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Perceptions and experiences with academic group work online and in-person: Perspectives across levels of undergraduate study

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Abstract

Group work is a commonly used and highly regarded learning tool in tertiary education. While previous research has examined collaboration within higher education contexts, no study has investigated student preferences and experiences across different years of study. This is essential for a better understanding of how to effectively integrate collaborative learning into the undergraduate curriculum. The present study surveyed first year, second year and senior (3rd and 4th year) undergraduate students (*n* = 100 per group) to gather insights regarding their experiences with collaborative learning as a function of year of study and in both in-person and online contexts. Overall, preferences regarding group composition (e.g., group size) and experiences regarding group work (e.g., efficiency, motivation, satisfaction, stress) were consistent across the year of study. However, notable shifts in experiences were observed, particularly from first to second year, with respect to instructor-related variables (i.e., group formation strategies, leadership opportunities) and student-related variables (i.e., perceived difficulty producing assignments, level of collaboration in groups, learning experiences and enjoyment). Some differences were also observed between in-person and online contexts. Implications for future studies and instructional design are discussed.

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Introduction

Group work is one of the most widely used and deeply researched teaching approaches in higher education (Johnson & Johnson, 2009; Wilson et al., 2018). Instruction that encourages two or more students to work collaboratively is associated with an array of social, cognitive, and instructional benefits including: individual learning achievement, greater academic satisfaction, more consistent class attendance, and the development of strong interpersonal skills (Gates et al., 1997; Jorczak, 2011; Micari & Pazos, 2021; Vogel & Wood, 2023). Group work also provides opportunities for peer scaffolding, knowledge exchange, and the exposure to diverse viewpoints (Johnson & Johnson, 2009; Jorczak, 2011; Poort et al., 2022; Poort et al., 2023). While there are notable strengths associated with peer collaboration, there are also potential challenges that may disincline students from wanting to participate in or actively engage in group work. For example, poorly organized or structured group assignments, as well as group tasks carried out under challenging working conditions (e.g., having too many group members), may lead to student dissatisfaction and disengagement from group work, resulting in group conflicts and poor learning experiences (Burdett, 2003; Monson, 2019). Several studies have offered tools or procedures to minimize these concerns (Barkley et al., 2005; Brickman et al., 2021; Johnson et al., 1998). Key to ensuring effective collaborative learning experiences is the timely and ongoing evaluation of students' experiences and perceptions with group work to determine the best ways to support student learning. This is especially the case given ongoing shifts in higher education learning environments. For example, the COVID-19 pandemic saw dramatic transitions to online instruction which included online collaborative activities, some of which have remained in place or have been modified for use in classrooms today (Saldanha et al., 2021, Tan et al., 2022). Understanding how these instructional and pedagogical shifts influence students' experiences with collaborative learning is essential to identify what does and does not promote optimal outcomes in today's classrooms. Thus, the present study explores differences in preferences, perceptions, and experiences with group work. In particular, this study focuses on potential differences across undergraduate academic levels (i.e., first-year, second-year and senior undergraduate students) and type of course delivery (i.e., in-person and online).

Student perspectives on effective group work

Extant research examining group preferences indicates that students generally favour self-formed groups over instructor-formed groups (Chapman et al., 2006; Vogel & Wood, 2023). Hilton and Philips (2010) suggest that allowing students to choose their own group members not only leads to higher satisfaction but also enhances skill development, personal responsibility, and the quality of projects or assignments. However, advantages have also been demonstrated when students do not select their groups. Poort et al. (2022) found that those who were unable to self-select their groups exhibited greater cognitive engagement, possibly due to the lack of heterogeneity and diverse perspectives typically found in self-selected groups.

Students also tend to prefer smaller groups, typically ranging from three to four students (Davis, 1993; Vogel & Wood, 2023). This may be because groups of this size facilitate better group coordination, task delegation, communication and group discussions as compared to larger

group sizes (groups with greater than four members) or dyadic groups (groups with two members; Davis, 1993).

Group dynamics including group member characteristics, roles, and task distribution, as well as work equality can also influence how students perceive group work. For example, leadership qualities and the availability of leadership roles in group settings can directly influence group members' self-efficacy and may promote supportive and more organized learning environments (Du et al., 2019). On the other hand, characteristics such as competitiveness may undermine cooperation within the classroom, especially when group projects are evaluated individually. Another source of reluctance towards engaging in group work often arises from some group members "free riding" or not contributing fairly or equally to group workload (Meijer et al., 2020). Unfair work distributions may detract from the productivity of the group as a whole, with some group members having to take on greater workload demands to compensate for those that fail to meet their obligations. As a result, students typically endorse instructional methods that limit free riding, including anonymous peer evaluations, group monitoring techniques, and a combination of group and individual evaluation (Meijer et al., 2020).

