio format, use of video, case studies, teamwork in class, exercises that relate to key facts, online tests and exams, and options for weighing of activities and exams for final grading). They then administered student questionnaires to assess the implementation of inclusive practices, students' academic self-efficacy, and students' affective states. Results indicated that students in classes that implemented more inclusive practices scored higher on concentration (in class and exams), memorization, understanding, and explaining concepts compared to students in classes with fewer inclusive practices (Yuval et al., 2004). However, implementation of inclusive practices did not lead to higher grades. Note that the validity and generalization of these findings are limited by the absence of a control group, pre-intervention assessment, and comparisons between students with and without disabilities. Another two-year longitudinal case study demonstrated the effects of integrating a variety of inclusive practices (e.g., group note-taking, podcast, posted Powerpoint slides, online forum and chat room, extra exam time, peer review evaluation) on indicators such as retention and completion rates for SWD taking university science courses, but with no effect on course grades (Moon et al., 2011). In two experimental studies with control groups, academic performance was compared between SWD and other high school students who received either business-as-usual instruction or UDL treatment in chemistry class to learn to calculate molar conversions. The UDL strategy comprised an inclusive pedagogical repertoire, including problem-solving demonstrations via video clips, a problem-solving workbook,

practice problems with answer keys, teacher's course notes, and a durable problem-solving strategy sheet that consolidated key information (King-Sears et al., 2015, King-Sears & Johnson, 2020). A research team member delivered the UDL treatment for the first two days of the course with the regular teacher as co-teacher. The results of these studies show significantly higher performance for SWD who received UDL compared to business-as-usual instruction. At the same time, other students performed lower in the UDL condition (King-Sears et al., 2015; King-Sears & Johnson, 2020). However, the exposure to inclusive teaching practices was rather short (only two classes), precluding broader conclusions about the influence of UDL on the entire course.

The Present Study

Considering the small number of studies that have addressed inclusive teaching practices in relation to UDL and the lack of quantitative studies that have examined the effectiveness of these practices for students, and particularly SWD, the present study had three objectives: (1) describe inclusive teaching practices as perceived by Quebec students according to teaching level (high school and college) and student's disability status; (2) determine relationships between the practices, adjustment to college, and student performance; and (3) explore the moderating effect of disability status (with or without disability) and disability type (ADHD, mental health disorder, or learning disorder) on the relationships between inclusive teaching practices and adjustment and academic performance in college.

Methods

Participants and Procedure

The participants in this study were enrolled in an ongoing longitudinal study launched in October 2019 called the ESH-Transition study (*Étudiants en Situation de Handicap pendant la Transition secondaire – collégiale*/Students with Disability during the high school-college Transition). The aim was to examine the effects of adapted services at college and teachers' inclusive practices on trajectories of adjustment and academic performance for SWD. The initial sample at Time 1 (T1) was composed of 1,826 students (M_{age} = 18.2 years, *SD* = 3.8; 78.6% girls) attending 10 colleges in the Province of Quebec, Canada. The colleges were located in three regions: 32.9% Montreal, 35.3% Quebec City, and 31.8% Central Quebec. The participants were taking various college programs (preuniversity: 57.0%, technical: 35.2%, Springboard[1]: 7.7%) and were either in their first term of college (93.7%) or in their first term at the current college (6.3% having attended another college earlier) in fall 2019. Participant-reported annual gross family income fell into the $60,000–$99,000 CAD category, and 16.3% of the students had received governmental financial assistance to attend college. Of the sample, 41.2% disclosed a disability at college entry, of which the most prevalent were: attention deficit disorder with or without hyperactivity (ADHD: 50%), mental health disorder (e.g., anxiety disorder, mood disorder: 48%), and language or learning disorder (e.g., dyslexia, dysphasia: 22%). In addition, 37% of these SWD presented comorbidity. All participants in the initial sample completed a battery of online questionnaires, including notably their assessments of the use of inclusive teaching practices in high school and their adjustment and academic performance after three months of college.

All these students were approached again at Time 2 (T2) in April 2020 when about one month of the first academic year remained before COVID-19 pandemic restrictions. Of the initial sample, 1,435 (78%) agreed to complete the second study phase. They responded to online questionnaires on their experiences of inclusive teaching practices since they began college as well as their adjustment and academic performance at college. We found no significant differences between students who withdrew from the study and those who participated at both measurement times in terms of the following variables: disability status, study region, study program, governmental financial assistance, family income category, and first-generation status, with X^2 (1 – 4df) varying from 0.03 to 3.01, $p > .05$. The two groups also scored similarly on the inclusive teaching practice constructs at T1, with t (1754 – 1801) varying from 0.02 to 1.81, $p > .05$. However, proportionally more girls, X^2 (1) = 29.36, $p < .001$, and students with ADHD, X^2 (1) = 4.99, $p < .03$, withdrew from the study. Moreover, the students who withdrew presented more problems with academic adjustment, t (1819) = 6.38, $p < .001$, and emotional adjustment, t (1809) = 3.41, $p < .001$, at T1 compared to students who completed both phases, and they generally earned a lower GPA in high school, t (1774) = 7.03, $p < .001$. The findings must be interpreted in light of the characteristics of the final sample.

