Students Ability to Self-Regulate in a First-Year Experience Health Sciences Course

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Abstract

Purpose: Research has shown students in general do better throughout their post-secondary education if they participated in a First Year Experience (FYE) course. Research questions whether first-year students peform better in face-to-face, online, or blended courses. The purpose of this study was to determine the perceptions of first-year health science students in online and blended learning environments and self-regulation, in a FYE course.

Methods: The study utilized educational design and research tools designed to create and improve teaching and learning practices. For the design of the learning environment, analysis, design, development, implementation, and evaluation (ADDIE) was implemented. Action-based research (ABR) was utilized for analyzing and improving instructional practices. A survey adapted to evaluate self-regulation was used to evaluate perceptions of self-regulation, goal setting, environment, task strategies, time management, help seeking, and self-evaluation and students' perceptions of instructional modality.

Results: A total of 657 students (online n=295 and blended n=362) consented and participated in the study. Majority of online participants (90%) somewhat agreed to strongly agreed in being efficient in goal setting compared to the blended group at 87%. In the area of environment for studying, 95% of online participants reported having a comfortable, distraction-free environment as compared to the blended group (85%). For the category of learning environment (online vs. blended), 94% of online participants reported being comfortable, compared to 85% in the blended. There was low confidence identified among participants (63%) in the categories of time management, environment, help seeking, and task strategies.

Conclusions: Ways to help students improve and expand their self-regulation skills should be developed in the early years of higher education. The study revealed students were not accessing supplemental resources to aid their learning. Therefore, faculty may need to consider streamlining the supplemental resources made available to students, utilizing the ADDIE model to evaluate their course. Increasing faculty and peer face time, could improve self-regulation skills and make students feel a stronger connection to the learning process and potentially overall academic success.

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ABSTRACT

Purpose: Research has shown students in general do better throughout their post-secondary education if they participated in a First Year Experience (FYE) course. Research questions whether first-year students perform better in face-to-face, online, or blended courses. The purpose of this study was to determine the perceptions of first-year health science students in online and blended learning environments and self-regulation, in a FYE course. **METHODS:** The study utilized educational design and research tools designed to create and improve teaching and learning practices. For the design of the learning environment, analysis, design, development, implementation, and evaluation (ADDIE) was implemented. Action-based research (ABR) was utilized for analyzing and improving instructional practices. A survey adapted to evaluate self-regulation was used to evaluate perceptions of self-regulation, goal setting, environment, task strategies, time management, help seeking, and self-evaluation and students' perceptions of instructional modality. **RESULTS:** A total of 657 students (online n=295 and blended n=362) consented and participated in the study. The majority of online participants (90%) somewhat agreed to strongly agreed in being efficient in goal setting compared to the blended group at 87%. In the area of environment for studying, 95% of online participants reported having a comfortable, distraction-free environment as compared to the blended group (85%). For the category of learning environment (online vs. blended), 94% of online participants reported being comfortable, compared to 85% in the blended. In the blended group, there was low confidence identified among participants (63%) in the categories of time management, environment, help seeking, and task strategies. **CONCLUSIONS:** Ways to help students improve and expand their self-regulation skills should be developed in the early years of higher education. The study revealed students were not accessing supplemental resources to aid their learning. Therefore, faculty may need to consider streamlining the supplemental resources made available to students, utilizing the ADDIE model to evaluate their course. Increasing faculty and peer face time could improve self-regulation skills and make students feel a stronger connection to the learning process and potentially overall academic success.

Keywords: self-regulation, online, learning, blended, instruction, perceptions

INTRODUCTION

Even though online education has increased in popularity since the mid-90s, there is a struggle establishing quality digital learning platforms.[1,2] Post-secondary research indicates that a higher percentage of students prefer online and blended formats over in-person learning.[1,3] Blended learning involves a portion of a course being delivered in person and the other portion online or virtually.[4] Similarly, another study including freshmen, noted most first-year students preferred online or blended education.[2] Online education involves a variety of instructional strategies and technologies to aid student learning.[5] However, the question remains if there are any best practices and if there are, should those practices work across the modalities.