Although group work has traditionally been implemented within in-person contexts, group work in online environments has become more common (Saldanha et al., 2021). Some studies indicate that students view group work less positively in fully online environments compared to in-person or blended contexts (Vogel & Wood, 2023). When academic group work occurs outside the classroom (i.e., online asynchronously or synchronously) factors including work-life scheduling challenges, digital divide issues, and organizational skills may limit or prohibit some learners from actively and effectively engaging in group work (Chang & Kang, 2016; Edvardsen Tonheim et al., 2024). Alternatively, students may perceive online collaborative contexts to be more flexible and less socially demanding, especially with asynchronous activities. Positive experiences and perceptions regarding collaborative learning may be an important factor underlying greater satisfaction and sense of community in online contexts (Chatterjee & Correia, 2020). The present study assesses group work in both in-person and online contexts.

Examining group work across academic level

Year of study may also influence students' group work experiences. As students move from their first year to their senior years of undergraduate studies, class sizes generally become smaller. In larger classrooms, organizing, supervising, and facilitating groups may be more challenging and limit student-instructor and student-student interactions (O'Neill & Moore, 2008). In addition, over years of study course objectives typically move from an emphasis on mastering foundational domain knowledge and skills to a focus on higher-order skills such as applying, analysing, evaluating, and creating content. This shift is consistent with Bloom's Taxonomy, where different levels of learning correspond to distinct learning outcomes that build sequentially upon one another (Anderson & Krathwohl, 2001; Bloom et al., 1956). This may also translate to differences in the scope of group work assignments, with group work in earlier years tending to align with remembering and understanding elements of the taxonomy and upper-year courses focusing on the more higher-level thinking elements of the taxonomy. Differences in learning objectives may subsequently influence the scope of group work expected across years of study with lower-stake group work activities accounting for a smaller proportion of the overall grade in earlier years compared to more intensive, complex, and higher-stake assignments required in more senior years. In addition, to potential organizational and cognitive differences

across years of study, social experiences may change in group work over the undergraduate years. For example, students taking required courses may become more familiar with peers in the same program and this familiarity may differentially impact how groups are formed and experienced. Given these considerations, it is important to assess potential changes in students' perceptions toward group work as a function of academic level, a consideration that has not yet been systematically evaluated.

The present study

Within the present literature, there has been considerable focus on evaluating students' preferences, perceptions, and experiences with group work; however, to our knowledge no study has evaluated these preferences and experiences as a function of year of study at the undergraduate level. Factors such as student expectations (Crisp et al., 2009), class size, instructional style, and assessment methods (Hassel & Ridout, 2018; Mulryan-Kyne, 2010) may vary across undergraduate years, influencing how groups are formed, function, and how they are evaluated. Additionally, as online learning becomes a more common learning context, it is important to understand how students experience group work in both online and in-person settings. Thus, the two main objectives of the present study include: (1) to examine students' group work preferences, perceptions, and experiences across undergraduate years of study, and (2) to examine students' experiences with group work across different instructional formats (i.e., in-person versus online). First-year, second-year and senior undergraduate students were surveyed about their general preferences regarding group work (i.e., amount of group work compared to independent work, preferred group selection methods), typical group work experiences (group size, group selection methods, and context), as well as their positive and negative experiences with group work (motivation level, satisfaction, efficiency, workload demand, stress).

Method

Participants

Participants who completed the survey included 300 undergraduate students from one mid-sized Canadian University. Of these students, 100 were in each of first year (n = 50 females, n = 50 males), second year (n = 66 females, n = 34 males) and third or fourth year (n = 56 female, n = 44 male). Only one first-year student reported not having group work as a course requirement during their university experience. Students' programs varied with 45.2% in science, followed by 28.1% in social sciences, 20.1% in arts and 6.7% in business. Approximately half self-identified as White (52%), followed by South Asian (16%), East Asian (9.3%), Black or African American (5.7%), European (5.3%), Aboriginal/ First Nations/ Inuit (.7%), and French Canadian (.3%), with the remaining participants (10.7%) selecting 'Other'.

Participants were recruited through the university's research pool, or through posters and emails distributed by professors to their classes. Participants received course credit or were entered into a draw for a token gift card for participation. This project was reviewed and approved by the university's Research Ethics Board and all participants were treated in accordance with APA/CPA ethical guidelines.

Materials

All participants completed one online survey. The survey assessed demographic information (i.e., age, gender, degree, ethnicity, level of study), group work preferences, collaborative learning experiences, academic competitiveness, as well as familiarity with technology and online synchronous and asynchronous collaborative platforms. Some survey questions were previously piloted in a separate sample (see Vogel & Wood, 2023). Refer to the Appendix for the complete list of questions included in the survey.

