Title: Skills for learning: An imperative foundation
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Extended Abstract

Many students acquire basic learning skills through special workshops, previous learning experiences, classroom exercises, counselling services, and peer or instructional tutoring. Not all students receive these opportunities, and the extent of learning development will necessarily vary across these students. Instilling learning skills in university students is a goal shared by many higher education instructors who seek to prepare students for postgraduate, real-world situations. The reality is that despite the necessity of these skills, many incoming students lack the ability to learn effectively. Professors often also do not have time to ensure students have the necessary skills to be successful.

Our study compared the midterm and examination performance of students who received two learning modules (text reading and exam strategies) before or after the midterm evaluation. Student motivation, interest, and perceived effectiveness were also assessed. As a benchmark, student performance was compared to those who did not complete either module. We also determined when the two learning modules would be ideally delivered for optimal effectiveness – before/after the midterm. It was expected that students who receive learning modules will show improved performance over time.

Study-1: Method

The first-year psychology class at a midsized Canadian university is offered in two large daytime sections (same instructor), plus two evening sections (separate instructors). Daytime students self-selectedly divided into those who completed the modules (n=398) and those who did not (n=427).

Two modules (viz. time management and exam strategies) were presented in twenty-five minute labs to students either before (n=220) or after (n=178) the course midterm conducted six weeks after the start of the semester. With completion of the modules, students indicated their age, sex, and the extent to which they believed they were (a) interested in, (b) motivated by, and (c) focused on the two modules presented (as each was measured on a 5-point Likert scale, where 1='strongly disagree' and 5='strongly agree'). Using this same scale, students also rated the extent to which they believed the modules had the potential to be effective in their learning, and that they were presented in a way that could be readily incorporated into their own future studies. Finally, students were asked whether they believed the two modules were presented at an appropriate time in the course, or should have been presented earlier or later in the semester. Midterm and examination scores were merged with the survey to compare module perceptions to test performance.

Study-1: Results

With alpha=.05 for all tests, we caution the reader that our high sample size may yield significant (though trivial) effects. Results showed no significant difference (in midterm or exam performance, and survey perceptions) between students who completed the modules before or

after the midterm ($ps > .05$). However, several differences were significant when comparing students (in the same lecture) who completed the modules to those who did not. That is, students given the modules performed significantly better on (a) the midterm, $t(806) = 4.39$, $p < .001$ (Ms = 62.87% vs. 59.77%); and (b) the exam, $t(806) = 3.88$, $p < .001$ (Ms = 61.69% vs. 58.42%). Furthermore, compared to students without modules from the evening section ($M=60.18\%$,), students who received modules performed significantly better on the midterm, $t(657) = 2.92$, $p = .004$; but not the final examination ($p > .05$).

Using only students who completed the modules, there were no significant differences in perceptions of their relative (a) interest in ($M=3.49$, $SD=.94$), (b) motivation by ($M=3.31$, $SD=.93$), (c) focus on ($M=3.40$, $SD=.91$), (d) effectiveness ($M =3.75$, $SD=.72$), and (e) likelihood to use what was learned from the modules in future classes ($M=3.79$, $SD=.95$). Finally, students who completed the modules *before* the midterm evenly believed the timing of modular presentation was appropriate (49.8%) vs. wishing it to have been presented earlier in the course (50.2%). However, most students completing the modules *after* the midterm (74.6%) wished they had been presented earlier, $\chi^2 (1, N=398) = 23.97$, $p < .001$.

Study-1: Discussion

Overall, students who completed modules scored significantly higher on both midterm and examination than students who did not. Furthermore, the moment in the course when the modules were presented (before or after the midterm) was related to performance on neither the midterm nor examination. When asked if the modules were timed appropriately in the course, students receiving pre-midterm modules were evenly divided, but three-quarters of students receiving post-midterm modules believed an earlier presentation to have been ideal (though presentation time made no significant difference to performance).

These results raise additional questions. We then wanted to determine which students received learning modules or specialty training prior – recently or not. This can be assessed as a covariate to exclude data from analysis. Another anomaly involves higher midterm scores for students who received modules *after* the midterm compared to those who would never receive modules. Whereas the examination score is truly the main dependent variable of interest, it remains an odd effect, warranting replication.

Study-2: Method

The first-year psychology course at the same university was, in this case, offered in two large daytime sections (same instructor) and three afternoon/evening sections (separate instructors). Daytime students self-selectedly divided into those who completed the modules ($n=352$), either before ($n=209$) or after the midterm ($n=143$); and those who did not ($n=415$).

Two modules (viz. time management and exam taking strategies) were presented again in twenty-five minute labs to 150 students before and 81 students after the midterm (conducted six weeks after the start of the semester) and 88 students did not receive modules. Upon modular completion, students indicated their age, sex, and the extent to which they believed they were (a) interested in, (b) motivated by, and (c) focused on the two modules presented (as each was measured on a 5-point Likert scale, where 1='strongly disagree' and 5='strongly agree'). Using this same scale, students also indicated the extent to which they believed the modules had the potential to be effective and were presented in a way that could be readily incorporated into their

own studies. Finally, students were asked whether they believed the modules were presented at an appropriate time in the course or whether they should have been presented earlier or later. Students' examination scores were merged with these survey data to compare module perceptions to student test performance.