1 Preuniversity programs are a prerequisite for students wishing to pursue university studies; technical programs offer more applied studies for students wishing to enter the job market directly (e.g., technicians); Springboard is a bridge program for tudents who are undecided about which college program they wish to attend or who do not meet the admission requirements.

Measures

Sociodemographic factors

A sociodemographic questionnaire administered at T1 established a portrait of the participants. The items addressed their study region, college program, age, gender, whether or not they received governmental financial assistance for college, parents' education and income, and students' high school GPA. Participants also indicated if they had been professionally diagnosed with a physical or psychological disorder and the nature of the diagnosis. Although this can appear as a medical-model version of disability, the reason is that students in Quebec (and Canada, generally) must present an official diagnosis from a health professional to access disability services (e.g., SWD accommodations).

Inclusive teaching practices

Inclusive teaching practices were assessed at T1 and T2 using the ITSI-S (Gawronski et al., 2016; Lombardi et al., 2011), a 33-item questionnaire based on UD principles. As described in the introduction, it measures six constructs: Accommodations, Accessible Course Materials, Course Modifications, Inclusive Lecture Strategies, Inclusive Classroom, and Inclusive Assessment. Students rated each construct according to their perceptions of their teachers' attitudes and beliefs (e.g., "I *believe it's important for my teacher to put his/her lecture notes online for all students*") as well as their actions and behaviors (e.g., "*My teacher puts his/her lecture notes online for all students*"). In this study, only the second part of the assessment (actions and behaviors) is considered. In addition, we adjusted the response scale to measure whether each practice was generally implemented by all the teachers in a given year (1 = "*None of my teachers uses this practice;*" 2 = "*Some of my teachers use this practice*;" …; 5 = "*All my teachers use this practice*"). At T1 (October 2019), participants referred to their experience during their final year of high school, and at T2 (April 2020) they referred to their first year of college. The Accommodations construct was not considered in the present study because it does not apply to students without disabilities. In addition, after translating the ITSI-S into French, we withdrew five of the original questionnaire items for having little correspondence to the situation in Quebec. The final version contains 20 items (see detailed items in French and English in the Appendix).

The questionnaire has been validated in many studies and presents excellent psychometric properties (see, Gawronski et al., 2016; Lombardi et al., 2015). In the present study, Cronbach's alpha for the subscales varied from .57 to .81 for high school and from .63 to .79 for college. The weakest coefficient was obtained for a subscale containing only two items (Course Modifications). The average alpha score was .75 for high school and .73 for college. Correlations between the five subscales varied from .34 to .62 for high school and from .36 to .60 for college. These reliability indicators are well in line with those reported in the initial validation study (Gawronski et al., 2016).

Adjustment to college

Adjustment to college was assessed at T1 and T2 using the French version of the Student Adaptation to College Questionnaire (SACQ-F; Larose et al., 1996). The SACQ-F contains 23 items that assess three constructs: academic adjustment (10 items, e.g., "*I am satisfied with my academic performance in college*," α = .80 at T1 and .81 at T2), social adjustment (6 items, e.g., "*I am somewhat satisfied with my social life at college*," α = .85 at T1 and .86 at T2), and personal and emotional adjustment (7 items, e.g., "*I find it very hard to deal with the stress of college life*," reverse coded, α = .76 at T1 and .77 at T2). Responses were rated on a Likert scale from 1 (*Completely disagree*) to 5 (*Completely agree*). The validity and reliability of the SACQ-F has been well demonstrated (Larose et al., 1996). Because the preliminary analysis obtained roughly similar predictive profiles across the SACQ-F subscales, we decided to use the total score (mean score for the 3 constructs) as a predictive variable for adjustment. This score presents excellent internal consistency at both T1 (α = .89) and T2 (α = .92).

Academic performance

Academic performance in the first college term (T1) was measured by the R score, which is the standard Quebec classification method for rating academic performance (BCI, 2020). The R score well represents students' ongoing performance, and it is used by all Quebec universities to select students for limited enrollment programs.

For T2, it was not possible to use the R score. The Quebec Government suspended the R score during the pandemic because of schools and classes closure at the end of the school year. It was replaced by an annual success rate based on the course attendance in fall 2019 and Winter 2020 and the estimated potential of failure in Winter 2020 at the time of the T2 questionnaires. It was calculated as follows: Number of courses taken minus (-) (number of courses dropped + number of courses they might fail) divided by (÷) number of courses taken. This annual success rate was used as an indicator of success after one year in college. In addition, student-reported high school

GPA at T1 was used as a control variable in the predictive analysis.

Analysis

With respect to the first objective, we present the descriptive data obtained from the ITSI-S according to teaching level (high school vs. college) and student's disability status (with or without disabilities). We ran a multivariate analysis followed by Anovas (F tests) with teaching level as the within factor and disability status as the between factor. For all performed tests, we computed partial eta² to represent the proportion of data variability that can be accounted to the corresponding effects and thus denote their practical importance (i.e., effect size). Partial eta² is considered as low size from 0.01, medium size from 0.06, and high size from 0.14 (Fritz et al., 2011). For the second objective, we examined the bivariate correlations between the variables and ran a hierarchical linear regression (for each dependent variable). We ran an initial series of regressions to determine predictive relationships between inclusive teaching practices in high school and adjustment and academic performance in the first college term while controlling for high school GPA. We ran a second series to predict adjustment and academic performance after one college year based on students' perceptions of inclusive practices in college. Here, we controlled for initial adjustment and academic performance in college and for inclusive practices in high school. To meet the third objective, we repeated the regression series with the inclusion of the moderating variable (i.e., disability status: with or without disability, disability type: ADHD, mental health disorder, or learning disorder) as a first step and the interaction terms between the moderating variable and each inclusive practice as a final step. These moderating effects were examined in separate regressions and were performed after centering all the variables.