Group work preferences

Participants were asked to identify their preferred method for completing assignments by selecting one alternative from *independently, in a group,* or *a mix of both.* Participants were also asked one question regarding preferred group size when working collaboratively (choices included *one other person* to *four or more other people*).

Collaborative learning experiences

Two questions, each using a 5-point scale (1 = *almost never* to 5 = *always*) assessed how often students experienced instructor formed and self-selected groups. Students' level of satisfaction with each of these group formation strategies was also assessed through two questions (1 = *very dissatisfied* to 5 = *very satisfied)*.

Participants rated six aspects of collaborative learning. Five individual questions assessed perceived efficiency, motivation, satisfaction, stress, and workload demand each using a 5-point scale (1 = *not at all* to 5 = *extremely)*.

Two individual questions assessed the presence of leadership roles when working in groups. The first question asked how often group assignments included a leadership role and the second question asked how often participants took on a leadership role in their groups (1 = *almost never* and 5 = *always*).

Academic competitiveness

Three questions were aggregated to assess academic competitiveness. Participants indicated their level of agreement (1 = *disagree strongly* to 5 = *agree strongly*) regarding their likelihood to actively engage in opportunities to compare their grades to other students as well as thinking about how their peers are doing in class relative to themselves. Participants also indicated how competitive they are in academic contexts (1 = *not at all* to 5 = *very*). The Cronbach's alpha (α = .74) for this scale was acceptable.

Familiarity/comfort with technology

Participants were asked to rate their comfort using technology (1 = *very uncomfortable* to 5 = *very comfortable*). In addition, two aggregated measures were created, one for ratings of their familiarity with Microsoft tools (i.e., Word, Excel, and PowerPoint; Cronbach's α = .70 was acceptable), and a 2-item measure assessing Google tools (i.e., Google Doc and Google Slides). In addition, one question assessed familiarity using discussion boards on a 5-point scale (1 = *not at all familiar* to 5 = *extremely familiar*).

Online and in-person group work contexts

Nine individual questions assessed students' experiences and preferences regarding synchronous online group work versus traditional in-person group work. One question

evaluated students' perceived difficulty in producing a final product/assignment in traditional in-person and synchronous online formats (1 = *always more difficult in traditional in-person collaborative methods than online synchronous collaborative platforms* to 5 = *always easier in traditional in-person collaborative methods than online synchronous collaborative platforms*). Students also indicated how their social skills have been impacted (1 = *very negatively* to 5 = *very positively*) when working collaboratively in-person and online. They also indicated how much they collaborated with their group members when working on an assignment when working in-person and when working online (1 = *completely independent* to 5 = *completely collaborative*).

Participants also compared their overall learning experience between in-person and online synchronous formats (1 = *always better in traditional collaborative methods than online synchronous collaborative platforms* to 5 = *always much worse in traditional collaborative methods than online synchronous collaborative platforms*) and indicated how enjoyable their experiences have been across each of the two contexts (1 = *not at all enjoyable* to 5 = *very enjoyable*). Participants were also asked how likely they would be to choose using online synchronous collaborative platforms over traditional collaborative ones in the future (1 = *extremely unlikely* to 5 = *extremely likely*).

Procedure

Participants attended one in-person lab session with the number of participants in each session ranging from 6 to 30 students. Each session was supervised by one research assistant who provided participants with a link to the online survey. Participants used their own device to complete the survey. Participants were provided with as much time as needed to complete the survey, with most requiring approximately 30 minutes to finish. The research assistant ensured students worked independently and provided technical support and clarifications as needed.

Results

One-way analyses of variance (ANOVA) were used to compare across the three levels of academic study (first-year, second-year, and senior students) followed by Tukey-b post hoc comparisons. All one-way ANOVA tests met the assumptions of independence of groups. In cases where the assumption of normality or homogeneity of variance was violated, Welch's *F* was reported. For comparisons involving both online versus in-person learning contexts and level of study, mixed model 2 (context: online versus in-person) X 3 (levels of study) ANOVAs were conducted. In cases where the assumption of sphericity was violated, Greenhouse-Geisser was reported.

Group work preferences

With respect to preferences for completing assignments, the majority of students across all academic levels favoured a combination of both group work and independent work (59% of first years, 60% of second years and 61% of seniors). However, approximately one-third of students preferred working independently (35% of first years, 34% of second years, 34% of senior years), while only a small percentage expressed a preference for primarily group work (6% first years, 6% second years, 5% *senior* years). There were no significant differences in these

preferences across academic years, $\chi^2(4) = .170$, $p = .997$, Cramer's V = .017.

