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Participation is Predictive of Individual, but Not Group, Work in the Context of a Blended General Education Course

Alice S. N. Kim
Teaching and Learning Research In Action, alice.kim@tlraction.com
Brian C. Nairn
York University, nairn1@yorku.ca
Celia Popovic
York University, cpopovic@yorku.ca
Linda Carozza
York University, lcarozza@yorku.ca
Elaine C. Balidio
Teaching and Learning Research In Action, elaine.balidio@tlraction.com

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Participation is Predictive of Individual, but Not Group, Work in the Context of a Blended General Education Course

Abstract
Past research on face-to-face instructional delivery demonstrates that students' participation is positively related to their achievement in a course (Rocca, 2010), and that participation mediates the relation between attendance and achievement (Kim et al., 2019). Given that blended learning is on the rise in higher education (Johnson et al., 2016), it is of growing interest to explore whether this positive association between participation and achievement holds in the context of blended learning. Here we investigated whether students' participation was (a) predictive of their overall grade in the course and (b) differentially predictive of their grades on three different types of assessments: tests (test and quiz), written assignments (argumentative letter and critical essay), and oral activities (debate). The results of our regression analyses showed that participation grades were predictive of learning achievement in the course with respect to overall grade (R^2=0.364; β=0.365), test grade (R^2=0.164; β=0.327), and written grade (R^2=0.212; β=0.278). Participation was not predictive of oral grades as a whole; however, further analyses showed that students' participation predicted the individual (vs. group-based) component of the oral grade (R^2=0.045; β=0.113). Thus, our findings demonstrate that students' participation grades are predictive of their grades on assessments that are independent but not group-based, at least in the context of the blended course investigated in this study.

Les recherches menées dans le passé sur la prestation de cours en personne montrent que la participation des étudiants et des étudiantes est liée positivement à leur réussite dans le cours (Rocca, 2010) et que la participation sert de médiateur dans la relation entre la présence en classe et la réussite (Kim et al, 2019). Étant donné que l'apprentissage hybride est de plus en plus populaire dans l'enseignement supérieur (Johnson et al, 2016), il devient de plus en plus intéressant d'explorer si cette association positive entre la participation et la réussite est toujours valable dans le contexte de l'apprentissage hybride. Dans cet article, nous enquêtons pour savoir si la participation des étudiants et des étudiantes (a) pouvait laisser prévoir leur note globale dans le cours et (b) pouvait laisser prévoir de façon différentielle leurs notes dans trois types de travaux : les tests (test et quiz), les devoirs écrits (lettre d'argumentation et essai critique) et les activités orales (débat). Les résultats de nos analyses de régression indiquent que les notes de participation pouvaient laisser prévoir les résultats d'apprentissage dans le cours en ce qui a trait à la note finale (R^2=0.364; ß=0.365), à la note du test (R^2=0.164; ß=0.3627) et à la note de l'écrit (R^2=0.212; ß=0.278). La participation ne pouvait pas laisser prévoir les notes de l'oral dans son ensemble; toutefois, des analyses complémentaires ont indiqué que la participation des étudiants et des étudiantes laissait prévoir la composante individuelle (par rapport à la composante du groupe) de la note orale (R^2=0.045; ß=0.113). Ainsi, nos résultats montrent que les notes de participation des étudiants et des étudiantes peuvent laisser prévoir leurs notes de devoirs et de travaux indépendants mais non pas pour le travail de groupe, tout au moins dans le contexte du cours hybride qui a fait l'objet de cette recherche.

Keywords
blended course, participation, engagement, assessment, blended learning; cours hybride, participation, engagement, évaluation, apprentissage hybride

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Since blended learning is becoming more of a norm in higher education (Johnson et al., 2016), it is of growing interest to examine the impact of various factors on students' academic achievement in this learning context, particularly factors that students can control, such as their participation in a given course. Past research on face-to-face instructional delivery demonstrates that students' participation is positively related to their achievement in a course (Rocca, 2010), and that participation mediates the positive association found between attendance and achievement (Kim et al., 2019). The extant literature on the relation between participation and achievement in the context of blended learning is mixed; whereas some studies demonstrate a positive association between these two variables (Rubio et al., 2018), other research shows that only some forms of online participation are significantly related to student achievement (Cheng & Chau, 2016).