Results

Description of Inclusive Teaching Practices

Table 1 presents the descriptive statistics for the students' perceptions of inclusive teaching practices by teaching level and students' disability status (with or without disability) (Objective 1). On a mean scale score from 1 ("*None of my teachers uses this practice*") to 5 ("*All my teachers use this practice*"), the majority of scores are closer to 1 than 5, indicating perceptions that a majority of teachers did not use inclusive practices. Course Modifications (M = 1.80) and Inclusive Assessment (M = 2.24) were the least widespread, whereas Inclusive Lecture Strategies (M = 2.93) and an Inclusive Classroom (M = 2.87) were rated as the most broadly applied.

The multivariate results by teaching level (within factor) and disability status (between factor) indicate a significant multivariate effect for teaching level, F (5, 1075) = 139.80, $p < .001$, partial eta² = .394, and a relatively weak but significant multivariate effect for disability status, F (5, 1075) = 2.36, $p < .05$, partial eta² = .011. For teaching level, the univariate results indicate significant differences for four of the five inclusive practice subscales. Accessible Course Materials, F (1, 1079) = 274.37, $p < .001$, partial eta² = .203, and Inclusive Lecture Strategies, F (1, 1079) = 40.17, $p < .001$, partial eta² = .036, were perceived as more frequently used in college than in high school, whereas Course Modifications, F (1, 1079) = 6.71, $p < .01$, partial eta² = .006, and an Inclusive Classroom, F (1, 1079) = 17.20, $p < .000$, partial eta² = .016, were perceived as more widespread in high school than in college.

The results for disability status indicate that SWD perceived less inclusive practices than students without disabilities. More specifically, SWD gave lower scores than students without disabilities did for Accessible Course Materials, F (1, 1079) = 6.91, $p < .009$, partial eta² = .006, Inclusive Lecture Strategies, F (1, 1079) = 4.01, $p < .05$, partial eta² = .003, Inclusive Classroom, F (1, 1079) = 7.53, $p < .006$, partial eta² = .007, and Inclusive Assessment, F (1, 1079) = 4.20, $p < .05$, partial eta² = .003. Note that all these effect sizes are small, which means that although significant, the differences between perceptions of students with or without disabilities are low.

We conducted a deeper examination of the differences between SWD and students without disabilities in their perceptions of inclusive teaching practices while accounting for diagnosis type). The differences reported in the previous paragraph apply mainly for students who disclosed ADHD or a mental health disorder, with F values varying from 4.22 to 27.08, $p < .01$. Differences in perceived teaching practices between students with learning disorders and students without disabilities were not significant, with F values ranging from 0.01 to 1.81, $p > .20$. In other words, students with or without a learning disorder had similar perceptions of teachers' inclusive practices.

Prediction of Adjustment and Academic Performance in the First College Term

Table 2 presents the correlations between the study variables, with some noteworthy results. First, the correlations between perceptions of inclusive teaching practices in high school and college are relatively weak (.13 – .34). This suggests that the stu-

Table 1

Means and Standard Deviations for the 5 Teaching Inclusive Practices as a Function of Teaching Level and Disability Status

	High School		College	
	SWD *M (SD)*	**Others** *M (SD)*	**SWD** *M (SD)*	**Others** *M (SD)*
Accessible course materials	2.14 (0.06)	2.35 (1.07)	2.87 (0.84)	2.90 (0.82)
Course modifications	1.84 (0.96)	1.85 (0.89)	1.76 (0.88)	1.76 (0.87)
Inclusive lecture strategies	2.78 (0.94)	2.89 (0.90)	3.00 (0.88)	3.05 (0.84)
Inclusive classroom	2.84 (0.90)	3.03 (0.88)	2.79 (0.76)	2.81 (0.75)
Inclusive assessment	2.17 (0.93)	2.34 (0.91)	2.23 (0.86)	2.22 (0.84)

Note. SWD = Students with Disabilities; *M* = Means; *SD* = Standard Deviation.

dents' assessments were fairly independent of their overall perceptions, and hence fairly representative of the teachers' actual practices. Second, the inter-level correlations among the inclusive practices vary from .34 to .62, indicating strong consistency as well as independence among the ITSI-S constructs. Third, several inclusive teaching practices are associated with adjustment and academic performance in college, although these associations are generally weak.

Table 3 summarizes the regression results for the prediction of adjustment to college and the *R* score in the first college term (T1) based on inclusive teaching practices in high school and controlling for high school GPA. Inclusive teaching practices in high school predict college adjustment in the first term above and beyond high school GPA, R^2 = 2.0%, F (5, 1653) = 5.90, $p < .001$. Standardized beta scores indicate that three of the five practices make a significant contribution. Adjustment in the first college term is positively associated with high school teachers' use of an Inclusive Classroom (β = .09, t = 2.29, $p < .05$) and Inclusive Assessment (β = .08, t = 2.31, $p < .05$), but negatively with Course Modifications (β = -.08, t = - 2.67, $p < .05$). Inclusive practices in high school also predict the R score in the first college term when controlling for high school GPA, R^2 = 1.0 %, F (5, 1264) = 3.71, $p < .002$. The R score in the first college term is positively associated with high school use of an Inclusive Classroom (β = .08, t = 2.32, $p < .05$) and Inclusive Lecture Strategies (β = .06, t = 2.60, $p < .01$), but negatively with Course Modifications (β = -.05, t = - 2.12, $p < .05$).