Students indicated a preference for smaller group sizes comprised of themselves and two other students (51% first years, 39% second years, 43% senior years), followed by dyads (32% first years, 29% second years, 27% senior years), three other group members (12% first years, 26% second years, 26% senior years) and few endorsed groups with four or more other members (5% first years, 6% second years, 4% senior years). Preferred group size did not differ as a function of academic level, F (2, 297) = 1.54, p = .215, $\eta^2 = .01$.

Collaborative learning experiences

Group formation strategies differed as a function of year of study both in terms of the frequency of instructor formed groups (F (2, 191) = 20.41, $p < .001$, $\eta^2 = .14$), and opportunities for self-selection of groups (F (2, 297) = 5.42, p = .005, $\eta^2 = .04$; see Table 1). Instructor-formed groups were most common in second year, followed by senior years and least often used in first year. Self-selected groups were most common in senior years, followed by second year, and first year. There were no significant differences in satisfaction with how groups were formed based on academic level, whether the groups were instructor-formed (F (2, 257) = 0.16, p = .857, $\eta^2 = .001$) or self-selected (F (2, 274) = 0.88, p = .414, $\eta^2 = .01$; see Table 1). However, comparisons of satisfaction between instructor-formed and self-selected groups indicated that students reported greater satisfaction when they were able to form their own groups with friends compared to when instructors formed their groups, at each level of study ($t_{first\ year}$ (60) = -5.43, $p < .001$, d = 0.97 , $t_{second\ year}$ (84) = -5.90, $p < .001$, d = 0.87, t_{senior} (91) = -5.23, $p < .001$, d = 0.78).

Table 1

Summary of Outcomes regarding Frequency of Use and Student Satisfaction with Instructor-Formed and Self-Selected Groups Across Academic Level

Group Formation Variables	First year students	Second year students	Senior students	*F*
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	
Frequency of instructor formed groups	2.67 (1.54)	3.87 (1.09)	3.37 (0.93)	F (2, 191) = 20.41*
Frequency of self-selected groups	3.72 (1.14)	3.27 (1.16)	3.74 (1.13)	F (2, 297) = 5.42*
Satisfaction with instructor-formed groups	3.06 (1.01)	3.06 (1.04)	3.14 (1.06)	F (2, 257) = 0.16
Satisfaction with self-selected groups	4.03 (0.89)	3.85 (0.90)	3.93 (0.95)	F (2, 274) = 0.88

Note. * Represents significant outcomes after Bonferroni correction for multiple comparisons $p < .0125$.

There were no differences across academic level in group work experiences including perceived efficiency (F (2, 297) = 0.64, p = .528, $\eta^2 = .004$), motivation (F (2, 297) = 0.345, p = .708, $\eta^2 = .002$), satisfaction (F (2, 297) = 0.91, p = .404, $\eta^2 = .01$), workload demand (F (2, 297) = 4.36, p = .014, $\eta^2 = .03$), and stress (F (2, 297) = 2.36, p = .096, $\eta^2 = .02$), see Table 2.

Table 2

Summary of Outcomes Regarding Group Work Experiences Across Academic Level

Group work Experiences Variables	First year students	Second year students	Senior students	*F*
	M (*SD)*	*M* (*SD)*	*M* (*SD)*	
Efficiency	3.42 (0.70)	3.44 (0.74)	3.33 (0.75)	*F* (2, 297) = 0.64
Motivation	3.51 (0.86)	3.56 (0.81)	3.46 (0.88)	*F* (2, 297) = 0.35
Satisfaction	3.27 (0.95)	3.23 (0.92)	3.10 (0.93)	*F* (2, 297) = 0.91
Workload demand	2.68 (0.82)	3.01 (0.80)	2.91 (0.82)	*F* (2, 297) = 4.36
Stress	2.89 (1.04)	3.21 (1.01)	3.04 (1.07)	*F* (2, 297) = 2.36

Note. * Represents significant outcomes after Bonferroni correction for multiple comparisons $p < .01$.

The frequency with which students were offered opportunities for leadership roles (F (2, 195) = 5.41, p = .005, η^2 = .04) differed as a function of students' academic year of study. Students reported more leadership opportunities in second year compared to first. Leadership opportunities did not differ from senior students. The uptake by students taking on these leadership roles did not differ across academic levels, F (2, 197) = 2.99, p = .052, η^2 = .02 (see Table 3).

Table 3

Summary of Outcomes Regarding Leadership Experiences Across Academic Level

Leadership Variables	First year students	Second year students	Senior students	*F*
	M (*SD)*	*M* (*SD)*	*M* (*SD)*	
Leadership opportunities	2.75 (1.31)	3.29 (0.99)	3.06 (1.14)	*F* (2, 195) = 5.41*
Uptake of leadership	2.64 (1.24)	3.03 (1.07)	2.94 (1.11)	*F* (2, 197) = 2.99

Note. * Represents significant outcomes after Bonferroni correction for multiple comparisons $p < .025$.