Specifically, Cheng and Chau (2016) found that online participation activities that served to facilitate students' communication and collaboration with instructors and peers (e.g., use of wikis and online forums), and activities that helped students compile and present materials for course requirements were both significantly related to students' achievement in the course. In contrast, online participation that consisted of engaging with interactive learning exercises and accessing learning resources (e.g., lecture notes) was not significantly related to their learning achievement. Though past research has investigated the relation between specific types of online participation (e.g., quizzes, homework, forums) and achievement in a course, as reviewed below, we are not aware of any studies that investigated whether students' participation grades differentially predicted the grades that they received on different types of assessments (e.g., written assignments vs. in-class tests) in a blended course. To help fill this gap, in this study on blended learning we investigated whether students' participation grades were differentially predictive of their grades on different types of assessments, namely tests, written assignments, and debates, as well as their overall grade in the course.

Blended learning is a mode of teaching and learning where some of the course is delivered in person and some is delivered online. Whereas some define it as a combination of face-to-face classes and online instruction and activities (Harriman, 2004; Quevedo, 2011), others use the term more generally to refer to the combined use of face-to-face and online activities in a pedagogically valuable manner (Picciano, 2009). In this study we used the definition set forth in our institution's Common Language for eLearning (York University, 2014) in which a third of the course contact time is in person, a third is online, and the final third may be either online or in person. This approach allows students to meet their instructor and peers in person to build relationships and a sense of community, while benefiting from the flexibility of the online delivery to choose when and where they study for at least a third of the course. In this way, blended learning can be conceptualized as a design approach, whereby both face-to-face and online learning are made better by the presence of each other. Past research has shown that students have positive attitudes toward blended learning as a result of having more freedom and responsibility in learning, as well as convenience (Wichadee, 2018).

Past research has also demonstrated a positive correlation between the number of times students participated in online activities, specifically voluntary quizzes, and students' final grade in the course (Förster et al., 2018). The use of online homework, however, has shown mixed findings. Whereas some studies have demonstrated improved grades by using computer-based homework (Arasasingham et al., 2011; Richards-Babb et al., 2011), others did not find significant differences in the exam scores of students who completed online homework compared to students who completed homework using the traditional paper-based format (Bonham et al., 2001; Bonham et al., 2003; Cole & Todd, 2003). Interestingly, Brewer and Becker (2010) found that low-skilled students benefited more by completing online homework compared to low-skilled students who completed paper-based textbook homework, suggesting

that the benefit of using online homework may vary across students based on their level of ability.

In the study by Brewer and Becker (2010), both methods of delivery provided students with information about whether they completed the homework questions correctly; whereas the homework of students who completed the homework online was graded immediately, students who completed the paper-based homework had access to the correct answers and worked-out solution for every odd-numbered question. Moreover, whereas students who completed the online homework were offered some tutorial assistance if needed, students who completed the paper-based homework received teacher comments on a small subset of the questions between five to seven days after the homework was submitted. Though it is possible that any differences in academic performance between these two groups of students may reflect differences in feedback received by students via online or paper-based delivery of homework, the findings of this study warrant further investigation into whether any benefit of using online homework varies across students of different skill level.

Past research has also investigated the relation between student participation in online discussion forums and their final mark in a course. Gharmallah (2017), for example, found that students' participation in online discussion forums was positively related to their final mark in the course. However, it is important to note that students were given specific tasks to complete using the online discussion forum, and that these tasks required students to work collaboratively with their peers in the course both intentionally and unintentionally. Along these lines, Zhang (2016) found a positive relation between the number of discussion forum postings contributed by a student and their final grade in the course. However, in this study as well, students were required to post meaningful comments. Moreover, two students were assigned to facilitate the discussion for each week, and their responsibilities included posting discussion topics that were relevant to the assigned week and following up with the responses of their peers, with the course instructor joining in on the discussion from time to time.