A study involving upper-level college students, focusing on perceptions of online learning, did so by measuring student preparedness, time management, communication, and technical competence. In all the subscale measures, student perceptions of online learning rated 4.0 on a 5.0 Likert scale, indicating most students felt confident in their ability to learn online.[3] Due to the shift in the post-secondary student population, universities are looking for ways to transition students during their first year for improving academic success and retention.[6] However, the modality of delivery for first-year experience courses is still be evaluated as it pertains to preparing students for post-secondary education.[6] Another expert conducted a study that concentrated on first-year students and reported most rating their perceptions of learning entirely online or in a blended environment high or very high.[2] First-year students reported high-levels of confidence, motivation, and enthusiasm to learn fully or partially online utilizing the university's learning management system (LMS).

Conversely, in a different study conducted with first-year students in a blended learning environment, 40% reported their preference for traditional, in-person learning.[7] Students like the flexibility, but in large part, did not enjoy blended learning environments compared to traditional, face-to-face.[8] Multiple studies indicated there is significant correlation between student maturity and positive perception and preparedness for the online learning environment.[2,3,8]

There was a significant amount of self-directed autonomy in online learning environments, so self-regulation is considered a key factor in student success in online and blended courses.[1,9] Further, when students lack the skills to be self-directed, motivated, and accountable for their learning, online and blended courses can be a detriment to students' academic outcome.[9] Self-regulation involves having the ability to monitor thinking, behavior, decision-making, and motivation as well as being able to set achievable goals.[10,11,12] After setting achievable goals, students must actively monitor and maintain control over the learning process, especially in blended environments.[11]

Research shows students who are better at self-regulation often reflect on feedback intrinsically and extrinsically to help them achieve academic goals. Intrinsic feedback involves cognitive or affective changes in thinking and comprehension, while extrinsic focuses more on observable activities.[3,12] Understanding the value and correlation between self-regulation, feedback, and academic achievement is just as beneficial to instructors so they can cultivate the appropriate learning environments where self-regulation is emphasized.[10]

While students have higher motivation for learning online, there was no significant impact to their course grade performance.[2] Although not significant, a study found that confidence, good time-management, and higher self-regulation had positive effects on grades.[13] Other studies report higher grade performance related to increased time spent learning online and higher self-regulation.[1,14] In a study that compared separate groups; one online and the other blended, the online students, trended higher grades, and self-regulation and time-management were reported as significantly higher than the blended group.[13]

The purpose of FYE is to provide first-year health science students the tools and resources needed to build a solid foundation for their undergraduate academic success. The college of health science includes students from communication science disorders, exercise science, nutrition, nursing, public health, and sports medicine programs. The cohorts are mixed, regardless of program of study, to support an interdisciplinary approach to learning. Students explore career opportunities with faculty, guest speakers, alumni, current seniors, and administration. Health science students learn the value of time management, communication, teamwork, and social/emotional intelligence as related to their studies, higher-education success, and future careers. Other competencies learned include meta-disciplinary, collaboration, professional skills, and roles and responsibilities of health science professionals. Health science students learn technical, interpersonal, and conceptual skills that will support them during their academic and professional careers.

While several studies exist on the impacts of post-secondary students learning entirely or in-part online, few studies exist on effects specifically on first-year undergraduate health science students. Pairing the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model with Action Based Research (ABR) two professors, teaching a first-year experience (FYE) course for freshman health science majors at a four-year institution, analyzed perceptions, engagement, and ability to self-regulate in online

and blended environments. The purpose of this study was to garner perceptions of health science students on engagement in online and blended learning environments, and ability to self-regulate, in a FYE course at a four-year state university. This study was guided by the following research questions: 1) What are student perceptions of FYE online and blended formats? 2) How do student perceptions correlate with self-regulation? 3) What aspects of online or blended learning helped or hindered students in the course?