Academic competitiveness

Means for competitiveness were above the midpoint of the scale (M_{first} = 3.46, SD = .90; M_{second} = 3.60, SD = .91; M_{senior} = 3.31, SD = 1.0) indicating moderate levels of competitiveness and social comparison. There were no significant differences for any of the three competitiveness ratings across the levels of study (F (2, 297) = 2.39, p = .093, η^2 = .02).

Familiarity and comfort with technology

Overall, mean scores for comfort with technology approached ceiling and did not differ across levels of study, F (2, 297) = 1.35, p = .261, $\eta^2 = .01$. In terms of familiarity, there were no differences across academic levels with respect to discussion forums (F (2, 297) = .568, p =.567, $\eta^2 = .01$) or Google tools (i.e., Google Docs, and Google Slides; F (2, 297) = .628, p = .534, $\eta^2 = .01$); however, differences were apparent with respect to Microsoft tools (i.e., PowerPoint, Microsoft Excel; F (2, 297) = 14.18 p < .001, $\eta^2 = .09$). First-year students were less familiar than second-year students and senior-level students. Second-year and senior students did not differ (see Table 4).

Table 4

Summary of Outcomes Regarding Experiences with Technology Across Academic Level

Technology Variables	First year students	Second year students	Senior students	*F*
	M (*SD)*	*M* (*SD)*	*M* (*SD)*	
Comfort with Technology	4.24 (0.78)	4.39 (0.70)	4.21 (1.00)	F (2, 297) = 1.35
Familiarity with Discussion Forums	2.52 (1.40)	2.51 (1.40)	2.69 (1.22)	F (2, 297) = 0.57
Familiarity with Google Tools	4.06 (1.15)	4.00 (1.01)	3.89 (1.11)	F (2, 297) = 0.63
Familiarity with Microsoft Tools	3.75 (0.76)	4.21 (0.69)	4.23 (0.68)	F (2, 297) = 14.18*

Note. * Represents significant outcomes after Bonferroni correction for multiple comparisons p < .0125.

Four correlations were conducted to assess potential relations between familiarity with Microsoft tools and ratings for levels of enjoyment working collaboratively, group work meeting expectations, learning experience, and perceived workload when working online across each level of study. No correlations were significant (largest r = .181).

Online and in-person group work contexts

Students responded to two questions about social experiences in groups. A 2 (context) X 3 (level of study) mixed model ANOVA yielded a main effect for learning context (F (1, 297) = 15.44, p <.001, η^2 = .05, see Table 5 for means) such that in-person group work contexts were rated as having a more positive impact on social skills than online contexts. There was no significant main effect for level of study (F (2, 297) = .171, p =.84, η^2 = .001). However, the main effect was qualified by a significant interaction (F (2, 297) = 5.11, p = .007, η^2 = .03) such that first year students' ratings regarding impact on social skills were much higher for in-person than online contexts (t (99) = 4.37, p < .001, d = 0.44). No significant differences were observed for second year or senior students.

The 2 (context) X 3 (level of study) mixed model ANOVA assessing students' level of engagement in collaborative work in online and in-person settings yielded a significant main effect for context, F (1, 297) = 4.12, p =.043, η^2 = .01 (see Table 5 for means), such that

students reported working more independently on group assignments in online synchronous environments compared to in-person. There was no significant main effect for level of study (F (2, 297) = .71, p = .49, η^2 = .005); however, the main effect was qualified by a significant interaction (F (2, 297) = 5.90, p =.003, η^2 = .04). Examination of the interaction indicated that the differences in learning context were specific to first-year students. First-year students were more collaborative when working in-person than when working online (t (99) = 4.05, p < .001, d = 0.41). No other groups differed (see Table 5 for summary of t-tests).

The 2 (context) X 3 (level of study) ANOVA examining enjoyment when working collaboratively yielded no significant main effects for context (F (2, 297) = 1.55, p = .21 η^2 = .005) or level of study (F (2, 297) = 2.64, p = .07, η^2 = .02). However, there was a significant interaction (F (2, 297) = 3.17, p = .043, η^2 = .02; see Table 5 for means). Examination of the interaction indicated that first year students reported greater enjoyment working collaboratively for in-person contexts compared to online contexts, t (99) = 2.63, p = .010, d = 0.26, see Table 5). No other differences were significant.