The studies reviewed above all set out to investigate the relation between various forms of online participation and a measure of overall achievement in a course. Although there are mixed findings regarding how the use of online homework relates to students' achievement in a course, the literature appears to suggest that the use of forums and online quizzes are positively related to students' grades in the course. Building upon this research, in this study we investigated whether students' overall participation grade is predictive of (a) their grade in a course and (b) their grades for different types of assessment in the course.

Current Study

In this study, the data were collected in a blended course on critical and analytical thinking. Participation accounted for 20% of students' final grade in the course and was composed of in-class team work that required application of skills, as well as individual reflections that were completed online and prompted students to reflect on course material in relation to their own personal experiences. Since participation grades composed a portion of the students' final grade for the dataset we analyzed, we removed the 20% participation component from students' final grade and re-weighted students' marks to be out of the remaining 80%. We used this latter re-weighted mark as the outcome measure in our first regression analysis, and students' participation mark was used as the predictor variable. The second component of our investigation was to assess whether students' participation grade differentially predicted their grades on different types of assessments. The assessments were categorized based on the general nature of what students were required to do. This resulted in the following assessment categories: oral grade (debates), test grades (test and quiz), and written grades (argumentative letter, critical essay).

Method

Participants

Students who participated in this study were enrolled in a blended and accelerated general education course at a large Canadian university in Southwestern Ontario. The course was interdisciplinary in nature, though it involved a strong emphasis in informal logic (i.e., reasoning skills). There were a total of 226 students enrolled across the five sections of the course included in this study. All of these sections of the course were offered between 2016 and 2018. Of the 226 enrolled students, 165 students provided written informed consent to participate in this study. Demographic information, including age and gender, were not collected. Based on enrolment data, students who enrolled in this course were in various stages of their respective degrees, majoring in a wide array of disciplines offered at the university. All students were invited to participate in the study towards the end of the course; near week 12 of a 12-week course. The study was not introduced to students before this date. All students who participated in the study consented to have their grades from the course included in the study, following the procedures outlined in certificate 2016-058, approved by the Human Participants Review Sub-Committee of our institutional Ethics Review Board. Students were offered bonus marks (2% was added to their final grades) if they participated in the present study. Students were not given an alternative to participating in the study to receive the 2% bonus points.

Procedure

Participation

Participation was worth 20% of students' final grade in the course, which was broken down into a minimum of 10 individual participation assignments, as described further below. Given that this course was blended, some participation assignments were completed in class and others were completed on the learning management system (LMS) online. Depending on the section of the course, 60% to 70% of the participation assignments were team activities that were completed in the classroom, and the remaining 30% to 40% of assignments were individual reflections completed online. For the team activities, students were organized into groups early on in the course based on temperament preferences and year level (where teams were made to be as heterogeneous as possible). The team assignments were practical/application based. Ten teams (of approximately five students) were assigned the same question. A typical assignment would require students to apply theories or methods already learned to argumentative passages. Most of the time, the questions were taken directly from the course textbook (Groarke & Tindale, 2013). Team members all received the same grade for the in-class participation assignments, so long as they were present from start to completion of the assignment.

The online participation assignments were completed independently and were reflective in nature. Students were prompted to respond to theories learned with the incorporation of personal experiences and were given a window of time to complete the assignment. All participation assignments were graded out of 10 marks and feedback was given by the course instructor, as pedagogically speaking these course components were organized to function as low-stakes formative evaluations (see Tessmer, 2013; Yorke, 2003) before major assignments were completed. As mentioned above, each of ten participation assignments was weighted to account for 2% of students' final grade, resulting in 20% of students' final grade being allocated to participation. Students were given the opportunity to complete one or two extra participation assignments to replace low or zero grades that they received on any of the participation

assignments. These extra assignments consisted of optional participation opportunities that students were invited to complete for the purposes of continued practice and feedback. A total of 77.5% of students earned a 70% or higher mark for participation. Less than 10% of students earned less than 50% of their participation grade.