Prediction of Adjustment and Academic Performance after One College Year

Table 4 presents the regression results for the prediction of adjustment and academic performance after one year of college and the annual success rate based on inclusive teaching practices in college while controlling for adjustment at T1 and inclusive teaching practices in high school. Inclusive practices in college predict student adjustment after one college year (T2) above and beyond initial adjustment and inclusive practices in high school, R^2 = 1.0%, F (5, 1101) = 3.65, $p < .003$. Standardized beta scores indicate that two of the five practices make a significant contribution. Adjustment after one college year is positively associated with Inclusive Lecture Strategies in college (β = .09, t = 3.29, $p < .001$), but negatively with Accessible Course Materials (β = -.06, t = - 2.20, $p < .05$). Inclusive practices in college also predict the annual success rate after controlling for the R score in the first term and inclusive practices in high school, R^2 = 2.0 %, F (5, 1045) = 6.08, $p < .001$. The annual success rate is positively associated with an Inclusive Classroom (β = .10, t = 2.58, $p < .01$) and Inclusive Lecture Strategies (β = .07, t = 2.64, $p < .05$) in college.

Moderating Effect of Disability Status and Type

To meet the third study objective, we ran a further series of regressions with the addition of disability status (with or without disability) and type (ADHD, mental health disorder, or learning disorder) as moderating variables. Given their empirical proximity, the variables were included separately. We examined

Table 2

Bivariate Correlations Among Inclusive Teaching Practices, Academic Adjustment, and Performance

		1	2	3	4	5	6	7	8	9	10	11	12	13
1-	Accessible course materials – high school	-												
2-	Course modifications - high school	0.36	-											
3-	Inclusive lecture strategies - high school	0.35	0.39	-										
4-	Inclusive classroom - high school	0.62	0.35	0.52	-									
5-	Inclusive assessment - high school	0.46	0.45	0.46	0.62	-								
6-	Accessible course materials - college	0.13	0.18	0.20	0.12	0.18	-							
7-	Course modifications - college	0.07	0.24	0.13	0.05	0.19	0.48	-						
8-	Inclusive lecture strategies - college	0.07	0.17	0.34	0.13	0.18	0.42	0.36	-					
9-	Inclusive classroom - college	0.10	0.11	0.20	0.21	0.22	0.52	0.41	0.53	-				
10-	Inclusive assessment - college	0.06	0.16	0.16	0.13	0.26	0.44	0.54	0.43	0.60	-			
11-	Academic adjustment at T1	-0.01	-0.07	0.01	0.04	0.01	0.10	0.04	0.12	0.16	0.12	-		
12-	Academic adjustment at T2	0.00	-0.07	0.01	0.07	0.00	0.07	0.06	0.10	0.16	0.12	0.53	-	
13-	R score in Fall 2019	0.07	-0.12	-0.05	0.11	-0.03	-0.15	-0.16	-0.13	-0.12	-0.09	0.30	0.27	-
14-	Annual success rate 2019-2020	0.02	-0.07	-0.02	0.07	-0.01	-0.02	-0.04	0.03	0.08	0.04	0.48	0.37	0.49

Note. Correlations >0.06 are significant at $p<.05$.

Table 3

Regression Results for the Prediction of Adjustment to College and the R Score in the First College Term (T1) Based on Inclusive Teaching Practices in High School and Controlling for High School GPA

		Step 1 β	*t*	Step 2 β	*t*	R^2	*F*	ΔR^2	*F* change
Adjustment to college (T1)									
1	High school GPA	0.13***	5.27	0.11***	4.53	0.02***	27.80 (1,1658)	0.02***	27.80 (1,1658)
2	Accessible course materials – high school			-0.02	-0.55	0.03***	9.62 (6,1653)	0.02***	5.90 (5,1653)
	Course modifications – high school			-0.08**	-2.67				
	Inclusive lecture strategies – high school			0.02	0.70				
	Inclusive classroom – high school			0.09*	2.29				
	Inclusive assessment – high school			0.08*	2.31				
R Score (TI)									
1	High school GPA	0.69***	33.97	0.67***	32.22	0.48***	1154.24 (1,1269)	0.48***	1154.24 (1,1269)
2	Accessible course materials – high school			0.01	0.35	0.48***	197.52 (6,1264)	0.01***	3.71 (5,1264)
	Course modifications – high school			-0.05*	-2.12				
	Inclusive lecture strategies – high school			0.06**	2.60				
	Inclusive classroom – high school			0.07*	2.32				
	Inclusive assessment – high school			-0.02	-0.59				

Note. *$p < .05$; **$p < .01$; ***$p < .001$.