Table 5

Means and Standard Deviation for Group Work Experiences as a Function of Academic Level Across In-person and Online Group Work Contexts

Variables	In-person group work	Online group work	
	M (*SD)*	*M* (*SD)*	*t*
Social Skills			
All students	3.81 (0.85)	3.54 (0.90)	*t* (299) = 3.88*
First-year students	3.95 (0.85)	3.38 (1.01)	*t* (99) = 4.37*
Second-year students	3.73 (0.87)	3.68 (0.79)	*t* (99) = 0.45
Senior-year students	3.75 (0.82)	3.56 (0.88)	*t* (99) = 1.65
Collaboration			
All students	3.41 (0.94)	3.23 (0.94)	*t* (299) = 2.00*
First-year students	3.61 (0.90)	3.04 (0.94)	*t* (99) = 4.05*
Second-year students	3.30 (0.98)	3.43 (0.87)	*t* (99) = -0.86
Senior-year students	3.31 (0.99)	3.23 (0.97)	*t* (99) = 0.53
Enjoyment			
All students	3.39 (0.96)	3.30 (1.00)	*t* (299) = 1.24
First-year students	3.65 (0.91)	3.29 (1.09)	*t* (99) = 2.63*
Second-year students	3.31 (0.98)	3.36 (0.91)	*t* (99) = -0.42
Senior-year students	3.22 (0.93)	3.25 (1.01)	*t* (99) = 2.63*

Note. * p < .05.

One-way ANOVAs were conducted for two questions with opposing anchors. The first assessed the relative difficulty in producing an assignment collaboratively with one anchor indicating traditional in-person settings were more difficult and the other that online synchronous environments were more difficult. No significant differences as a function of academic level were found (F (2, 297) = 3.04, p = .049, η^2 = .02; see Table 6).

The second dual anchor question addressed perceived learning in online and in-person contexts as a function of academic level. Significant differences (F (2, 297) = 5.72, p = .004, η^2 = .04; see Table 6) indicated that first-year students reported greater positive learning outcomes

when working in-person compared to second-year students. No other comparisons were significant

Finally, students' overall mean ratings fell well above the midpoint of the scale consistent with a rating that they were likely to use asynchronous collaborative methods in the future. These ratings did not differ as a function of academic level, F (2, 297) = 1.96, p = .142, η^2 = .01 (see Table 6).

Table 6

Summary of Outcomes Regarding Group Work Experiences in In-Person and Online contexts Across Academic Level

Variables	First year students	Second year students	Senior students	*F*
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	
Difficulty producing a collaborative assignment	2.88 (1.14)	2.48 (1.13)	2.75 (1.23)	F (2, 297) = 3.04
Perceived learning	2.50 (1.03)	2.99 (1.02)	2.84 (1.10)	F (2, 297) = 5.72*
Likelihood to choose online over in-person platforms in the future	3.42 (1.14)	3.68 (1.12)	3.71 (1.16)	F (2, 297) = 1.96

Note. * Represents significant outcomes after Bonferroni correction for multiple comparisons p < .016.

Discussion

The first objective of the present study was to examine potential differences in undergraduate students' preferences, perceptions, and experiences with collaborative learning as a function of their level of study (i.e., first year, second year, and senior). Overall, there was more stability than differences in students' preferences with group work across levels of study. Although, there were some notable differences between first- and second-year students. A second objective of the present study was to examine outcomes as a function of course delivery formats (in-person vs. online). Formats yielded differences in experiences and again, these were evident for first- versus second-year students.

Group work preferences: Expectations met

Students across different years of study indicated similar preferences towards group work with respect to group size and formation. Consistent with previous global assessments of students' preferences in higher education, students at each level endorsed working in dyads or small groups comprised of three or four students as the ideal size (e.g., Burdett, 2003). Research supports this preference in terms of academic outcomes as smaller groups optimize accountability among group members and promote more opportunities for each student to engage collaboratively with other members (Davis, 1993; Vogel & Wood, 2023).

Student expectations regarding group work

Students across different levels of study were consistent in their preferences for instructional settings that provided a balance between opportunities to work independently on assignments and to work collaboratively, with almost two thirds of students at each level of study supporting this balanced approach. This preference for mixed learning opportunities aligns with best practice literature advocating for variety in learning and assessment opportunities to promote deeper learning (Hmelo-Silver, 2004), address different learner needs (Wilson et al., 2018) and to foster development of both independent and teamwork skills (Hockings et al., 2018; Payne et al., 2006). However, across levels, we also observed that almost a third of students shied away from any group work, instead preferring independent work only. It is possible that, for some students, previous negative group work experiences (Burdett, 2003; Elmassah et al., 2020) may have impacted their perceptions regarding group work. As noted in previous research, thoughtful planning and design of collaborative learning experiences is needed to support students and minimize potential negative outcomes (Barkley et al., 2005; Johnson et al., 1998). These outcomes may have important policy implications. To ensure that group work and collaborative opportunities are utilized effectively in the classroom, it may be necessary to offer instructors professional development opportunities regarding best practices when using group work. This in turn could positively impact students' experiences and perceptions about group work. However, it may also be important to acknowledge that some students may perform best when working independently. Given today's diverse classrooms, offering alternate assessment options may be needed to best meet the needs of the diverse array of students when flexibility is a possible part of course design. Adopting this flexible approach promotes inclusive instructional practices by accommodating different learning styles and allowing students to demonstrate their knowledge in ways that align with their individual strengths (Barua & Lockee, 2024).