Oral Assignment: Debates

Class debates were worked on collaboratively with the same team that students were grouped in for weekly participation assignments. The debates were completed in the second half of the course, and at this point in the term, students who had been active knew their team members and could make informed decisions about who would best suit different debater roles. The debates were worth 15% of the final grade. The grade was divided into three equally weighted (5%) components: (a) student fulfilling his/her debater role, (b) team synchronicity and consistency, and (c) the evaluation of a different debate in the class. The first component is the only individual grade; the latter two are team grades where all students in a team earn the same grade, regardless of their individual contributions. The learning outcomes of the debate varied, and depending on which role a student assumed, the expectation was that she/he/they would fulfill those outcomes. Different roles included: developing arguments for the issue; being able to evaluate arguments made by the other team; being able to connect arguments and counter-arguments back to your team's standpoint; being able to ask and answer critical questions; being able to synthesize debates fairly and make recommendations for mutual standpoints moving forward. Students were expected to adhere to the argument principles (Damer, 2012) learned in the course as they completed all aspects of the debate.

Tests and Quiz

The test was an in-class, closed book assessment. In one section of this course, there was a single mid-term test, and in all other sections, students were assessed on their knowledge of the relevant material using two shorter tests. These latter tests were held a quarter way through the course and at the mid-term mark. The material tested was the same across tests in all sections of the course. Tests accounted for 20 to 25% of students' course grade depending on the section of the course. The format of questions included mostly short answer questions as well as some multiple choice and true/false questions. All questions tested application and analysis skills; that is, there were no questions that tested knowledge retention or comprehension, solely. Students had to demonstrate that they could analyze short argumentative passages by applying concepts (e.g., cognitive biases) and methods (e.g., diagramming an argument) learned. Tests were graded by the instructor and returned within two weeks. The test questions were reviewed in class with students.

The quiz was an online, timed, multiple choice quiz on the topic of fallacies that students completed on the course LMS. Students had only one opportunity to take the quiz. They were instructed to take the quiz in isolation and independently from their peers, though this could not be monitored. Questions were derived from a repository of questions. Both the questions, and the order of answer options for each question was randomized by the LMS. The quiz, consisting of 10 to 12 questions depending on the course section, was worth 5% of the overall grade and was completed near the end of the course. As this was a blended course, and the online portions were asynchronously delivered, students were given a window of opportunity to complete the quiz at their convenience. The quiz required students to engage in analysis and application. Students were given argumentative scenarios (retrieved from the course text and the media), and they had to choose the relevant fallacy that was committed or

choose “no fallacy” if there was none present in the passage. Quiz grades and feedback were provided after the window to write the quiz lapsed.

Written Assignments: Argumentative Letter and Critical Essay

The argumentative letter was an independent written assignment between 750 and 900 words in length. This assignment was worth either 10% or 15% of students’ overall grade depending on the section of the course, and it was completed in the first half of the course. Students were given approximately two weeks to complete their letters. They were instructed to choose a topic out of three or four options provided to them (e.g., legalization of abortion), find a specific audience’s stance on the issue (e.g., Pope Francis or Abortion Rights Coalition of Canada), and aim to convince this person/group of an alternative perspective (e.g., it is important to recognize bodily autonomy). The learning outcomes for this assignment included researching arguments, summarizing arguments, providing counter-arguments, and addressing a hostile audience in an empathetic and collaborative manner as a technique of persuasion (Ramage et al., 2015). Letters were graded by the course instructor. A student who earned a high grade (letter grade of A/A+) provided arguments that were relevant to the audience, and relayed the disagreement in a collaborative and empathetic manner in an effort to reach a joint resolution of the issue with the resistant audience the letter was addressed to.

The essay was an independent written assignment between 1250 and 1500 words in length. It was cumulative in nature and worth 25% of students’ overall grade. Students were provided with the assignment instructions and given approximately a three-week deadline to upload their essays to the course LMS. Steps of instruction for this critical analysis were: (1) choose between one of two film options and watch the film; (2) roughly diagram the film's arguments; (3) analyze all the arguments as fully as possible by uncovering argument schemes and/or fallacies, and choose the schemes/fallacies to write a paper about; (4) make connections with the schemes/fallacies to other course concepts to build critical thoughts; (5) develop a critical thesis that ties together the analyses chosen; and (6) write the essay. The learning outcomes relevant to this writing assignment included diagramming arguments, evaluating arguments, discussing fallacies with methods delivered in the course (i.e., neutralization method), and providing a succinct analysis, neutrally, that is connected with a relevant critical thesis. All essays were graded by the course instructor. A student who earned a high grade (A/A+) summarized the film’s arguments accurately, provided an accurate analysis, and was able to tie analyses under some critical theme (i.e., the essay is not a dump of analyses, but rather a structured analysis proven through the critical discussion of various arguments in the film).