Table 4

Regression Results for the Prediction of Adjustment and Academic Performance After One Year of College Based on Inclusive Teaching Practices in College and Controlling for Adjustment at T1, R Score in the First Term and Inclusive Teaching Practices in High School

		Step 1 β	*t*	Step 2 β	*t*	R^2	*F*	ΔR^2	*F* change
Adjustment to College (T2)									
1	Adjustment at T1	0.71***	33.48	0.71***	32.72	0.51***	194.88 (6,1106)	0.51***	194.88 (6,1106)
	Accessible course materials – high school	-0.01	-0.40	-0.01	-0.19				
	Course modifications – high school	-0.03	-1.27	-0.03	-0.98				
	Inclusive lecture strategies – high school	-0.01	-0.54	-0.04	-1.37				
	Inclusive classroom – high school	0.06	1.82	0.06	1.69				
	Inclusive assessment – high school	-0.03	-0.95	-0.02	-0.70				
2	Accessible course materials – college			-0.06*	-2.19	0.52***	109.23 (11,1101)		
	Course modifications – college			-0.02	-0.69				
	Inclusive lecture strategies – college			0.09***	3.28				
	Inclusive classroom – college			0.03	0.88				
	Inclusive assessment – college			-0.03	-1.16				
Academic Performance (T2)									
1	R score in the first college term (T1)	0.50***	18.25	0.52***	19.03	0.27***	63.50 (6,1050)	0.27***	63.50 (6,1050)
	Accessible course materials – high school	-0.05	-1.45	-0.05	-1.40				
	Course modifications – high school	-0.06	-1.76	-0.05	-1.58				
	Inclusive lecture strategies – high school	0.03	0.76	-0.01	-0.20				
	Inclusive classroom – high school	0.09*	2.07	0.07	1.76				
	Inclusive assessment – high school	0.01	0.23	-0.01	-0.31				
2	Accessible course materials – college			0.03	0.81	0.29***	38.24 (11,1045)	0.02***	6.08 (5,1045)
	Course modifications – college			-0.00	-0.07				
	Inclusive lecture strategies – college			0.07	2.64				
	Inclusive classroom – college			0.10**	2.58				
	Inclusive assessment – college			0.00	0.05				

Note. *$p < .05$; **$p < .01$; ***$p < .001$.

the interaction effects of disability status X inclusive practices and disability type X inclusive practices and found no moderating effect. In other words, the predictions of college adjustment and academic performance based on inclusive teaching practices are the same for students with and without disabilities.

Discussion

The objectives of this study were to describe Quebec student perceptions of teachers' inclusive teaching practices in high school and college and to determine whether these practices are predictive for student adjustment and academic performance in college.

Description of teachers' inclusive practices

Overall, the students felt that inclusive teaching practices (assessed using the ITSI-S) were seldom or only sometimes applied in both high school and college. The most often used practices were inclusive lecture strategies and an inclusive classroom, whereas course modifications and inclusive assessments were only rarely used. These results concur with the literature (Dallas & Sprong, 2015; Gawronski et al., 2016; Lombardi et al., 2011). They confirm that inclusive teaching still derives from individual teacher initiatives, and represents the exception rather than common practice (Fovet, 2021).

Comparing the two teaching levels, accessible course materials and inclusive lecture strategies were perceived as more widespread in college than in high school. The greater use of accessible course materials could be explained by the fact that college teachers are increasingly applying learning management systems to post course materials and students' grades. As for inclusive lecture strategies, they could be more prevalent in college because college teachers see their students less frequently than high school teachers do and would therefore tend to plan their class contents more carefully. More structured and well-presented classes would in turn facilitate the introduction of accessible course materials and inclusive lecture strategies. For instance, college teachers commonly use PowerPoint presentations that students can consult online beforehand. In contrast, high school teachers made greater use of inclusive classroom practices and course modifications compared to college teachers. This discrepancy could have something to do with North America's teacher training system: all high school teachers must earn a university degree in education, whereas college teachers typically have university training in their subject matter but little or no instruction in pedagogical methods (McGuire et al., 2006). Hence, high school teachers would be better prepared to use diverse resources and activities, and therefore more liable to use an inclusive classroom. With respect to course modifications, college teachers are responsible for more courses and more students than high school teachers, which might discourage them from offering additional activities and assessments to meet individual needs. More generally, the limited use of course modifications in college could be due to the reluctance of college teachers to offer additional evaluations to some students only, because they feel it would be inequitable for other students. Note also that most postsecondary teachers have little knowledge or experience in teaching SWD (Gokool-Baurhoo & Asghar, 2019). Consequently, they could view course modifications as giving SWD an unfair advantage over students without disabilities. In contrast, in Quebec high schools, it is common practice to allow students to retake failed exams, including exams set by the Ministry of Education. The fact that this is normal practice in high school but not in college could explain why there are more course modifications in high school.

On another note, compared to students without disabilities, more students with ADHD or a mental health disorder perceived lesser use of inclusive teaching practices, with the exception of course modifications. This finding could be explained by the fact that this subgroup of SWD felt a greater need for inclusive practices, and consequently felt their absence more strongly than students without disabilities. On the other hand, there was practically no difference in this sense between students without disabilities and students with learning disabilities, who benefited from special accommodations in addition to the regular inclusive practices. Notably, they could use digital course notes, digital and audio textbooks, and in-class computers. This additional accessibility could have enhanced their perceptions of the use of inclusive practices in their courses. Meanwhile, students with ADHD or a mental health disorder would not necessarily receive these special accommodations. Moreover, given the retrospective nature of this study, it is possible that students with ADHD or a mental health disorder found it harder to recall the teaching practices in previous courses (Skodzik et al., 2017). In addition, they may have confused their perceptions of teaching practices in previous courses with those in current courses that fell short of their needs.