METHODOLOGY
Theoretical Framework
The ADDIE model is a common instructional design process used by business and education professionals when building or enhancing learning tools. The ADDIE model has been shown to provide a systematic, well-organized approach to the redesign process in business and education.[15,16,17] ADDIE was appropriate for this study because the model includes five components: analysis, design, development, implementation, and evaluation. ABR was an appropriate addition because it is utilized when someone wants to improve their instructional practices.[18,19]

ABR is introspective in nature, contributing to self-improvement.[20] In ABR, the participant serves a dual role acting internally and externally as a participant and principal researcher.[18,20] Internal research is often controlled by the participant and external by the investigator.[18,19] Utilizing mixed methods in a study is advantageous, both internally and externally, as well as contributing to reliability and credibility. The value of remaining objective and impartial when acting in dual roles and accentuated researcher credibility and reliability through the means of triangulation.[19]

To increase content validity and credibility and decrease the risk of bias in ABR, the investigators utilized a triangulation method.[19] The first point in triangulation, the co-investigators examined data to help ensure objectivity, which is conveyed as peer debriefing. The second point in triangulation was intermittent check-ins with participants to see if they had any questions, remarks, or apprehensions. The final point in triangulation was piloting the survey to support reliability and content validity of the dual-role investigator. To achieve this, six faculty in other health science programs tested the survey.

Design and Sample
Utilizing ADDIE, in fall 2018, the FYE pilot was run and considered the analysis phase to gather data. The design and development phases of ADDIE were conducted throughout the summer of 2019 for the official roll out across all 5 colleges at the university. Participating faculty members utilized data from the pilot to design and develop a standardized health science FYE course. In fall 2019, the first official health science FYE course was implemented followed by an evaluation period at the end of semester to complete the final two phases of ADDIE. This study focused on two groups of health science students in their FYE course instruction. The first group were freshmen who completed their health science course entirely online and the second in 50/50 blended instruction modality.

This study was approved by the university's institutional review board. A convenience sample of four sections of 907 health science students in a FYE course were included in the study. Participants were greater than 18 years of age and designated as first year students with less than 24-credit hours. In addition, transfer students with less than 24 credits were considered first year students and were required to take the course. All participants, regardless of course delivery modality received the same curriculum and instruction. The students were asked to participate at the end of the semester. There was no compensation or incentives offered to them. To ensure that the participants anonymity and the investigators knowledge of who completed the survey all data was de-identified and summarized as an aggregate to not include specific participant, program, or section identifiers. Students received a digital and written statement explaining the purpose of the study. A statement was provided indicating that the study was completely voluntary, and that participation or non-participation would not affect their grade in the course. Consent was obtained prior to completing the survey. The survey was administered during class time taking approximately 15 minutes to complete. During the digital administration of the survey the instructors left the room to ensure anonymity in those completing the survey and prevent participants from feeling pressure from the instructor to participate.

Survey Development
This survey was informed by previous work, which focused on measuring self-regulation in online and blended learning environments.[1] They demonstrated stronger student preference to online learning and significant connection between student performance and their ability to self-regulate in online and blended courses. The survey was adapted for this study to evaluate self-regulation for online or blended learning.[1] There were two sections of the survey; one that collected perceptions of self-regulation, goal setting, environment, task strategies, time management, help seeking, and self-evaluation and the other perceptions of instructional modality. A Likert Scale was used for rating the participants agreement with the statements (strongly disagree to strongly agree). A Cronbach Alpha analysis was completed prior to administering the survey resulting in a score of .981.

RESULTS
A sample population (N=657), broken into online participants (N=295) and blended (N=362), consented and participated in the survey. The data analysis was based on the three research questions.

Student Perceptions of FYE Online and Blended Formats
Participants in the online group reported higher agreement to the statements related to goal setting, study environment, task strategies, time management, help seeking, and self-evaluation than the blended group. Ninety percent of the online group somewhat agreed to strongly agreed in being efficient in goal setting compared to the blended group at 87%. Although not significant the correlation between goal setting and the final course grade was better in the blended group. Ninety-five percent of participants in the online group reported having a comfortable, distraction-free environment to study as compared to the blended group (85%). Having these characteristics potentially contributed to the positive, better grade performance for the online group as compared to the blended.

Sixty-eight percent of the online group and 61% of the blended, responded somewhat or strongly agree to the task strategy questions. Most participants 72% in the online group reported they somewhat agreed to strongly agreed they were efficient at time management, compared to 69% in the blended group. Most, 86% of participants in the online group stated they somewhat agreed to strongly agreed they were willing to and comfortable seeking help from faculty and peers compared to 81% in the blended group. Similarly, 88% participants in the online group indicated they somewhat agreed to strongly agreed they were confident with their ability to accurately self-evaluate compared to 72% in the blended group. (See Figure 1).