Data Processing

With the exception of the overall final grades, the grades used in our analyses were converted from a raw score to a percentage out of 100% for each individual assessment. For the overall final grade, of which 20% was accounted for by the participation grade, the participation component was removed and the final grade was re-weighted out of 80%.

Assessments were organized into categories based on the general nature of what students were required to do, resulting in the categories of assessments described above: tests, written assignments, and an oral assignment. This resulted in four outcome measures that were each used as dependent variables (final grade, test grade, written grade, oral grade), with the participation grade being the predictor variable.

Data Analysis

Regression Analyses

Two sets of regression analyses were conducted in this study. In the initial regression analysis, students' grades for all of the assessments in the course were used to assess whether students' participation grades were predictive of their overall performance in the course (their grades on all other assessments for the course, excluding their participation grade, which was used as the predictor variable). For the second set of regression analyses, the assessments were categorized based on the general nature of what students were required to do—as mentioned above, this resulted in the following assessment categories: oral assignment (debates), tests (test and quiz), and written assignments (argumentative letter, critical essay). This second set of regression analyses was conducted to investigate whether students' participation grades were differentially predictive of their performance on different types of assessment (e.g., debate, tests, and written pieces). Thus, three separate regression analyses were conducted, with each of the three assessment categories used as the outcome measure. Students' participation grades was used as the predictor variable across each of the three regression analyses.

All regression analyses were conducted using SPSS statistical package software (IBM SPSS Statistics for Windows, v24. Armonk, NY: IBM Corp.). Prior to calculating the linear regressions, a number of assumptions were checked (see Appendix for a summary of these results). Since all of the relevant assumptions were met, the analyses proceeded as normal. Based on the results (see Results section), the oral grade was further partitioned into its separate components of individual grade, team grade, and peer-evaluation grade for further investigation as described below.

Results

Overall, the mean (*SD*) participation grade was 81.71% (13.68). The linear regression analyses showed that participation grades were predictive of each grade component analyzed, with the exception of the oral grades (Table 1). To further examine the oral grade component, the oral grades were separated into their sub-components which consisted of an individual grade, a team grade, and a peer-evaluation grade. These additional analyses revealed that participation grade was predictive of the individual grade component of the total oral grade. A significant regression equation was found ($F(1, 158) = 7.41$, $p = 0.007$) with an R^2 of 0.045 (see Equation 1).

$$\text{Individual Oral Grade} = 0.113\ (\text{Participation Grade}) + 66.98 \quad (1)$$

The remaining analyses of team oral grade and peer-evaluation oral grade did not produce significant results, indicating that overall participation may have a greater impact on individualized work as opposed to team/group work.

Table 1
Summary of Simple Regression Analyses that were Calculated for Each Grade Component

Grade Component	R^2	Equation	ANOVA
Final Grade (n=165)	0.364	Final Grade = 0.365 (Participation Grade) + 42.85	$F(1,163) = 92.23$, $p<0.001$
Test Grade (n=164)	0.164	Test Grade = 0.327 (Participation Grade) + 39.93	$F(1,162) = 31.70$, $p<0.001$
Written Grade (n=158)	0.212	Written Grade = 0.278 (Participation Grade) + 48.60	$F(1,156) = 41.98$, $p<0.001$
Oral Grade (n=158)	0.016	Oral Grade = 0.044 (Participation Grade) + 71.15	$F(1,156) = 2.57$, $p<0.111$

Note. Included is the R^2 value, the regression equation produced, and the resulting Analysis of Variance (ANOVA) which determined the significance level.