Prediction of Adjustment and Academic Performance in the First College Term

The regression results showed that the use of an inclusive classroom, inclusive lecture strategies, and

inclusive assessments in high school positively predict adjustment and academic performance in the first college term. Inclusive classroom practices are used relatively frequently in high school and have been associated with positive learning outcomes (Katz, 2013; Rousseau et al., 2017). Our results reveal that the more that students perceived that high school teaching practices incorporated multiple means of representation and engagement, the better their adjustment and academic performance at college entry. In addition, inclusive assessment practices enable students to express their comprehension through diverse actions and means. In high school, this would act to support student autonomy through self-determined learning (Katz, 2013; Ryan & Deci, 2009), which would then positively impact academic adjustment in college. Furthermore, the use of inclusive lecture strategies in high school shows a positive effect on success rates in the first term of college. This finding suggests that when teachers present more open and accessible course structures that set forth clear objectives and key points, students can achieve more durable, long-term learning that prepares them for success in college. By applying these practices proactively in high school, teachers can foster autonomous learning within a structured course framework, which promotes student engagement (Jang et al., 2010). Students would then feel more competent and autonomous in learning and assessment situations, which would equip them to take ownership of their college studies and to seek the resources they need to thrive at a postsecondary level.

In contrast, the use of course modifications in high school appeared to have a negative effect on adjustment and academic performance in college. This finding could be explained by the fact that course modifications are used less often in college than in high school. Students who benefited from these accommodations in high school may find it harder to adjust to the reality of college, where they suddenly have to assume the same academic load and pass the same exams as everyone else. Course modifications might therefore be considered as useful for success in the short term, in high school. However, they come with lighter demands that do not nurture the development of effective strategies, particularly self-directed learning skills. In short, adaptations that are meant to ease task difficulty or improve poor grades through supplementary exams do not help students acquire the skills they need to adjust at college, as reflected in the academic performance results for the first college term.

Prediction of Adjustment and Academic Performance After One Year of College

After one year of college, the use of inclusive lecture strategies by college teachers positively predicted students' adjustment to college and success rates. Essentially, these practices refer to the teacher's ability to structure information in order to foster learning. For example, objectives and key points are summarized throughout the class. This well-organized approach facilitates student adjustment and success. In addition, the use of inclusive classroom strategies by college teachers had a positive effect on students' success rates. These results are in line with Kumar and Wideman (2014), who demonstrated in an undergraduate course that multiple means of representation and engagement are beneficial for student learning. Our study details these results in a much larger and broader student sample where inclusive lecture and inclusive classroom strategies exert a positive effect on academic performance in college.

Surprisingly, the use of accessible course materials by college teachers appears to hinder adjustment to college. Although our study addressed practices used prior to the COVID-19 pandemic, it is worth noting that the second measurement time (with respect to college teaching practices) was in April 2020, which could have influenced the students' perceptions of this practice. Another potential influence on the results is the multiplicity of remote delivery platforms that were used, which could have confused some students. Because the teachers used a variety of platforms to transmit information and course materials (e.g., Omnivox, MIO, Moodle, Googledrive, Onedrive, TEAMS), the students had to readjust for each course and in each term. Currently, college teachers tend not to consult or collaborate with each other, and combined with the tendency of some teachers to put a lot of course materials and notes online (e.g., research articles, website links, supplementary information), students may be overwhelmed with a profusion of information. Moreover, thanks to the abundance of platforms and the diversity of distribution methods that college teachers favor, students could perceive their workloads as heavier. A glut of ad hoc online delivery systems could impede student adjustment to college and academic performance, which underscores the importance for teachers to align their approaches, reduce the number of digital platforms, and prune the volume of online course materials.

Finally, neither student status (with or without disability) nor disability type appears to have had a moderating effect on the results, indicating that inclusive practices have the same effects on adjustment and academic performance for both SWD and

students without disabilities. These findings contradict those of King-Sears et al. (2015) and King-Sears and Johnson (2020), who found that students without disabilities performed lower than SWD in inclusive courses. However, their results were obtained in a highly contextualized setting: treatment and comparison groups taught for three or four classes in a chemistry course. In comparison, our study examined, in a very large and broad sample, students' perceptions of inclusive teaching practices across all their courses for an entire term. Our findings suggest that inclusive practices, and more particularly inclusive classroom activities and inclusive lecture strategies, have similar benefits for all students. These practices are therefore recommended for both high school and college teachers.