Figure 1. Comparison of Self-Regulation Catagories
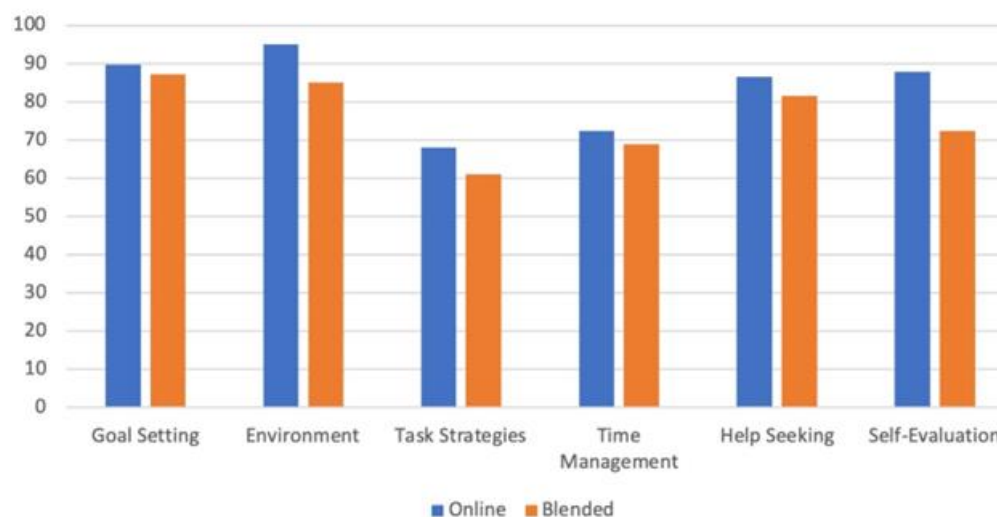
How Student Perceptions Correlate with Self-regulation
Although not statistically significant, of the final course grades 86% of participants in the blended group earned A or B compared to 82% in the online group. To further determine the answer to this research question, both groups were asked about their perceptions on modality. Like data from the first research question, 94% of participants in the online group reported being comfortable with their learning environment (online vs. blended) compared to 85% in the blended.

Aspects of Online or Blended Learning that Helped or Hindered Students in the Course
A pattern of low confidence was identified among blended participants (63%) in the categories of task strategies, time management, environment, and help-seeking. Health science students reported not spending as much time or putting the same effort into their online courses as their in-person course. Additionally, participants noted rarely putting in extra effort because the course was either completely or partially online. Participants stated the online and blended environment did not help them learn the material as well because they were not able to ask real-time questions. Sixty-three percent in the online group and 50% in the blended group did not utilize the additional resources to aid their learning. From a qualitative standpoint, there were two main themes that emerged as reasons students did not utilize the additional resources. The first theme was no points were attached to using the resources,

therefore no penalty for not using them. The second common theme referenced the students knew the additional resources were not part of regular in-class discussion, so they were held accountable for utilizing them. Finally, seventy-two percent of the online group and 51% of the blended felt connected enough with their classmates and professors to seek help. (See Table 1).

Table 1. Sample Categories of Self-Regulation Questions

Sample Category	Self-Regulation Questions
Goal Setting	I set standards for my assignments in online courses. I set short-term (daily or weekly) goals as well as long-term goals (monthly or for the semester. I keep a high standard for my learning in my hybrid/online courses. I don't compromise the quality of my work because it is online.
Environment	I find a comfortable place to study. I choose a time with few distractions for studying for my hybrid/online courses.
Task Strategies	I try to take more thorough notes for my online courses because notes are even more important for learning online than in a regular classroom. I read aloud; instructional materials posted online to fight against distractions I work extra problems/questions in my online courses in addition to the assigned ones to master the course content.
Time Management	I allocate extra studying time for my hybrid/online courses because I know it is time demanding. I try to schedule the same time every-day or every week to study for my hybrid/online courses, and I observe the schedule. Although we don't have to attend daily class, I still try to distribute my studying time evenly across days.
Help Seeking	I share my problems/questions with my classmates online so we know what we are struggling with and how to solve our problems. I am persistent in getting help from the instructor throughout the semester.
Self-evaluation	I summarize my learning in hybrid/online courses to examine my understanding of what I have learned. I communicate with my classmates to find out what I am learning that is different from what they are learning.