Group work preferences: Expectations not met

Students across levels of study preferred to self-select their group members, however; their reported experience suggests this preference was often not met. Instead, instructors often assigned class members to groups, and this was especially the case for students in second year and above. This disconnect between student expectations and their experiences may reflect instructor demands associated with class size and number. For example, practicalities associated with large classes (e.g., predictability in attendance, not knowing students) and lecture hall seating (e.g., lack of room for students to move, spacing of students) typical of entry level or lecture courses, may make it more challenging for instructors to arrange groups in advance and thus they may resort to strategies such as asking students to arrange their own groups based on proximity. Whereas smaller class sizes with more flexible seating (e.g., Baepler et al., 2014) and greater familiarity with students, more typical of senior level courses, may enhance instructors' ease regarding group formation. Although the shift toward greater instructor involvement in group formation at more senior levels of study may be intended to enhance group functioning, it may also detract from students' sense of agency. Instruction that supports student agency is associated with greater learning outcomes (Stenalt & Lassesen, 2022). This disconnect between students' preferences and instructors' behaviours observed in the present study would be important to explore further. In particular, clarifying what factors

inform instructors' decision making at different levels of study would enhance understanding of group formation strategies. In addition, it would also be interesting to explore instructor decisions if they were aware of students' perceptions regarding the strategies used. Our findings suggest that instructors of more senior level students may need to re-consider how they approach group formation for collaborative activities and may wish to involve their students more directly in the group formation process to foster greater satisfaction and learning.

Differences in group work experiences across levels of study

Overall, students' experiences remained stable and consistent across academic levels. Only one comparison approached significance. Specifically, second-year students found collaborative work to be more demanding than their junior, first-year peers. This suggests that further investigation regarding elements related to perceived workload may be important for future investigations. For example, it may be important to determine whether higher demands are associated with the perceived increase in leadership opportunities available and greater uptake of these opportunities reported by second-year students. In addition, as noted above, students in second year were more likely to have their group membership assigned by instructors. It may be that this transition from self-selection to assigned membership between first- and second year could contribute to greater perceived demands. For example, groups organized to reflect diversity in terms of learners' performance, ideologies, or beliefs may be more demanding academically and socially for students to navigate than homogeneous groups. However, these demands may be offset by the learning opportunities arising from greater diversity in views (Poort et al. 2022). It may be important for instructors to be aware of the potential for perceived greater demands when considering group formation strategies and this may be important to acknowledge and discuss with students as part of the learning experience.

Online and in-person collaborative experiences yielded interesting differences as a function of level of study. First-year students indicated greater enjoyment, collaboration, and experienced a greater positive impact on social skills with in-person learning contexts than online contexts. It may be that in-person group work activities provide opportunities for first-year students to establish connections with peers and develop peer groups which may foster a greater sense of community for these newcomers to campus (Michaelsen,1983; Vogel & Wood, 2023). A significant body of research indicates the importance of social connections as a foundation for successful transition from high school to university (e.g., Lamothe et al., 2009). In-person collaborative learning opportunities may be an important framework for formation of social connections and engagement, and these opportunities may be especially relevant for first-year students.

Students see online collaborative work as a desirable component of their future learning. Students' ratings indicated a likelihood that they would use online collaborative work going forward. This may reflect perceived conveniences offered through online contexts. For example, students' familiarity with technology and, in particular, platforms that permit discussion and document sharing may contribute to their positive views toward online collaborations. Online collaborations may also afford greater flexibility to balance work and school demands (Young, 2006). In addition, opportunities for collaborative work that extends beyond the classroom may offer additional opportunities to revisit and reflect on course content.

Importantly, students in the present study indicated a desire for online collaborative opportunities in the future but also provided positive ratings regarding in-person collaborative learning. Clearly, students support online collaborative opportunities but also in-person ones as part of their educational experience.

Limitations and future directions

The present study used survey methods and a cross-sectional design to assess student perceptions and experiences. This approach may be subject to cohort differences as students at the different levels of study may have differential experiences during their academic careers other than those tested here that impacted their ratings. The outcomes in the present study provide a foundation for further investigation that could more clearly identify which instructional strategies inform students' perceptions. For example, longitudinal tracking of students over their undergraduate programs may provide a richer understanding of undergraduate collaborative experiences. Future research may also benefit from more intensive investigation of specific constructs surveyed. For example, the present study employed single-item questions. These provide a basic understanding of students' experiences; however, they are more limited in scope than would be the case if constructs were examined from multiple perspectives and in greater detail (Davies, 2020). Such investigations could provide a more nuanced understanding of constructs assessed and more comprehensive conclusions. Moreover, the present study surveyed collaborative experiences broadly and did not ask students to identify specific course(s) where they experienced group work. An ideal next step would be a more intensive examination of collaborative experiences in specified courses and across different disciplines and perhaps different universities to better understand when and where collaborative experiences promote best outcomes.