Study-2: Results

There were no significant differences (in exam performance and survey perceptions) between students who completed the modules before or after the midterm (i.e., early or late in the semester; $ps > .05$). However, some differences were significant when comparing students who completed the modules to those who did not; specifically, students who received modules performed better on the exam ($Ms = 59.55\%$ vs. 56.89%), $t(1083) = 2.95$, $p = .003$. Whereas differences were not significant between exam scores in the two pre-midterm module sections ($p > .05$), exam scores were higher for post-midterm modular students in the daytime (compared to evening) section; $t(291) = 2.28$, $p = .023$.

Most students who completed the modules *before* the midterm believed it to be at the appropriate time (61%, though 39% wished it even earlier). However, a greater percentage (75%) of students who received modules *after* the midterm also wished them presented earlier, χ^2 (1, $N=483$) $= 61.35$, $p < .001$. There were several significant survey differences concerning when students received modules. For perceived interest in modules, students receiving modules *before* the course midterm were significantly less interested ($n=280$, $M=3.47$, $SD=1.02$) compared to students receiving modules *after* the midterm ($n=204$, $M=3.74$, $SD=.82$); $t(477) = 3.21$, $p < .001$. Moreover, for perceived motivation to learn the modules, students receiving modules *before* the midterm were significantly less motivated ($n=280$, $M=3.44$, $SD=.93$) than students receiving modules *after* the midterm ($n=205$, $M=3.65$, $SD=.84$); $t(481) = 2.56$, $p = .010$. Finally, for level of focus on the modules delivered, students receiving modules *before* the midterm were significantly less focused on the modules ($n=278$, $M=3.50$, $SD=.93$) compared to students receiving the two modules *after* the midterm ($n=206$, $M=3.66$, $SD=.81$); $t(477) = 2.00$, $p = .046$. Thus, it appears that students see more value in the learning modules after having more obviously required the skills covered in the modules.

Study-2: Discussion

Results of the second study mirror those of the first – students completing modules performed significantly better on the examination than student who did not; timing of modular presentation (before/after the midterm) did not affect examination performance. When asked if presented at the appropriate time, almost three of five students believed the timing was suitable, whereas three of four students receiving modules *after* the midterm advocated for an earlier presentation (even though time of module presentation made no difference in examination results). However, time of modular presentation did affect students' perceptions of the value of the exercises; since each of interest, motivation, and focus were lower among those students who completed modules before the midterm. This suggests that students who performed poorly on the midterm could have taken the modules more seriously in an effort to finish the semester with a better overall score in the course.

General Discussion

Students attend classes with a variety of educational foundations and skills; these learning modules will ensure students receive a rich educational skill set by which to enhance effective learning in today's context of higher learning. Please note the correlational nature of these studies precludes any causality. It is possible that our results could have resulted from several other factors such as personality, varying stress, motivational differences, even tutoring or mentoring. For example, one may attribute test performance differences to student motivation, improved through training in general learning skills. Students also self-selected into participating in the learning modules and thus differences in motivation could have made a difference. That being said, given the introduction of control groups in this study, a similar level of individual differences is assumed to be equivalent in both groups and thus minimizes this explanation.

This study targets first-year students, and offers enhanced learning skills to ensure success. Our results show that no matter when in the semester students receive learning modules, exam performance was enhanced. It is interesting that the students seemed to recognize the necessity and benefits of the learning modules more so after having had an examination where such skills could be applied. Thus, emphasis on such advantages should be placed prior to examinations in order to equip the students with the necessary tools they need to build a foundation for learning successfully.

Based on previous research and on our own preliminary studies, the next question is to determine whether more students, across campus, could benefit from learning modules delivered in a convenient and widely accessible online format. We propose to develop a program that will adapt the previously in-lab learning modules into online learning modules delivery (e.g., time management, note taking, study, memorization, textbook reading, and test taking skills). Further development of the presentation of such learning modules by including modular testing of knowledge retained and occasional maintenance sessions of learning module content should prove useful. This program would offer many future opportunities to educational institutions across the country by transforming students' learning experiences as they commence post-secondary studies.

Research and applied work have both shown that regardless of the types of delivery format, applicability of learning content appears to be an imperative issue to enhance student's learning experience in the context of higher education (Lim, 2002). The skills presented in our learning modules are not only applicable in nature but they are offered in an applicable way being offered during a course semester where such skills are evidently necessary. The goal for this area of research on teaching and learning should be to continue building more structurally sound foundations of student learning by offering basic learning skills (e.g., time management, exam taking strategies, reading, note taking, and study skills) at the onset of post-secondary studies in order to give students appropriate tools in which to use to forge their future.

References

Lim, D. H. (2002). Perceived differences between classroom and distance education: Seeking instructional strategies for learning applications. *International Journal of Educational Technology, 3(1),* ISSN 1327-7308.