DISCUSSION

Extra resources made available for participants throughout the course to supplement their learning were not utilized much. The purpose of this study was to garner perceptions on engagement in online and blended learning environments, and ability to self-regulate, in a health science FYE course. Student perceptions of taking courses online during their first year and their ability to self-regulate were identified. As in a similar study, students reported high ratings in their perceptions of learning entirely or partially online.[2] Other studies reported higher grade performance and increased effort put into online course work.[1, 14] In contrast, this study did not find significant improvement in grade performance within or between the groups. Also, students reported not putting in as much effort purportedly due to flexible deadlines associated with their first-year experience course.

Extra resources made available for participants throughout the course to supplement their learning were not utilized much possibly because there were no points assigned, poor time management, or students were overwhelmed by the quantity. The modality of learning (online vs. blended) and time spent interacting directly with faculty and peers influenced feelings of having a stronger connection and were more likely to ask for help. The researchers speculate that the online group had more synchronous face time with their professors than the blended. Both modalities included asynchronous/synchronous time with online being 50%

synchronous and blended 30%. Therefore, faculty may need to consider utilizing the ADDIE model to evaluate their course for streamlining the supplemental resources and percentage of time engaged directly with students (synchronous vs. asynchronous).

The results from this study continue to question whether first-year health science students are ready to effectively learn online. Reported student perceptions for self-regulation were not consistent with grade performance and use of resources. Similarly, to Broadbent et al. the online group reported higher self-regulation.[13] Participants in the online group reported higher self-regulation but this did not correlate with their grade performance. The relationship between student perceptions, self-regulation, readiness to learn online, and grade performance was inconsistent and the need for further research. While the online group reported being more comfortable with their learning environment and modality of the course, their overall grade performance was still lower than the blended group. The difference in final grade performance was not significant between groups, therefore the question remains if first-year students are ready to learn completely online. In this study, the blended group scored higher in final grades, suggesting first-year students may have some ability to self-regulate, but still need direct guidance in accountability to regulate their course participation. Additionally, these findings suggest first-year students could benefit from more face-to-face instruction to learn more effectively and gain the skills. Perhaps the blended model with similar face-to-face time that was offered in the online (50% synchronous) could create a more conducive learning environment.

Strengths and Limitations
A strength of the study was the amount online teaching experience of the faculty participating in the FYE course. A majority of the faculty had greater than 10 years of experience teaching and developing online courses. Another strength was the administrative and academic affairs support for participating faculty. This enabled adequate access to resources, such designated instructional design staff for effectively executing the course.

One challenge was being able to delineate if self-regulation and grade performance was caused by students dropping out without withdrawing from the course or the online teaching experience of the faculty. Perhaps providing more training to less experienced faculty teaching online, and first-year students could enhance student performance during their first year.

The final limitation was the amount of influence faculty had over students' ability to self-regulate. Since the course is 4 credits, there is high risk to negatively impacting GPA and leading course remediation. At midterm, faculty noticed a higher number of students underperforming (C- or less). This led to concerns by the faculty of the students' ability to self-regulate and complete the course successfully. The purpose of the course is to enhance students' academic success. The faculty decided to provide extended due dates, accepted late work, offered make-up and remediation time, and ramped up reminder communication. By the end of semester after all the faculty influence promoting self-regulation, final grades were recorded. In the online group 81% earned As and Bs, 9% with Cs, and 10% Ds and Fs. In the blended group, 86% earned As and Bs, 6% with Cs, and 8% with Ds and Fs.

CONCLUSION
As researchers and educators, it is difficult to determine if first-year students can study and learn independently. Therefore, expecting them to learn partially or entirely online during their first year may be a detriment to academic success. Consideration of ways to help students develop or expand their self-regulation skills are needed to be developed in the early years of higher education.