Conclusions and Future Research Avenues

The aim of this repeated measures study was to describe inclusive teaching practices as perceived by high school and college students with and without disabilities, to determine relationships between these practices and adjustment and academic performance in college, and to explore the moderating effect of student status and disability type on these relationships. Students' perceptions were gathered in a vast longitudinal data collection from ten colleges in Quebec (Canada). Over 1,400 students, of whom approximately 40% disclosed a disability, participated at two measurement times for a broadly representative portrait. One notable finding was that inclusive teaching practices were seldom or only sometimes used in both high school and college. Yet according to our results, the use of these practices exerted a positive effect on students' adjustment and academic performance in college, particularly inclusive classroom and inclusive lecture strategies. These practices allowed students to better understand course structures, including key points and objectives, while supporting autonomous learning through multiple means of engagement and representation. However, it would be informative to delve deeper into the effectiveness of course modification practices in high school: our results suggest that they actually hinder the transition to college and lead to lower first-term college grades. High school teachers should be made aware of these implications, and further studies should be undertaken to better assess the effects of these practices. Finally, our results showed no differences between students with and without disabilities in terms of the effects of inclusive teaching practices in high school, suggesting that these practices are beneficial for all college students.

This study includes certain limitations. First, we gathered students' perceptions exclusively. Hence, there could be discrepancies between students' perceptions of the use of practices and the actual use of practices. Furthermore, students evaluated the use of inclusive practices across all their teachers for an academic year, which could have been a difficult task whenever the practices varied a lot from one teacher to another. The weak correlation between inclusive practices in high school and college points to differences in perceptions as well as practices. However, no objective observations of the practices were conducted. For instance, the fact that inclusive practices were applied does not necessarily mean that the students or teachers were aware that inclusion was the goal, nor that all the practices fit into a coherent, well-thought-out framework. Future studies could therefore investigate actual practices using classroom observations combined with interviews with high school and college teachers. Furthermore, the student assessments of practices were conducted a posteriori. Importantly, the questions pertaining to high school were posed in the first term of college, for a potential risk of memory gaps. In addition, although the second measurement time was during the first pandemic lockdown in Quebec, the questionnaire items overlooked this aspect. Yet, the students' perceptions of teaching practices before the pandemic could have colored their perceptions at the time of the second questionnaire, when emergency distance learning measures were in place. Hence, it would be useful to query the students again after the pandemic ends and college classrooms and labs return to normal. Such investigations would allow for the confirmation of the conclusions of this study and assessing the pandemic's effects on inclusive teaching practices, adjustment, and academic performance in college. Third, different measures were used for academic performance from the first to the second time point due to the unavailability of the students' R score (standardly used by all postsecondary institutions in Quebec) because of the pandemic. Although we used what we thought was the best representative of students' academic performance at the second time point during the pandemic, the corresponding results have to be interpreted with caution in light of this. The continuation of this longitudinal research project will allow for new measurements of students' academic performance at the next time points, and to provide additional evidence of its relationships with the use of inclusive teaching practices. Finally, we should keep in mind that the shared variation between inclusive teaching practices and adjustment and performance in high school and college were relatively low, suggesting more continuity

than discontinuity in student adjustment throughout the transition. In addition, this variation applied more for girls and low-risk populations as suggested by the attrition analyses. In other words, it is important for teachers to understand that the scope of their inclusive practices competes with that of other factors specific to the student characteristics and their developmental context.

With respect to the implications for practice, our results point to the need to train college teachers how to integrate inclusive practices into their courses. To date, these practices are barely present, and both high school and college teachers are largely uninformed of their impact. Greater use of these practices would not only facilitate the transition from high school to college, it would also foster success in college, in the first term and beyond. Moreover, inclusive practices appear to be beneficial for students with and without disabilities, underscoring the advantages of applying them in both high school and college. For disability service professionals, this study stresses the importance of building teachers' awareness about inclusive teaching as complementary practices to accommodations. Writing service plans and providing accommodations to specific students is the start, but with the increasing number of students with diverse needs comes a need to design or adapt courses in order to lessen the weight put on disability services. As specialists with SWD, disability service providers could partner with instructional designers to offer training or webinars about inclusive teaching, and what students with or without disabilities could gain from a wide use of such practices. For that, it is essential that both disability service providers and instructional designers are themselves aware of inclusive teaching practices and understand their benefits for answering the needs of diverse students.

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About the Authors

Catherine Beaulieu received her B.A. and M.Ps. degrees in psychology from University of Montreal and Ph.D. in Biomedical Sciences from University of Montreal. Her experience includes working as a clinical psychologist for Employee Assistance programs. She is currently a professor in psychology in the Department of social science in a college program. Her research interests include inclusive teaching practices, school transition, adapted services and accommodation and students with disabilities. She can be reached by email at: cabeaulieu@cegepsl.qc.ca.

Simon Larose is Professor of Developmental Psychology at Laval University, Faculty of Education (Québec City, CANADA). His main fields of research and teaching are adolescent and young adult development, mentoring, college transition, and academic adjustment. Since 2018, he has been leading the ESH-Transition project (www.fse.ulaval.ca/transition). This project involves monitoring disability students during post-secondary and professional transitions and evaluating the impact of the services and support measures they receive. He can be reached by email at: simon.larose@fse.ulaval.ca.

Géraldine Heilporn is an assistant professor in educational technologies at the Faculty of Education of Université Laval. She conducts research and teaching activities about the use of digital technology in teaching and learning in various educational settings, from high school to university. She is particularly interested in student engagement in blended course modalities or in digitally mediated activities. Her projects aim to support the learning, engagement and inclusion of all students with increasingly diverse needs. She can be reached by email at: Geraldine.heilporn@fse.ulaval.ca.

Julien S. Bureau received his Ph.D. from Université de Montréal. He is currently an associate professor in the Faculty of Education at Université Laval. His interests include academic motivation and equity in educational measurement. He can be reached by email at: julien.bureau@fse.ulaval.ca.