Conclusion

The present study addressed a gap in the collaborative learning literature pertaining to potential differences in perceptions and experiences across levels of study in higher education. Overall, outcomes indicated that experiences differed most from first- to second year with some differences specific to online collaborative contexts. However, students' experiences were more similar than different across level of study. Most students favoured collaborative learning opportunities as part of their learning experiences. Ensuring that instructors are informed regarding how to best design and execute collaborative learning opportunities can maximize their effectiveness.

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Pinto: Conceptualization (supporting); Data curation(supporting); investigation (lead); Methodology (supporting); Writing – original draft (supporting)

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Appendix

Group Work Preferences

1) In general, for a school assignment, I prefer to work
    a) Independently
    b) In a group
    c) A mix of both
2) If I were assigned to work with others to complete a school assignment, my preferred group size would be
    a) Myself and one other person
    b) Myself and two others
    c) Myself and three others
    d) Myself and four or more others

Collaborative Learning Experiences

3) In my university courses, the groups I have been in have been randomly formed by the instructor

    Responses: Almost never to Always

4) In my university courses, I have been able to self-select group members with classmates and/or friends to do assigned group work

    Responses: Almost never to Always

5) How satisfied have you been with groups being randomly formed by the instructor?

    Responses: Very dissatisfied to Very satisfied

6) How satisfied have you been with groups where you have been able to self-select group members?

    Responses: Very dissatisfied to Very satisfied

7) When working in a group, the efficiency level is

    Responses: Not at all efficient to Extremely efficient

8) When working in a group, the motivation level is

    Responses: Not at all motivating to Extremely motivating

9) When working in a group, the satisfaction level is

    Responses: Not at all satisfying to Extremely Satisfying

10) When working in a group, the stress level is

    Responses: Not at all stressful to Extremely stressful

11) When working in a group, the workload is

    Responses: Not at all demanding to Extremely demanding

12) Since coming to university, how often have your group assignment(s) included a leadership role?

    Responses: Almost never to Always

13) Response: Almost never to Always Since coming to university, how often have you been a leader of your group for your group assignment(s)?

    Responses: Almost never to Always

Academic Competitiveness

14) Are you someone who actively seeks to compare your grades to other students?

    Responses: Disagree strongly to Agree strongly

15) Are you someone who thinks about how your peers are doing in a class relative to yourself?

    Responses: Disagree strongly to Agree strongly

16) Overall, how competitive are you in academic contexts?

    Responses: I am not at all competitive to I am very competitive

Familiarity/Comfort with Technology

17) In general, how would you rate your comfort level using computer technology?

    Responses: Very uncomfortable to Very comfortable

18) Please rate your familiarity level with each the following applications/platforms: (Microsoft Word, Microsoft Excel, Microsoft PowerPoint, Google Docs, Google Slides, Discussion boards)

    Responses: Not at all familiar to Extremely familiar

Online and In-person Group Work Contexts

19) Generating a final output for a group assignment is

    Responses: Always more difficult in traditional in-person collaborative methods than online synchronous collaborative platforms to Always easier in traditional in-person collaborative methods than online synchronous collaborative platforms

20) How has traditional in-person collaborative methods impacted your social skills

    Responses: Very negatively to Very positively

21) How has online synchronous collaborative platforms impacted your social skills

    Responses: Very negatively to Very positively

22) In general, how would you rate your experiences in terms of roles for you and the other group members in traditional in-person collaborative methods

    Responses: Completely independent to Completely collaboratively

23) In general, how would you rate your experiences in terms of roles for you and the other group members for online synchronous collaborative platforms

    Responses: Completely independent to Completely collaboratively

24) How would you compare your learning experience from your group assignments in traditional in-person collaborative methods with online collaborative platforms

    Responses: Always much better in traditional in-person collaborative methods than online synchronous collaborative platforms to Always much worse in traditional in-person collaborative methods than online synchronous collaborative platforms

25) Overall, how enjoyable has your experience in group assignments been in traditional in-person collaborative contexts?

    Responses: Not at all enjoyable to Very enjoyable

26) Overall, how enjoyable has your experience in group assignments been in online synchronous collaborative contexts?

    Responses: Not at all enjoyable to Very enjoyable

27) In general, how likely are you to choose online synchronous collaborative platforms over traditional in-person collaborative methods in future?

    Responses: Extremely unlikely to Extremely likely