REFERENCES
1.   Barnard L, Lan WY, To YM, Paton VO, Lai S. Measuring self-regulation in online and blended learning environments. *Internet High Educ*. 2009;12(1):1-6. doi.org/10.1016/j.iheduc.2008.10.005
2.   Fearnley M, Malay C. Assessing students' online learning readiness: Are college freshmen ready? *Asia Pac Soc Sci Rev*. 2021;21(3):249-259.
3.   Martin F, Stamper B, Flowers C. Examining student perception of readiness for online learning: Importance and confidence. *Online Learn J*. 2020;24(2):38-58. doi.org/10.24059/olj.v24i2.2053
4.   Bouilheres F, Le LTVH, McDonald S, Nkhoma C, Jandug-Montera L. Defining student learning experience through blended learning. *Educ Inf Technol*. 2020;25(4):3049-3069. doi.org/10.1007/s10639-020-10110-y
5.   Steele J, Holbeck R, Mandernach J. Defining effective online pedagogy. *J Instr Res*. 2019;8(2):5-8.
6.   Ahadi D, Pedri J, Nichols L. Implementing a first-year experience curriculum in a large lecture course: Opportunities, challenges, and myths. *Can J High Educ*. 2019;49(2):72-89. doi.org/10.47678/cjhe.v49i2.188241
7.   Tomas L, Evans N, Doyle T, Skamp K. Are first year students ready for a flipped classroom? A case for a flipped learning continuum. *Int J Educ Tech High Educ*. 2019;16(5):1-22. doi.org/10.1186/s41239-019-0135-4
8.   Williams B, Horner C, Allen S. Flipped v's traditional teaching perspectives in a first year accounting unit: An action research study. *Account Educ*. 2019;28(4):333-352. Doi.org/10.1080/09639284.2019.1609536
9.   Zimmerman B. Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *Am Educ Res J*. 2008;45(1):166-183. doi.org/10.3102/0002831207312909
10. Nonthamand N, Suaklay N. Self-regulation students' online learning behavior in general education courses of University of Phayao. *Int J Emerg Technol Learn*. 2021;16(14):269-278. doi.org/10.3991/ijet.v16i14.19897
11. Zheng B, Ward A, Stanulis R. Self-regulated learning in a competency-based and flipped learning environment: Learning strategies across achievement levels and years. *Med Educ Online*. 2019;25(1686949): 1-7. doi.org/10.1080/10872981.2019.1686949
12. Nicol D, MacFarlane-Dick D. Formative assessment and self-regulated learning: a model and seven principles of good feedback practice. *Stud High Educ*. 2006;31(2):199-218. doi.org/10.1080/03075070600572090
13. Broadbent J, Sharman S, Panadero E, Fuller-Tyszkiewicz M. How does self-regulated learning influence formative assessment and summative grade? Comparing online and blended learners. *Internet High Educ*. 2021;50. doi.org/10.1016/j.iheduc.2021.100805
14. Calafiore P, Damianov D. The effect of time spent online on student achievement in online economics and finance courses. *J Econ Educ*, 2011;42(3):209-223. doi.org/10.1080/00220485.2011.581934
15. Instructional design central. Updated 2022. Accessed September 3, 2022. https://www.instructionaldesigncentral.com/addie-model
16. Novalic F, Azizovic E, Selimovic F, Saracevic M. The importance of implementing a multimedia application created according to the ADDIE instructional design model in writing and reading the letters of the alphabet. *Croatian J Educ*. 2021;23(1):217-253. doi.org/10.15516/cje.v23i1.3888
17. Shibley I, Amaral KE, Shank JD, Shibley L. Designing a Blended Course: Using ADDIE to Guide Instructional Design. *J Coll Sci Teach*. 2011;40(6):80-85.
18. Herr K, Anderson G, eds. *The Action Research Dissertation: A Guide for Students and Faculty*. SAGE Publications; 2015.
19. Hendricks C, ed. *Improving Schools Through Action Research: A Reflective Practice Approach*. Pearson Education Inc; 2017.
20. Sagor R, ed. *The Action Research Guidebook: A Four-stage Process for Educators and School Teams*. Corwin; 2011.