Caroline Cellard received her Ph.D. degree in clinical psychology from Laval University. She is currently a clinical neuropsychologist and full professor in the School of psychology at Laval University. She is involved in the training and teaching of students in clinical neuropsychology. The objectives of her research promoting mental health in youth are to understand cognitive processes involved in mental illnesses, to develop innovative treatment to reduce cognitive deficits (i.e. cognitive remediation therapy) and to transfer knowledge and tools developed in research into academic and health communities. She can be reached by email at: caroline.cellard@psy.ulaval.ca.

Michel Janosz received his Ph.D. in Applied Human Sciences from the University of Montreal. He is a specialist of the relations between school experience and psychosocial adjustment. He is currently professor at the School of Psychoeducation at the University of Montreal. His research interests include school dropout, school violence and school-based prevention practices. He can be reached by email at: Michel.janosz@umontreal.ca.

Geneviève Boisclair Châteauvert received her M.A degree in psychopedagogy from Laval University. She is a research professional and a lecturer at Laval University. Her main fields of interest are adolescent development, parenting, motivation, school transitions, and mentoring. She has expertise in research design and statistical analysis. She can be reached by email at: Genevieve.boisclairchateauvert@fse.ulaval.ca.

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Appendix

The 20-item scale administered in this study is presented below, both in French and in English.

During the last academic year, how many of your teachers… (Au cours de la présente année scolaire, combien de tes enseignants…)

Accessible course materials

1. use a course website (e.g. Angel, Blackboard or faculty web page). / *utilisent un site web de cours.*
2. put lecture notes online for ALL students. / *mettent en ligne leurs notes de cours pour les étudiants.*
3. post electronic versions of course handouts. / *publient des versions électroniques des documents qu'ils utilisent pour leurs cours.*
4. allow students flexibility in submitting assignments electronically (e.g. mail attachment, digital drop box). / *donnent aux étudiants de la flexibilité quant à la façon de soumettre leurs travaux électroniquement (p.ex.: pièce jointe au courriel, boîte de dépôt numérique).*

Course modifications

5. reduce the course reading load for ANY student who expresses a need. / *réduisent la charge de lecture dans leurs cours pour les étudiants qui en expriment le besoin.*
6. allow ANY student to complete extra credit assignments. / *permettent aux étudiants de faire des évaluations supplémentaires.*

Inclusive lecture strategies

7. repeat the question back to the class before answering when a question is asked during a class session. / *répètent la question d'un étudiant en classe avant d'y répondre.*
8. begin each class session with an outline/agenda of the topics that will be covered. / *commencent chaque cours par une présentation des sujets qui seront vus en classe.*
9. summarize key points throughout each class session. / *résument les points importants à chaque cours.*
10. connect key points with larger course objectives during class sessions. / *font le lien entre les points importants et les objectifs généraux du cours à chaque cours.*

Inclusive classroom strategies

11. use technology so that my course material can be available in a variety of formats (e.g. podcast of lecture available for download, course readings available as mp3 files). / *utilisent des outils technologiques pour que le matériel du cours soit disponible en plusieurs formats (p.ex.: podcast du cours à télécharger, enregistrements du cours disponibles en fichiers mp3).*
12. use interactive technology to facilitate class communication and participation (e.g. Discussion Board). / *utilisent des technologies interactives pour faciliter la communication et la participation en classe (p.ex. Socrative, Kahoot, forum de discussion).*
13. present course information in multiple formats (e.g. lecture, text, graphics, audio, video, hands-on exercises). / *présentent le contenu de leurs cours de plusieurs façons (p.ex.: prestation orale, textes, graphiques, enregistrements audio, vidéos, exercices pratiques).*
14. create multiple opportunities for engagement. / *créent de nombreuses occasions de favoriser l'engagement de l'étudiant.*
15. use a variety of instructional formats in addition to lecture, such as small groups, peer assisted learning, and hands on activities. / *utilisent de nombreuses formules pédagogiques en plus des prestations orales, comme le travail en petit groupe, l'apprentissage par les pairs et les activités pratiques.*
16. supplement class sessions and reading assignments with visual aids (e.g. photographs, videos, diagrams, interactive simulations). / *complètent les séances de cours et les travaux de lecture avec des aides visuelles (p.ex.: photographies, vidéos, diagrammes, simulations interactives).*

Inclusive assessment

17. allow students to demonstrate the knowledge and skills in ways other than traditional tests and exams (e.g. written essays, portfolios, journals). / *permettent aux étudiants de démontrer ce qu'ils ont appris d'autres façons que par les tests et examens traditionnels (p.ex.: essais écrits, porte-folios, journaux).*
18. allow students to express comprehension in multiple ways. / *permettent aux étudiants d'exprimer ce qu'ils ont appris de multiples façons.*
19. are flexible with assignment deadlines in my course(s) for ANY student who expresses a need. / *sont flexibles à propos des dates de remise des travaux dans leurs cours pour les étudiants qui en expriment le besoin.*
20. allow flexible response options on exams (e.g., change from written to oral) for ANY student who expresses a need. / *permettent une flexibilité dans le mode de réponse aux examens (p.ex.: passer de la forme écrite à orale) pour les étudiants qui en expriment le besoin.*