Discussion

In this study, we investigated whether students' participation grades were predictive of their overall achievement (final grade) in the course, as well as whether students' participation grades were differentially predictive of their grades for different categories of assessments (tests, written, and oral assignments) in the context of a blended course. Our findings indicate that participation grades were predictive of students' grades on both the test and written assessments, but not the oral assessment which took the form of a group-based debate. As discussed further below, the latter result may be linked to the collaborative nature of the debate and the possibility that when students work collectively together, they produce something greater than they could have on their own, or that in group settings individuals may modify their behaviour and work ethic in a manner that is inconsistent with the rest of their work in the course.

The notion that students produce better work when they collaborate with peers in groups vs. working on their own aligns with Vygotsky's (1978) theory that when more able students work with less able students, the latter are better positioned to produce better work than when working alone. On the other hand it may be that stronger students raise the standard of the group work thus raising the overall average of the group. Nonetheless, the results of past research demonstrates that students perform better when they work in groups compared to when they work alone (Stenlunda et al., 2017; Mbalamula, 2018), which could explain why it might be that participation assignments that are completed independently by students are not predictive of their grades in group-based work. However, in this study, more than half of the participation assignments were group based, which may prompt questions about what impact the level of alignment between participation and other course assessments might have on whether participation grades are predictive of achievement in a course.

As noted above, one might question whether the relation between participation and assessment depends on the level of alignment between what students did to complete the participation assignments and what they did to complete the other assessments in the course. In this study, students' participation consisted of both group-based work that was completed in person, as well as independent work that was completed online. Moreover, the group-based participation work was application based, requiring students to apply theories or methods that were covered in the course to argumentative passages. In contrast, the independent

participation work was reflective, requiring students to respond to theories learned based on personal experiences. Importantly, the method of delivery (face-to-face vs. online) used for participation may be second to what students actually do for participation in the course. For example, in contrast to how online participation was assigned to independent work in the present study, Gharmallah (2017) and Zhang (2016) both reported using online discussion forums in a manner that required students to work collaboratively with their peers, thereby opening up the channels for student-to-student, student-to-instructor, and instructor-to-students asynchronous communications. Future research should continue to investigate the impact of independent vs. group-based participation on students' achievement using different types of assessments and delivery methods (online vs. face-to-face).

Another relevant question in the context of blended courses is how much participation work students should complete online. In the context of a blended course, Cavanaugh and colleagues (2016) investigated whether students' level of participation in an online learning environment, specifically a LMS, was correlated with their achievement in the course. Participation was quantified by the number of times students signed into the LMS and the amount of time they spent on the LMS. The findings of the study showed that students who logged onto the LMS with intermediate frequency (mean number of login times across students within the 18-week semester of the course was 18.7 logins) compared to the rest of the students in the class, and for an average session length (mean session duration across students was 1.26 hours) tended to achieve the best outcomes in the course, whereas students who logged into the LMS near the lower or higher end of times (minimum and maximum login times throughout the duration of the course was 1 and 80, respectively) received lower grades. Based on the results of their model, Cavanaugh and colleagues approximated that the optimal combination of login times and session length was roughly 22 logins with an average session length of 63 minutes. Though this question of identifying the ideal quantity of participation is important, it should be paired with considerations of the quality of participation, as past research suggests that both the quantity and quality of students' participation are associated with academic achievement (Song et al., 2019).

In the context of an online course, Song and colleagues (2019) found that the quality and quantity of students' online forum posts was positively associated with their achievement in the course. Providing further support for the importance of the quality of students' engagement, Bonafini and colleagues (2017) found that the quality of students' engagement in discussion forums and with videos was positively related with their achievement in the context of a massive open online course. Similarly, Bettinger and colleagues (2016) found that more active participation in discussion forums was linked to higher achievement in the course. Moreover, the results of an investigation on students' online participation and achievement in a course by Banoor et al. (2018) shows that engaging students in online activities that require higher levels of critical thinking is linked to better grades. Future research should continue to investigate how to optimize the use of the online components of blended courses, specifically in terms of both the quality and quantity of participation activities.

The reported relation between students' participation performance and performance on assessments that call for independent vs. group-based work may be unique to the present course. This potential uniqueness may be attributable to the level of alignment between the participation assignments and other course assessments, the students enrolled in the course and the course instructor, the learning environment, and/or factors associated with the institution in general (e.g., culture, curriculum policies). Future research should investigate further the generalizability of the present findings. Nonetheless, our findings speak to matters related to course design in a blended learning context, with emphasis on the importance of a participation component in the course. Firstly, given that our findings indicate that students' participation grades are predictive of their grades on assessments that are completed individually, course

instructors should encourage their students to engage with the course material in a meaningful and thoughtful manner. To do so, instructors could allocate a portion of students' final grade to participation in the course, and further, make these assignments low-stakes, frequent, and consistently distributed throughout the course (e.g., assigning a participation grade to students for each class).

Secondly, students may also benefit from knowing the main findings of this study (that participation grades are predictive of their grades on assessments that are completed independently), which could lead them to use the feedback they receive on their participation assignments to assess what study strategies, note-taking practices, etc. are effective for them; having this insight would help students make informed decisions about their academic practices and adjust their behaviour accordingly. Along these lines, participation assignments should be low-stakes and distributed consistently and frequently throughout the course to motivate students to stay engaged with the material and to provide continuous feedback to students.

Participation assignments in the course under investigation were used in the manner outlined above. In future offerings of this course, low grades on participation assignments could also be used to identify students who are likely to benefit most from additional academic support and/or resources (e.g., meeting with the instructor and/or teaching assistant outside of class to clarify key concepts, workshops and other resources offered by the institutional learning centre). Connecting students with the help they need in a timely manner could enhance their learning trajectory in a course. Moreover, if participation assignments are assigned frequently and consistently and the corresponding feedback is provided promptly to students, it is more likely to catch students in need of help before they fall too far behind in the course. Moreover, in cases where a large proportion of students score poorly on an assignment, the instructor could adapt subsequent lectures and class activities accordingly.

Conclusion

In this study, we investigated whether students' participation was (a) predictive of their overall grade in the course and (b) differentially predictive of their grades on three different types of course assessments: tests (tests and quiz), written assignments (essay and argumentative letter), and oral assignment (debate). Our results demonstrate that students' participation grades were predictive of their overall grade in the course and their grades on both the test and written assessments, but not the oral assessment; whereas the latter assessment took the form of a group-based activity, the former assessments consisted of work that was completed independently. Thus, our findings demonstrate that students' participation grades are predictive of their grades on assessments that are independent vs. group-based, at least in the context of the present blended course.

Although this research was conducted in a particular educational context, and caution is needed in making generalizations until more research demonstrate similar results, our findings may nonetheless help inform course design in a blended learning context. Specifically, given that our findings show that low-stakes participation grades are predictive of overall achievement in a course, frequent, low-stakes participation assignments that are distributed consistently throughout a course may help motivate students to engage in the relevant material throughout the course. Additionally, if students receive timely feedback, they could use this information to help inform their decisions about their academic practices and behaviours. Course instructors could also use participation grades to identify students who would likely benefit most from additional academic support and advise them accordingly. Moreover, instructors could also adapt their subsequent lectures according to students' responses on participation assignments. Future research should investigate the impact of both the delivery

method (online vs. face-to-face) and nature (independent vs. group-based) of the participation activity on how students' participation relates to their achievement in a course.

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Appendix
Regression Analysis Assumptions

Table A1

Summary of the Statistical Results Used to Check the Regression Assumptions

Grade Component	Independent Errors Durbin-Watson[1]	Outliers – Standardized Residual[2] (Min; Max)	Collinearity Tolerance[3]	Collinearity – Variance Inflation Factor (VIF)[4]
Final Grade	1.88	-3.01; 3.24	1.00	1.00
Test Grade	2.01	-2.84; 2.25	1.00	1.00
Written Grade	2.00	-3.21; 1.88	1.00	1.00
Oral Grade – Overall	1.88	-2.98; 2.15	1.00	1.00
Oral Grade – Individual	2.13	-2.39; 1.95	1.00	1.00
Oral Grade – Team	1.50	-2.74; 2.52	1.00	1.00
Oral Grade – Peer Evaluation	1.82	-1.69; 2.16	1.00	1.00

Note. [1]Range between 1-3, as close to 2 as possible; [2]Range between ±3.29; [3]Value >0.1; [4]Value <10.